Working Paper:

Optimizing Teaching and Learning in the Middle Grades

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Introduction

How do we optimize student learning in the middle grades? For well over a century, educators have grappled with this question as they have designed and redesigned schools for early adolescents (Lounsbury, 2015; National Education Association, 1899). For much of this time, aligning schools to students' developmental needs has been a primary goal (National Middle School Association [NMSA], 2010). And while full implementation of this concept has yielded positive student outcomes, the results from partial implementation are often disappointing (Felner, Jackson, Kasak, Mulhall, Brand, & Flowers, 1997; McEwin & Greene, 2011).

The current U.S. policy and school reform context, however, presents new opportunities for developmentally responsive teaching and learning. Once largely marginalized from national policy, responding to the needs of early adolescents now resonates with more mainstream reforms and associated mandates, including calls for deeper learning (Huberman, Bitter, Anthony, & O'Day, 2014); the proliferation of state mandates for personal learning plans and personalized learning (Netcoh, 2017); and the adoption of standards that emphasize 21st century skills, such as the Common Core State Standards, Next Generation Science Standards, and the C3 Framework.

We know a great deal about early adolescents' developmental needs (Williams, Mims, & Johnson, 2019). These needs can inform a positive school culture and climate (Debnam & Bottiani, 2019), as well as the organizational structures and types of school leadership suitable for schools that serve this age (Meyers, Sanzo, & Taylor, 2019). Yet, what about the nature of teaching and learning? What is the nature of learning experiences that are developmentally appropriate for middle grades practice?

Eccles and Roeser (2011) identified two aspects of academic work that are particularly important for adolescents' development: "the content of the curriculum in terms of its intellectual substance and its consideration of global social – historical realities (e.g., Noddings, 2005)" and "the design of instruction to cultivate interest, meaningfulness, and challenge as well as deep cognitive, emotional, and behavioral

engagement with the material (Fredricks, Blumenfeld, & Paris, 2004)" (p. 226). In this paper we consider aspects of curriculum and instruction that respond to young adolescents' needs for autonomy, belonging, competence (Deci & Ryan, 1985; Williams, Mims, & Johnson, 2019; Skinner & Pitzer). We also consider the complex role that students' identity exploration plays in this work. Along the way, we re-frame the deficit perspective too often applied to this age group and lay out critical, evidence-based approaches consonant with developmental needs.

Teaching to Support Autonomy

Young adolescents often express desire for greater autonomy and independence (Williams et al., 2019). Indeed, during middle school, many students find their need for increased autonomy clashing with a school environment characterized by increased teacher control and reduced opportunities for decision-making (Eccles, 1999). This at times results in conflict, as "adolescents, compared with children, come to disagree with adults' judgments that they are not ready to display agency and control over personal choices" (Yeager, Dahl, & Dweck, 2018, p. 5). It is not surprising, then, that as students assert their readiness for greater responsibility, disagreements grow increasingly common. As a result, young adolescents earn a reputation for being stubborn and strong-willed.

How might educators leverage this desire for autonomy to advance student learning? Autonomy-supportive educators capitalize on students' need for greater independence by creating opportunities for student agency and choice; they invite and consider students' opinions (Reeve, 2009; Skinner, Pitzer & Brule, 2014; Williams et al., 2019). In so doing, they influence student engagement, enthusiasm, motivation, and foster deeper learning (Noguera, Darling-Hammond, & Friedlaender, 2015; Skinner, Pitzer & Brule, 2014; Su & Reeve, 2011). Research suggests that empowering pedagogies that offer greater autonomy, such as those rooted in student-centered learning, hold potential for fostering engagement and achievement of early adolescents. Research also illustrates that middle schoolers benefit

from developing capacities, such as executive function and metacognition, that enable them to be successful in those more autonomous learning environments. We discuss both in the section that follows.

Student-Centered Learning

A number of teaching approaches respond to students' desire for increased independence and responsibility, many of which have roots in student-centered learning. Bush and Saye (2000) provide a succinct summary of this often nebulous term:

> Student-centered learning environments are designed to provide students with opportunities to take a more active role in their learning by shifting the responsibilities of organizing, analyzing, and synthesizing content from the teacher to the learner (Means, 1994). These environments allow students to examine complex problems using a wide variety of resources, develop their own strategies for addressing these problems, and present and negotiate solutions to these problems in a collaborative manner (Hannafin, Hill, & Land, 1997). (p. 129)

Whether called student-centered learning, student-directed learning, learner-centered pedagogy, experiential learning, learner-centered instruction or another related term, instruction that places students in greater control of their learning goals, tasks, actions and outcomes is a strong developmental fit for this age group.

