Article

Student Ownership of Learning as a Key Component of College Readiness

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Abstract

This article considers the importance of ownership of learning as a key component of college readiness. The article is organized around two conceptual models. The first is a four-part model of college readiness that includes key cognitive strategies, key content knowledge, key learning skills and techniques, and key transition knowledge and skills. The second is a five-part model of ownership of learning that consists of the following elements: motivation and engagement, goal orientation and self-direction, self-efficacy and self-confidence, metacognition and self-monitoring, and persistence. Finally, the article concludes with a discussion of the role and importance of ownership of learning and makes the case that these elements can and should be taught to all students, and particularly in settings where an achievement gap exists.

Keywords

college readiness, self-regulation, ownership of learning

College readiness has historically been defined in terms of content knowledge, particularly in reading, writing, and mathematics (Conley, 2005, 2010, 2014; Wagner, 2006). While such knowledge is necessary, evidence suggests it is not sufficient, particularly in an era where public policy goals seek to broaden participation and success in postsecondary education of a wider range of students, many of whom may lack complete command over foundational academic content knowledge.

A key factor beyond content knowledge that contributes to college readiness is student ownership of learning. Students who demonstrate ownership of learning can be successful in a wide range of learning environments such as large classes and online

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courses where they have less interaction with the instructor. Strong ownership of learning can even compensate to a degree for less effective teachers. Students who own their learning can go beyond simply following teacher directions. They are more likely to complete complex assignments, solve problems that require persistence, and create original or novel work of high quality.

Ownership of learning cannot compensate entirely for fundamental deficits in content knowledge mastery. However, students with strong motivation and drive, a desire to achieve goals, a belief in their own capacity for success, the ability to reflect on their learning strategies, and a willingness to persist in the face of obstacles can overcome specific shortcomings in English and mathematics content knowledge or obtain the knowledge necessary to succeed. The ability to compensate for content deficiencies is particularly important for students who receive less than ideal preparation for college but is rarely taken into account in any systematic fashion in the admissions and placement process at all but the most selective institutions. Ownership of learning is one of several key indicators of college readiness that is not sufficiently taught or measured. It can be developed systematically and will have the greatest effect on students for whom college is likely to be particularly challenging in the first place.

This article outlines the research base to support the importance of ownership of learning as a key component in college readiness. The article is organized around two conceptual models. The first considers college readiness to be a function of 42 components organized into four elements, or keys. The second model explains ownership of learning as being composed of five elements. These elements interact in both a linear and iterative fashion during the learning process in ways that greatly enhance effectiveness for learners who possess all five elements. Finally, the article concludes with a discussion of the role and importance of ownership of learning.

The Complexity of College Readiness: The Four Keys Model

The conceptual model used here to operationalize college readiness is Conley's (2014) four keys to college and career readiness. It encompasses a comprehensive list of constructs that have been tied empirically and theoretically to college and career readiness. The four keys is a model consisting of 42 components specific to college and career readiness. All were derived from analysis of entry-level postsecondary courses or from related research on college readiness and success. All are actionable; in other words, they can be taught and learned and are not personality traits or general cognitive abilities.