Student-centered learning has been shown to play an important role in a range of young adolescent outcomes, including achievement, attitudes toward subject matter, reflection, engagement and behavior. Odom and Bell (2015) found positive associations of student-centered practices with early adolescents' science achievement and attitudes toward science, whereas teacher demonstrations, which were negatively associated with achievement, provided "insufficient opportunity for students to develop and understanding of the processes of science or to make use of procedural knowledge in developing conceptual understanding" (p. 93). Similarly, art classrooms that employed learner-centered pedagogy, defined as emphasizing inquiry, self-direction and connection making, have been positively correlated

with students' quality of thinking (Ingalls Vanada, 2016). Middle schoolers perceived that student-centered learning, particularly that which was active, collaborative and exploratory, helped to prompt and support their reflective thinking (Song, Koszalka, & Grabowski, 2005). Further, when engaged in learner-centered math and science classes, students reported that their classes were more engaging, school was less boring, and they were less afraid of their teachers; their teachers concomitantly asserted that students were "more engaged, better behaved and performed better academically" than in traditional settings (Burns, Pierson, & Reddy, 2014, p. 19).

Middle schoolers often report enjoyment of experiential learning opportunities, noting their preference for hands-on, active learning (Bishop & Pflaum, 2005; Greenman, 2013; James & Williams, 2017; Kruger, Jekkals, & Steinfeldt, 2017). Their parents and teachers perceive experiential learning to benefit students' social and emotional learning, and they highlight social skills and 21st century skills, such as critical thinking, collaboration and digital literacy, as particular areas of growth (Greenman, 2013). Students also point to benefits of experiential learning for their non-cognitive growth, such as increased confidence and problem-solving abilities, accountability, and willingness to revise work (Kruger, Jekkals, & Steinfeldt, 2017).

Student-centered learning comes in myriad forms, one of the most prevalent of which is project-based learning (PBL). Project-based learning is a type of experiential learning that is rooted in "complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations" (Thomas, 2000, p. 1). Research has demonstrated that, when compared to students in more traditional classrooms, middle school students engaged in PBL score higher on tests (Koparan & Guven, 2014; Main, 2015; Marx et al., 2004) and report their learning to be more enjoyable and satisfying (Hugerat, 2016).

Research on PBL is not without complications, however. Main found that Black students in the textbook/lecture setting retained information longer than than Black students in the PBL setting. And Kanter's (2009) research on the effects of project-based science curricula in diverse middle school classrooms acknowledged that project-based approaches "can present an unresolved tension between the practical doing and the content learning" (p. 527). These contradictions present particular challenges for teacher preparation. Yet Kanter also offered preliminary evidence that PBL "can be designed in such a way that students can do the performance but at the same time develop a meaningful understanding of the related science content" (p. 546).

Teaching for Cognitive Self-Awareness

As early adolescents assume greater responsibility for their learning, they face the demand for more goal-oriented behaviors, where grades increasingly are based on long-term projects and writing assignments. Executive functions (EF) such as decision-making, action planning, perspective taking, and abstract thinking are critical neurocognitive processes for students to practice and hone as they assume increased responsibility for learning (Luria, 1966). Working memory, and the accompanying ability to organize and plan for long-range tasks, is a strong predictor of students' school success (Langberg, Dvorsky, & Evans, 2013). It is therefore unsurprising that the development of EF can lead to higher GPAs, and that EF scores during the middle grades can predict academic performance in secondary school (Samuels, Tournaki, Blackman & Zilinski, 2016). Similarly, young adolescents' capacity for metacognition, often referred to as thinking about thinking, is central to their academic success in middle school (Sperling, Richmond, Ramsay, & Klapp, 2012). Fortunately, as critical brain regions grow more interconnected in early adolescence, middle schoolers demonstrate increasing cognitive flexibility and become more and more capable of these complex tasks.

Because the relationship between a student's organizational skills and academic performance may be stronger during middle school than in elementary school (Jacobson, Williford, & Pianta, 2011), middle

grades educators play a central role in strengthening students' neural networks and self-awareness. Young adolescents benefit from instructional approaches that enhance their cognitive strategies and help them to regulate and reflect on their thinking. In one study of EF in mathematical problem-solving, middle schoolers were more likely to make progress if teachers explicitly provided cognitive clues and direct instruction on related EF tasks within the lesson context (Kotsopoulosa & Lee, 2012). Explicit teaching of EF can have a particularly powerful effect on disadvantaged students' academic performance, as well as those from diverse cultural backgrounds and those with special learning needs (Kotsopoulosa & Lee, 2012; Langberg, Dvorsky, & Evans, 2013). Relatedly, goal-setting theory suggests that students are more likely to work toward specific outcomes when they have the opportunity to set goals toward those outcomes (Schunk, 2003). Teaching young adolescents how to set and work toward specific goals can improve students' academic performance (Bruhn, McDaniel, Fernando, & Troughton, 2016) and engagement (Rowe, Mazzotti, Ingram, & Lee, 2017). Direct instruction of multiple metacognitive skills also can lead to positive student outcomes (Soodla, Jõgi, & Kikas, 2017; Zepeda, Richey, Ronevich, Nokes-Malach, 2015), particularly for non-native English speakers (Ahmadi, Ismail, & Abdullah, 2013).

Because teaching for cognitive self-awareness calls upon educators to scaffold students' EF and metacognitive strategies, increasing student autonomy in the classroom does not render the teacher irrelevant. On the contrary, to be successful with greater autonomy, students benefit from support and direct instruction from the teacher. They also benefit from developing strong relationships with their teachers. As Williams et al. (2019) reminded us, as students assume greater responsibility, "the developmental task for most teens is about establishing a balance between autonomy and connection (Smetana, 2011)" (p. 11). In the next section, we explore what research tells us about helping students build meaningful connections that foster learning and growth.

Teaching to Foster Belonging

Just as many middle schoolers want to be independent and responsible, so too do they want to fit in and belong to a group. Students' sense of school connectedness, or their belief "that adults and peers in the school care about their learning as well as about them as individuals" (CDCP, 2009, p. 3), has significant implications for their learning and overall well-being. In a study of more than twelve thousand adolescents drawn from the National Longitudinal Study of Adolescent Health, school connectedness was the strongest protective factor for students to decrease school absenteeism, substance abuse, early sexual initiation, risk of unintentional injury, and violence (Resnick, Bearman, Blum, et al., 1997).

Unfortunately, too many adolescents report a low sense of belonging, with student engagement across the globe trending downward into and through the middle years (Organisation for Economic Cooperation and Development, 2000, 2017). As young adolescents exert their need for a sense of belonging, they are often characterized as cliquish, hurtful and prone to bullying. However, these negative behaviors may also be products of a mismatch between their need for affiliation and the opportunities school provides. What if curriculum and instruction worked in sync with the sense of community students need to thrive? What if we helped them strike a healthy balance between their needs for autonomy and connection? Here we consider useful curricular and instructional approaches to building students' relationships with teachers, peers, and the world at large.

Student-to-Teacher Relationships

Students' sense of belonging is influenced by how they feel about their teachers and, importantly, if they believe their teachers respect and value them. Feeling respected by adults is critical at this age and, as Williams et al. (2019) suggested, "approaches that make an adolescent feel valued and worthy of respect may be most effective" (p.15). Indeed, students' perceptions of positive teacher regard have been associated with increased academic achievement and feelings of academic competence, predicting increases in self esteem over time (Roeser & Eccles, 1998). Relatedly, positive teacher regard has been

associated with decreases in depressive symptoms, predicting diminished anger and school truancy (Roeser & Eccles, 1998). .

Positive teacher-student relationships may be particularly important in supporting students with historically marginalized backgrounds. In their review of the academic and social benefits of culturally relevant education (CRE), Aronson and Laughter (2016) identified several studies that demonstrate CRE's benefits to teacher-student relationships. For instance, in Johnson's (2011) three year study of middle school teachers responding to a growing Latinx population, a professional development program grounded in culturally relevant pedagogy, collaborative learning, and inquiry science had a positive impact on teachers' social relations with their students, characterized by mutual respect based on a deeper understanding of students' cultural socio-political experiences. Johnson noted that this increased understanding and respect was part of a broader shift in roles among teachers and students in the course of creating more collaborative and inquiry-oriented environments. Hugerat (2016) found that students in project-based science classrooms, also collaborative and inquiry-oriented, reported significantly better teacher-student relationships than students in a control group. Overall, Barber and Olsen (2004) observed that, "the degree to which students felt supported by their teachers was most consistently predictive of their reported functioning, inside and outside of school" (p. 27).

Student-to-Student Relationships

Like the teacher relationship, peer relationships in early adolescence play a powerful role in academic success (Molloy, Gest, & Rulison, 2011). As Williams and colleagues (2019) asserted, "...adolescents' sensitivity to social stimuli, particularly when it involves social status, increases rapidly, as does their tendency for novelty- and sensation-seeking (Crone & Dahl, 2012)..." While society often focuses on the negative aspects of early adolescents' social nature, educators can leverage these same relationships and this reward sensitivity to promote learning. Students' connectedness to peers can reflect their general inclusion and engagement as well as their access to academic and social support (Elreda,

Kibler, Futch Ehrlich, & Johnson, 2016; Wentzel & Asher, 1995). Peer learning, social emotional learning (SEL) and adventure-based learning (ABL) all demonstrate potential to provide this kind of connection for early adolescents.

Peer learning is one approach to building a positive sense of belonging and interdependence in the middle grades classroom. Defined as any activity "in which students work together to increase their knowledge or complete an assignment, examples of peer learning include cooperative learning, collaborative learning, peer tutoring, cross-age tutoring, learning communities, peer-assisted learning, team-based learning, problem based learning, and many other programs" (Johnson, Johnson, & Roseth, 2010, p. 1). Peer learning approaches that emphasize cooperation and collaboration over competition and individualism fit well with the needs of early adolescents.