The four keys include thinking skills (key cognitive strategies), attitudes toward and understanding of the structure of the content being presented (key content knowledge), ownership of learning in the form of self-regulatory behaviors along with specific methods for being an effective learner (key learning skills and techniques), and contextual knowledge required to select a college, apply successfully, cope with financial demands, understand the culture of college, and be aware of how the role of college student is different from that of high school student (key transition knowledge and skills). The four keys are presented in Figure 1.
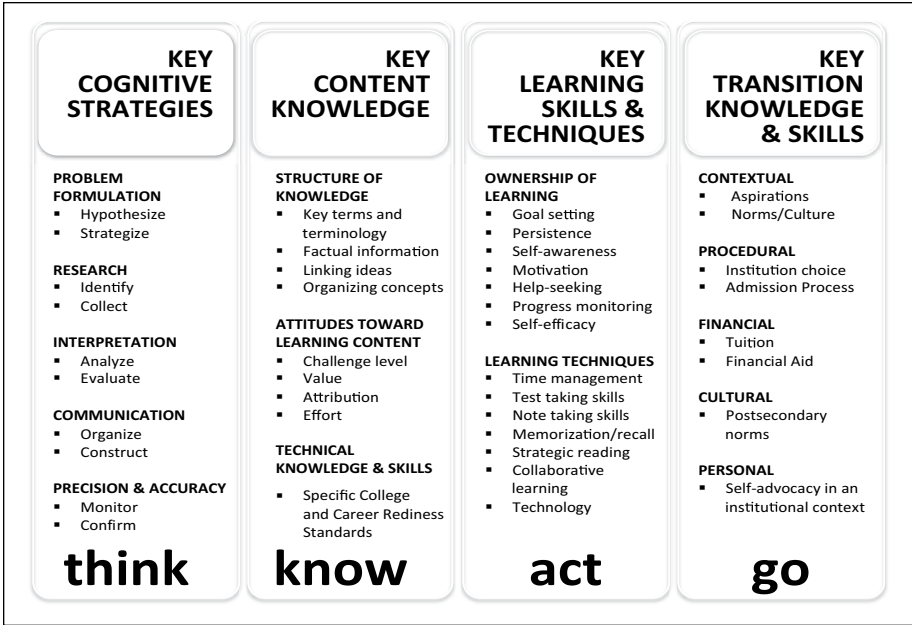
KEY COGNITIVE STRATEGIES	KEY CONTENT KNOWLEDGE	KEY LEARNING SKILLS & TECHNIQUES	KEY TRANSITION KNOWLEDGE & SKILLS
PROBLEM FORMULATION ▪ Hypothesize ▪ Strategize **RESEARCH** ▪ Identify ▪ Collect **INTERPRETATION** ▪ Analyze ▪ Evaluate **COMMUNICATION** ▪ Organize ▪ Construct **PRECISION & ACCURACY** ▪ Monitor ▪ Confirm	**STRUCTURE OF KNOWLEDGE** ▪ Key terms and terminology ▪ Factual information ▪ Linking ideas ▪ Organizing concepts **ATTITUDES TOWARD LEARNING CONTENT** ▪ Challenge level ▪ Value ▪ Attribution ▪ Effort **TECHNICAL KNOWLEDGE & SKILLS** ▪ Specific College and Career Rediness Standards	**OWNERSHIP OF LEARNING** ▪ Goal setting ▪ Persistence ▪ Self-awareness ▪ Motivation ▪ Help-seeking ▪ Progress monitoring ▪ Self-efficacy **LEARNING TECHNIQUES** ▪ Time management ▪ Test taking skills ▪ Note taking skills ▪ Memorization/recall ▪ Strategic reading ▪ Collaborative learning ▪ Technology	**CONTEXTUAL** ▪ Aspirations ▪ Norms/Culture **PROCEDURAL** ▪ Institution choice ▪ Admission Process **FINANCIAL** ▪ Tuition ▪ Financial Aid **CULTURAL** ▪ Postsecondary norms **PERSONAL** ▪ Self-advocacy in an institutional context
think	**know**	**act**	**go**

Figure 1. Four keys to college and career readiness.

A Conceptual Model for Student Ownership of Learning

Of the four keys, the one most central to this article is key learning skills and techniques, which consist of two subelements. One subelement is the specific learning techniques students must master, such as time management or study skills. The other is student ownership of learning, on which this article focuses. The ownership element includes five major components: motivation and engagement, goal orientation and self-direction, self-efficacy and self-confidence, metacognition and self-monitoring, and persistence. These five components are not strictly sequential, although a strong case can be made for a reinforcing relationship among them.

For convenience sake, we assume that ownership of learning begins with student intrinsic or extrinsic motivation and engagement in learning. This creates a drive to set learning goals. Once learning goals have been established, an action potential exists between the current state and a desired state of being. This action potential is the driver for learners to take ownership of their learning. Setting learning goals also helps learners understand that they can have control over their own learning, which leads to a stronger sense of self-efficacy and self-confidence, which can cause them to set additional and more challenging learning goals and persist to achieve them (Zimmerman, Bandura, & Martinez-Pons, 1992). Once effective learners have set goals and have begun to develop a sense of control over the learning process, these students exercise metacognition and the self-monitoring skills that enable them to determine how well

Figure 2. Student ownership of learning model.

they are employing the specific learning skills necessary to achieve their goals. They consciously monitor their use of a wider range of learning strategies and use these strategies to complete the complex academic tasks necessary to achieve their goals. This heightened sense of self-awareness and efficacy, combined with an expanded and expanding repertoire of learning strategies employed in a conscious, self-monitored fashion, enables learners to take on more challenges and to persist with learning tasks that are not achieved easily or quickly. Having succeeded to learn something that is meaningful and valuable to them, they are subsequently more motivated and engaged and ready to set new goals and begin again (see Figure 2).