Analyzing multiple studies of social interdependence on middle school students, researchers learned that cooperation was associated with increased academic achievement over competition and individualism (Johnson, Johnson, & Roseth, 2010). For students from diverse backgrounds, a sense of belonging may be especially important and complex, as they face substantial ethnic, racial, sociolinguistic and socioeconomic divides when learning in an environment often characterized by middle-class, majority cultural norms (Eccles & Roeser, 2011; Garcia-Reid, Reid, & Peterson, 2005). Peer relationships between ELL and non-ELL students "may help to facilitate student learning for all students and for ELL students in particular" (Elreda, Kibler, Futch Ehrlich, & Johnson, 2016, p. A-4).

Additionally, teaching for social emotional learning (SEL) can support early adolescents' acquisition of skills to collaborate and learn in productive and supportive ways. SEL programs have been found to intervene effectively with bullying perpetration, especially among students with disabilities (Espelage, Rose, & Polanin, 2015). This is especially important because studies suggest that students with disabilities may be at higher risk of involvement than their counterparts without disabilities (Rose, Espelage, & Monday-Amaya, 2009). Similarly, English Learners participating in an explicit SEL

curriculum illustrated increased SEL knowledge and social-emotional resilience (Castro-Olivo, 2014). SEL programs and curricula are not without controversy, however. The National Equity Project cautions that the potential of SEL will only be realized when educators recognize that all learning is social and emotional for all students, and when the concept of self-awareness includes how one's social identities contribute to one's sense of power and agency in various contexts (National Equity Project, n.d.).

Physical and experiential approaches to social emotional learning show particular promise with young adolescents. For example, Adventure-Based Learning (ABL) is rooted in structured, physical, team-building activities that offer students opportunities to practice group communication, collaboration, problem solving and trust (Stuhr, Sutherland, Ressler, & Ortiz-Stuhr, 2015), while also appealing to early adolescents' novelty or sensation-seeking interests. In one study, middle schoolers perceived that participating in ABL promoted their relationship skills and helped them evaluate their respect, communication and leadership (Stuhr, Sutherland, Ressler, & Ortiz-Stuhr, 2015). The study also cautioned that, while students found it to be "enjoyable and fun," they also needed time "to warm up to this type of curriculum…" (p. 35).

Similarly, challenge courses, one type of ABL, can help build trust and respect within middle grades learning communities. Challenge courses have been shown to increase students' locus of control, or "the belief that their behavior and its ensuing consequences are within their control" (Newberry & Lindsay, 2000, p. 41). They have resulted in stronger social relations among students, such as greater group cohesion among middle schoolers (Glass & Benshoff, 2002); enhanced communication and interaction among students; and improved trust in self and others (Battey & Ebbeck, 2013). Hellison's (2011) widely researched Teaching Personal and Social Responsibility (TPSR) model to promote values, character, responsibility and life skills through physical activity has also shown promise. In their systematic review of the research on the TPSR model, Pozo, Grao-Cruces and Péréz-Ordás (2016) cited

evidence of a wide range of social-emotional and academic benefits to students, including improved

conflict resolution, empathy, caring, relatedness, and self-efficacy.

While these outcomes are promising, the research on SEL in the middle grades is complex and

the implementation of SEL approaches clearly matters. One study of a school-based, year-long SEL

program showed no effects on social, emotional and civic attitudes, but was associated with reductions in

failing grades and skipping classes, suggesting that SEL still may have positive effects on behaviors

related to academic success (McBride, Chung & Robertson, 2016).

Student-to-World Relationships

Finally, young adolescents' need for connectedness and belonging can also be met through

affiliation with their local or global community. In contrast to popular characterizations of young

adolescents as aloof or disinterested in the world beyond themselves, early adolescence is marked by just

the opposite. As Williams et al. (2019) described, early adolescents grow increasingly interested in the

world around them; share its questions and concerns; and desire a wider network of relationships beyond

their family and school. Research into youth-adult partnerships and civic development illustrates that

youth achieve positive outcomes when the freedom to make decisions is coupled with trust and

power-sharing from adults (Zeldin, Gauley, Krauss, Kornbluh, & Collura, 2017). They benefit from

opportunities for civic engagement as they pursue agency in the world, imagine their future selves, and

seek purpose for schooling itself. Because not all students have the same rich opportunities for civic

engagement through after-school and out-of-school learning (Vossoughi, 2017), middle schools can

increase equitable access to such rich learning opportunities by integrating approaches like service

learning into the curriculum.

Service learning, broadly defined, is a curricular approach in which students explore community

problems; develop and implement plans to solve those problems; and reflect actively on what they are

learning throughout the experience (Billig, 2000; National Society for Experiential Learning, 1994).

Unlike community service or volunteerism, service learning emphasizes acquiring skills and knowledge and serving the community (Eyler & Giles, 1999; Thompson, 2013). It offers students a chance to connect in meaningful ways with their communities, often collaboratively. Further, it typically results in tangible outcomes and demonstrable, positive impact on the community (Thompson, 2013). Research underscores service learning's fit with young adolescent development, suggesting a number of positive affective and academic outcomes for participants, despite its relatively low adoption in the middle grades settings (Richards, et al., 2013). Young adolescents from diverse racial and socioeconomic backgrounds who participate in service learning have demonstrated myriad positive outcomes, including significant academic gains, increased leadership skills, higher efficacy, and consistent concern for others, when compared to their non-participating counterparts (McBride, Robertson, & Chung, 2014; Newman, Dantzler & Collman, 2015; Richards, et al., 2013; Scales et al., 2000). Overall, service learning in the middle grades holds considerable potential for fostering a sense of belonging, as well as meeting many other academic and affective needs of young adolescents.

Teaching to Build Competence

Feeling academically and socially competent is crucial to middle schoolers' success, yet can be a challenge given that young adolescents have a greater tendency to compare themselves to peers and to judge themselves more critically than other age groups (Williams et al., 2019). These characteristics can contribute to increased vulnerability and emotional reactions, reactions that often result in middle schoolers' being labeled as moody and impulsive. In particular, transitions to, through, and out of middle school can undermine students' sense of academic and social-emotional competence. In Barber and Olsen's (2004) five-year study of hundreds of families with young adolescents, students reported declines in their academic, personal and interpersonal functioning with each change in grade level. Fortunately, we know a fair amount about how teachers can support students in their quest for competence. Fostering a

growth mindset, adopting iteration-oriented pedagogies, and providing clear and ongoing feedback and assessment can all help young adolescents be successful in school.

Growth Mindset

Students who feel more efficacious perform better academically, particularly during transitions (Debnam & Bottiani, 2019). For this reason, instruction that helps students view failure not as an end-point but rather as an opportunity to learn can be a powerful approach with middle schoolers. Mindset instruction is rooted in this perspective. People with a fixed mindset believe that intelligence is a fixed trait, whereas people who hold a growth mindset believe that intelligence can be developed (Kamins & Dweck, 1999; Dweck 2000). Fortunately, the degree to which an individual holds a growth mindset can be influenced through intervention (Dweck 2000). As learners shift toward a growth mindset they demonstrate greater motivation and increased achievement (Yeager & Dweck 2012).

During early adolescence, teaching students to adopt a growth mindset has demonstrated promising results, including increases in students' grades and motivation. For example, in one study, when a growth mindset intervention was introduced to seventh graders, classroom motivation and grades increased whereas the motivation and grades of students without the intervention decreased (Blackwell, Trzesniewski, & Dweck, 2007). In a study of seventh graders' mindset and mathematics achievement by the same researchers, a growth mindset predicted an upward trajectory in students' grades over two years; concomitantly, a fixed mindset predicted a flat trajectory. Teaching young adolescents to adopt a growth mindset also has been associated with increased control and interest (Schmidt, Shumow, & Kackar-Cam, 2017). Students who hold a growth mindset "endorse stronger learning goals, hold more positive beliefs about effort, and make fewer ability-based, 'helpless' attributions" and "choose more positive, effort-based strategies in response to failure, boosting mathematics achievement over the junior high school transition" (Blackwell, Trzesniewski, & Dweck, 2007, p. 258).

Research on mindset, like most educational research however, is complex and not unequivocal and suggests considerable teacher effects, with students' beliefs about mindset differing across classrooms (Schmidt, Shumow, & Kackar-Cam, 2015). Further, whereas Schmidt, Shumow, and Kackar-Cam (2017) found promising results from mindset intervention for ninth graders, the same results did not hold true for seventh graders, raising questions about developmentally optimal intervention periods. Schmidt, Shumow, and Kackar-Cam (2017) posited that in a "less failure-prone environment such as elementary school, vulnerable students may be buffered against the consequences of a belief in fixed intelligence. However, when they encounter the challenges of middle school, these students are less equipped to surmount them" (p. 258). Given that early adolescence is often a time of challenging personal and scholastic transitions, and that motivational beliefs may not be present until individuals face challenging circumstances (Dweck, 2002; Grant & Dweck, 2003), early adolescence may be a particularly apt time for mindset instruction.

Iteration-oriented Pedagogies

In alignment with fostering growth mindset, a number of iteration-oriented pedagogies help students view their mistakes as learning opportunities. Design thinking, a method for solving problems with a considerable emphasis on ideation and prototyping (Brown & Wyatt, 2010), is one such promising approach. With its emphasis on rapid prototyping, design thinking creates a learning context where mistakes are both expected and seen as a chance to learn. Middle school students participating in design thinking developed more adaptive attitudes to failure than their counterparts in non-design thinking contexts, suggesting that "design thinking education has the potential to instill persistence in the face of ill-defined problems, reframe failure and improve task performance for middle school students" (Marks, 2017, p. 64). Relatedly, maker-centered learning is often based in design thinking. The term 'makerspace' conveys a variety of spaces that offer resources for creative learning and producing (Martin, 2015). The act of making can provide young adolescents with opportunities to develop interest and confidence in a