Overview of the Literature

The literature on the elements of the ownership of learning model is extensive. It is summarized here by element, although a case can often be made that much of the literature base covers more than one element of the model. Organizing the review around the model was done for clarity's sake and not under the belief that separate and distinct bodies of literature exist for each model element.

Motivation and Engagement

Motivation and engagement are closely related. Motivation is an internal state, while engagement is the manifestation of motivation behaviorally. Student engagement leads to higher achievement in the classroom (Finn, 1989, 1993; Finn & Rock, 1997; Marks & Coll, 2007; Newmann, 1992). At the college level, engagement is significantly and positively related to students' grade point average (GPA), performance in individual classes, and retention (Credé & Kuncel, 2008; Richardson, Abraham, &

- Help students learn how to learn
- Include tips, tricks and techniques of three types:
  - Generic learning strategies
  - Subject-specific
  - Topic-specific
- Students then build a plan, or strategy, for relearning course material (or for succeeding in the course)
- Examples:
  - Time management plan to prepare for exam
  - Ways to remember historical events in context
  - Understanding enzymatic reaction processes

Figure 3. Strategies to build motivation and engagement.

Bond, 2012; Robbins et al., 2004). The converse is also true in that a lack of engagement adversely affects student achievement (Finn, 1989; Finn & Rock, 1997; Steinberg, 1996; Wehlage, Rutter, Smith, Lesko, & Fernandez, 1989).

Conley's (2005, 2007, 2010, 2014) four keys to college and career readiness model includes motivation and engagement in several places. The motivation and engagement factors in the four keys model involve students' ability to see the value in coursework, motivate to excel, see the value of learning, and enjoy a challenge. These skills are particularly important in a college setting where students are required to manage their own time and take responsibility for their own learning.

Engagement can be thought of as comprising three components: behavioral engagement (compliance with norms and expectations), emotional engagement (interest, enjoyment), and cognitive engagement (investment in learning, challenge-seeking; Fredricks, Blumenfield, & Paris, 2004; Trowler, 2010). Behavioral engagement may not be enough for students to succeed in college and careers where higher order thinking is required, motivation must manifest itself in the potential for self-guided action, and students must be both emotionally and cognitively engaged to succeed (Conley, 2007, 2010). Indeed, academic *intrinsic* motivation, or "self-motivation for and enjoyment of academic learning and tasks" is more strongly correlated with college GPA than academic *extrinsic* motivation, or "learning and involvement in academic tasks for instrumental reasons" (Richardson et al., 2012). When students are engaged and interested in what they are learning, greater learning gains occur. Compliance-based learning, in which the learner simply waits to be told what to do and then follows directions, results in lower quality academic products (Richardson et al., 2012). Strategies to build motivation and engagement are presented in Figure 3.

Goal Orientation and Self-Direction

Students who are motivated and engaged then need to have strong goal orientation and self-direction. Academic goals are positively and significantly related to K-12 student

achievement, college students' GPA, and college retention (Marzano, Gaddy, & Dean, 2000; Richardson et al., 2012; Robbins et al., 2004). The four keys model (Conley, 2014) describes goal setting as the strategies students use to set academic and personal goals for high school and beyond and identify resources and steps to attain these aspirations.

Goal attainment hinges on the ability to exercise control over one's behavior. An individual's intention to pursue a goal is not enough if that goal is beyond the individual's influence (Ajzen, 1991; Bandura, 1977; Locke & Latham, 1990, 2006). A person's perceptions of behavioral control can be a key predictor of his or her behavior in situations that are not completely under the person's volition (Ajzen, 1991). Teaching students that academic goals are within their control is the first step in promoting students' goal orientation, which is associated with academic achievement (Cury, Elliot, Da Fonseca, & Miller, 2006; Dweck & Legget, 1988; Midgley & Urdan, 2001; Roeser, Midgley, & Urdan, 1996; Shim, Ryan, & Anderson, 2008; Wolters, 2004). Students with high goal orientation have a growth mind-set and ask, "What can I learn?" Students with low goal orientation have a fixed mind-set and believe their intellectual capacity is finite; these students seek to avoid failure and ask, "How can I prove what I already know?" (Dweck & Leggett, 1988). Self-direction is promoted through novel and complex work, which students find rewarding (Bronfenbrenner, 1979; Csikszentmihalyi, 1990).