range of fields, based in an iterative process in which "failure is interpreted as an indicator that more effort is required, rather than a cue to disengage" (Martin, 2015, p. 35). Maker-centered learning relies on a ''growth mindset that encourages students to believe they can learn to do anything'' (Dougherty, 2013, p. 10). While research on maker-centered learning in the middle grades is limited, some scholars suggest that making can soften deficit-based views of youth that emphasize what they cannot do rather than their competencies (Vossoughi, Escudé, Kong, & Hooper, 2013), an orientation sometimes lacking in school settings (Gutiérrez, & Rogoff, 2003). Others point to the many connections between making and widely adopted curricular expectations, such as computational thinking (Blikstein, 2008) and the engineering focus in the Next Generation Science Standards (Quinn & Bell, 2013), as additional rationale for integrating maker-centered learning into the middle school curriculum.

Formative Assessment

Building competence in the middle grades classroom also calls on us to consider how we assess and communicate about student learning. Paris, Roth and Turner (2000) raised concerns about the validity of standardized tests after finding that as students progressed through the middle years, their anxiety over the social and academic impact of their performance on standardized tests increased while the value they placed upon them—and their effort to perform well—decreased.

Students' sense of competence is influenced by many things, including how they compare themselves to others and how they believe others see them. Williams and colleagues (2019) noted that during middle school, "More frequent social comparison, coupled with a greater focus on the importance of ability (over effort), can foster negative self-evaluations among some teens" (p. tbd). Indeed, tracking students by ability can be particularly damaging to young adolescents as it determines the social comparison group students use to develop their academic identities (Marsh et al., 2008). Students who perceive an emphasis on competition and differential treatment by ability can experience diminished academic values, feelings of self-esteem, and academic achievement, along with increases in truancy,

anger and depressive symptoms over time (Roeser & Eccles, 1998). For these reasons, flexible and heterogeneous groupings in the middle grades offer an important alternative to more streamlined and homogeneous arrangements. More personalized approaches, through which students proceed at their own pace, can also be a helpful substitute to grouping by ability (Pane, Steiner, Baird & Hamilton, 2015).

Considerable research indicates that a mastery goal orientation—when students' achievement-related behaviors and task engagement are driven by their pursuit of competence, personal development and growth— is associated with improved self-efficacy, persistence, preference for challenge, self-regulated learning, affect and well-being (Kaplan & Maehr, 2006). In contrast, the outcomes are far more mixed when students adopt a performance goal orientation. Beginning in early adolescence, even performance goals framed as opportunities for growth and success are less predictive of positive outcomes than a mastery orientation and can promote maladaptive behaviors spurred by fear of demonstrating a lack of ability, particularly in front of peers (Kaplan & Maehr, 2006; Middleton & Midgley, 1997; Midgley, Kaplan & Middleton, 2001).

The decisions middle grades teachers make with regard to assessment influence how students form their perceptions of assessment tasks, their self-efficacy, and their orientation toward learning goals (Bookhart, Walsh & Zientarski, 2006). Advocates for an increased emphasis on deeper learning call for replacing the traditional emphasis on summative assessment with a greater emphasis on formative assessment (Darling-Hammond, Wilhoit & Pittenger, 2014). Formative assessment, including self-assessment, has been well documented as an effective strategy to increase student achievement (Black & Wiliam, 1998), and as one that is consistent across age groups and disability status (Fuchs & Fuchs, 1986). Wiliam and Thompson (2007) summarized five key strategies of formative assessment, intentionally framed in language that acknowledges teachers, peers and learners as essential agents in the processes of formative assessment: (1) clarifying and sharing learning intentions and criteria for success; (2) engineering effective classroom discussions and other learning tasks that elicit evidence of student

understanding; (3) providing feedback that moves learners forward; (4) activating students as instructional resources for one another; and (5) activating students as the owners of their own learning.

Shifting the ownership for communicating one's learning from teachers to students is a related assessment strategy that responds to both students' development of competence and their need for autonomy. In the context of current emphasis on deeper learning, portfolios have been described as a way to enrich standardized tests that incorporate performance components and a more appropriate vehicle to inform teaching (Barrett, 2007; Darling-Hammond, Wilhoit & Pittenger, 2014). Student data portfolios involve students more directly with assessment data they are in fact judged against (Cruz & Zambo, 2013). The student-led conference, often based on a portfolio, can be a developmentally appropriate and empowering alternative to the more well-known parent-teacher conference for middle schoolers (Hackman, Kenworthy & Nibbelink, 1998). In a student-led conference, the student facilitates the academic conference with the family members, with the teacher on hand for support as needed, shifting students' from the periphery of traditional parent-teacher conferences to equal partner in conversations about their academic progress (Hackmann, 1997). This alternative conferencing format has been associated with several positive outcomes. Students engaging in student-led conferences report being more likely to revise and edit their work, and to spend more time on it overall; teachers report planning lessons more intentionally; administrators report greater family participation; and parents report preferring the student-led conference over the traditional conference format (Tuinstra & Hiatt-Michael, 2004).

Identity as Curriculum

As young adolescents strive for autonomy, belonging and competence, middle school can be a whirlwind of identity development. Many students this age begin to pose life's quintessential questions, pondering who they are and imagining who they hope to become. Unfortunately, young adolescents often face ridicule for their seemingly constant experimentation with new selves. Instead of dismissing

students' latest attempts to understand who they are, educators can help them explore their identities by recognizing the intersectional nature of self-definition. As students grow and change across the various developmental domains-- physically, socially, emotionally, and cognitively-- their race/ethnicity, class, gender identity, sexual orientation, and/or exceptionality also play important roles.

Despite the importance of understanding self, we do not often honor and integrate students' myriad identities into their learning opportunities. Offering "developmentally and culturally meaningful topics to a diverse and large school population is an ongoing challenge in the United States... and little attempt has been made to evaluate curricular materials in terms of their meaningfulness to students" (Eccles & Roeser, 2011, p. 226). Williams et al. (2019) emphasized this complexity particularly for students of color, stating that "one of the most salient aspects of collective identity development is understanding what it means to be a member of their racial-ethnic group. Having a strong sense of racial-ethnic identity is related to psychological wellbeing, academic success, and prosocial behavior" (p. tbd). Indeed, a strong positive ethnic identity can protect students from some of the negative effects of discrimination (Burchinal, Roberts, Zeisel, & Rowley, 2008; Wong, Eccles, & Sameroff, 2003). Similarly, there is a relative dearth of research on marginalized populations within the field of middle grades education. Brinegar (2015) noted in her content analysis of almost 700 articles from middle grades research publications over a 13 year span that,

> only 10 articles centered on the educational experiences of specific racial and ethnic groups...only seven articles examined ways to improve the schooling experiences of young adolescents in poverty…(and) only 36 manuscripts explored the topics of equity, discrimination, and social justice" (p. 5).

While we still have much to learn, we do know that teaching diverse students through culturally relevant education holds great promise (Aronson & Laughter, 2016; Dover, 2013). For example, Harrison (2005) invited middle schoolers to grapple with issues such as racial profiling and inequitable housing,

noting, "Young adolescents' cognitive development, which is transitioning to more abstract thinking, coupled with a heightened interest in what is just, presents an ideal context for a curriculum grounded in social justice pedagogies" (p.3). Indeed, young adolescents are both developing cognitively and interested in what is just. This makes them ripe for exploring curriculum through a social justice lens. Connecting to middle school students' racial and ethnic identities within the curriculum also shows potential for increased use of academic language and literacy (Adams & Laughter, 2012; Johns, 2008); academic achievement (Choi, 2013); and student empowerment and engagement (Dmick, 2012), as minority students report greater interest in curriculum that represents the experiences of historically underrepresented groups (Graham & Taylor, 2002). We also know that interesting and relevant tasks can increase students' intrinsic motivation to succeed as well as the chances that they will develop a positive identity as a capable learner (Eccles, 2009). For these reasons, a middle school curriculum should include meaningful exploration of students' current selves, as well as curricular resources and materials that reflect the diversity within and around these early adolescents.

Fostering healthy identity development in the middle grades also means helping students imagine the many possibilities ahead of them. The exploration of possible selves in relation to one's current school involvement can promote a number of positive outcomes, including prosocial behavior and school bonding (Williams et al., 2019; Oyserman, Terry, & Bybee, 2002). Middle school is the time when students define themselves as either college worthy or not. Learners from low income, minority or first generation backgrounds face particular risk factors in this self-definition. Because the middle grades are "the launching pad for a secondary and post-secondary education system that enables all students to obtain the schooling and/or career training they will need to fully experience the opportunities of 21st century America" (Balfanz, 2010, p. 3), engaging young adolescents in exploration of post-secondary education and career options is a key component of a developmentally responsive curriculum.

This exploration can take many forms, but arguably most important is its degree of relevance to the young adolescent. As Brazee (1997) noted, "The problem with middle school curriculum is that we ask students to give answers to questions they do not ask" (p. 187). Opportunities to job shadow, conduct interviews, and participate in apprenticeships are active and hands-on ways for students to investigate and imagine the possibilities of their future selves. They also serve to build relationships between trusted adults and youth, which can further strengthen academic outcomes (Oyserman, Terry, & Bybee, 2002). Relatedly, careful course counseling related to post-secondary aspirations is crucial in middle school to ensure that students keep options open by enrolling in courses that align with college entrance expectations. Eighth grade algebra is often used as an example of a gatekeeper course, due to the sequential nature of mathematics coursework and research that illustrates that students who complete algebra in eighth grade attend college at greater rates than those who do not (Gamoran, & Hannigan, 2000; Spielhagen, 2006).

Conclusion: Promising Pedagogies

Responding to young adolescent needs with curriculum and instruction is a considerable agenda, but it need not mean a piling on of new initiatives. Just as there is ample evidence that effective middle grades reform involves the synergistic impact of responsive environments, school structures, curriculum, instruction, and assessment (Felner et al., 1997), the most promising instructional practices also appear to have greatest impact when implemented in concert (Black & Wiliam, 1998). White & Frederiksen's (1998) efforts to create an inquiry-driven middle school science classroom provided scaffolding for teachers and students alike: authentic and self-directed inquiry (autonomy); using scientific tools, habits and thinking strategies, including formative self-assessment (competence); in order to develop a high performing, mixed ability, and collaborative research community (identity and belonging). It was in the course of collaborative inquiry with higher-achieving partners that lower-achieving students benefited most from reflective self-assessment (White & Frederiksen, 1998). Many of these higher-order skills are

also prioritized in the Common Core State Standards (CCSS), Next Generation Science Standards, and C3 Framework for Social Studies, for instance, all of which call for authentic tasks requiring critical abilities such as research, experimentation, collaboration, modeling, and communication (Darling-Hammond, et al., 2013; National Research Council, 2012).

There are also a number of core pedagogies, well supported in their own right as academically efficacious, that match with students' developmental needs. They may serve as helpful frameworks to select, organize, and implement what could otherwise be an overwhelming and potentially counterproductive flood of reforms for any given teacher or school. Many personalized learning initiatives open the door to greater student autonomy by addressing an individual's needs, skills, identities and interests; offering a variety of learning pathways toward college and career; and assessing learning based on students' competency or proficiency. The emergence of competency-based, or proficiency-based, assessment responds to the concomitant need for ongoing feedback as students' progress towards goals is individually paced and continually assessed (Pane, Steiner, Baird & Hamilton, 2015). Coupled with learning management systems, digital portfolios and multimedia, these more ambitious approaches to responsive teaching and learning are more accessible than ever before (Pane, Steiner, Baird & Hamilton, 2015). Recent innovations, often bolstered by the affordances of technology, are expanding ways in which early adolescents can act more autonomously in the course of their learning. Blended learning, for instance, in which online activities and resources complement classroom-based learning, can give students greater control over where, when, by what path, and at what pace they go about their learning (Clayton Christensen Institute). Blended learning can also provide teachers with greater flexibility in meeting the developmental needs of students by preserving more classroom time to engage in problem solving and interacting with peers (Moore, Gillett & Steele, 2014).

The many converging trends that support more responsive instruction for middle grades students pose challenges for schools undertaking significant change. There is no single answer for deepening

learning, closing achievement gaps, or preparing all early adolescents to thrive in career, college and life. Fortunately, research regarding effective implementation of school change has yielded its own converging trends. The central tenets of effective professional development—that it be active, collaborative, relevant, and rich in feedback and reflection, for instance—have remained more or less stable for nearly 30 years (Darling-Hammond, Hyler & Gardner, 2017). Effective plans for change must acknowledge the integrated nature of teaching and learning. For example, in their synthesis of Response to Instruction and mastery learning, Guskey and Jung (2011) warned that the two concepts "can be presented as narrow, constricted, and separate models rather than sets of flexible, research-based principles that guide educators to better practice" (p. 254). Coherent plans for school change address how multiple initiatives fit together (Elmore et al., 2014). And to arrive at coherent plans, and to fuel their implementation over time, teachers and leaders, individually and collectively, must discover their strategic and moral purposes, what they find personally meaningful in the hard work of learning and change (Fullan & Quinn, 2015). It is when these critical facets of adult learning—arguably indistinguishable from those of young adolescent learning—that the path to effective teaching and learning yields, and is propelled by, the deeply human experience of personal and collective efficacy (Goddard, Goddard, Sook Kim & Miller, 2015).

Key Takeaways and Implications for Practice

- Student-centered approaches, such as project-based and experiential learning, support early adolescents' need for autonomy and positively influence their engagement and achievement.

- Middle grades teachers can promote motivation, engagement, and academic performance by helping students understand themselves as thinkers and learners, including through executive functioning, goal-setting, and metacognition.

- Curriculum and instruction in the middle grades should foster students' sense of belonging by integrating approaches such as culturally relevant pedagogy, service learning, social emotional learning and adventure-based learning.

- Middle grades students benefit from iterative pedagogies, such as maker-centered learning, mindset instruction and proficiency-based assessment, that offer opportunities to learn from mistakes and emphasize what students can do over deficit-based views that emphasize what they cannot.

- Middle school curriculum should include meaningful exploration of students' current selves, as well as curricular resources and materials that reflect the diversity within and around these early adolescents.

- Young adolescents are both developing cognitively and interested in what is just and are therefore ripe for exploring curriculum through a justice lens.

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