Cognitive research has confirmed that intelligence is not fixed, but can change over time (Ramsden et al., 2011). A "growth" or "mastery-oriented" mind-set toward goal achievement helps empower students to believe that they can develop their cognitive capabilities and improve their performance. Students with a mastery-oriented mind-set enjoy challenge, are willing to engage in difficult tasks, and employ strategies to cope with obstacles, whereas students with a compliance mind-set avoid challenge, are unable to function effectively in the face of obstacles, and attribute failure to personal inadequacy (Dweck & Leggett, 1988). Students with a mastery-oriented reaction to failure exhibit sustained or improved performance after experiencing failure, whereas students with a compliance mind-set exhibit deteriorating performance after experiencing failure (Dweck & Reppucci, 1973).

Learning goals cause individuals to seek to increase their ability to master new tasks and to emphasize understanding and growth. Performance goals cause individuals to seek to prove, validate, or document their ability and avoid discrediting it or calling it into question. Learning goals have been shown to improve problem solving, exam grades, course grades, processing of course material, achievement test scores, and intrinsic motivation (Dweck & Sorich, 1999; Grant & Dweck, 2003; Greene & Miller, 1996; Kaplan & Maehr, 1999; Meece & Holt, 1993; Midgley & Urdan, 2001; Roeser et al., 1996). When learning goals are highlighted, students' beliefs about their abilities are not constraints to achievement; children of both high and low belief in their abilities seek to increase their competence when they adopt a mastery oriented mind-set (Elliot & Dweck, 1998). Furthermore, specific, challenging goals lead to higher performance than easy, "do your best" goals, or no goals at all (Locke, Shaw, Saari, & Latham, 1981). Classes that emphasize the importance and benefits of

obtaining new knowledge and skills encourage students to set mastery goals rather than performance goals (Dweck & Leggett, 1988; Grant & Dweck, 2003).

Encouraging students to establish high educational aspirations can help ensure that students will pursue postsecondary education. Educational aspirations are strongly related to college enrollment, retention, and GPA (Cooper, 2009; Richardson et al., 2012; Robbins et al., 2004). Students who aspire to obtain college degrees are 28% more likely to apply to and attend college than students with no aspirations to attend college (Cabrera & La Nasa, 2001). In a study examining students' background characteristics in relation to student post-high-school aspirations for a sample of 5,308 students, high school cumulative GPA was the strongest predictor of all aspirations examined (Gilkey, Seburn, & Conley, 2011). Students who did well academically were more likely to aspire to college, and vice versa.

Despite this connection between aspirations and educational attainment, studies indicate a persistent aspirations slump in American public schools. Of eighth grade students, 88% reported that they aspired to attend college on the National Educational Longitudinal Study (NELS; Venezia, Kirst, & Antonio, 2003). Of students in the NELS data set who had obtained college qualifications such as the requisite GPA, class rank, aptitude test scores, and SAT and ACT scores, 69% enrolled in college, whereas only 9% of unqualified students enrolled (Cabrera & La Nasa, 2001). Looked at from a slightly different perspective, of 100 U.S. middle-schoolers, only about 40 enroll in college directly out of high school, and, as noted previously, nearly 90% originally aspired to college (U.S. Department of Education, 2008).

One roadblock for students who aspire to college but do not attend is a lack of knowledge about what to do to be college eligible (Cabrera & La Nasa, 2001). In a study analyzing the relationship between 11th and 12th grade students' scores on an instrument designed to gauge student aspirations in relation to overall readiness, a significant difference was found to exist between students' academic goals and their understanding and awareness of how to transition into college (Gilkey et al., 2011). In that study, students who aspired to attend a 4-year college after high school had significantly higher mean scores on subscales gauging "college knowledge" than did students who planned to attend a 2-year college or work and those who did not have post-high-school plans. For example, on items measuring students' college awareness (how to make the transition to college, the differences between high school and college, and types of colleges and fields of study), students who aspired to attend 4-year college had much higher mean scores ($M = 4.19$, $SD = 0.87$) than students who did not have post-high-school plans ($M = 2.54$, $SD = 1.20$). The difference was statistically significant, $F(3, 671) = 66.57$, $p = .00$. In other words, students who aspired to go to college rated themselves higher on items that measured their awareness of and preparation for college.

In practice, these findings mean that students with clearer and higher aspirations are more likely to develop the knowledge about going on to college that other students who may be equally capable intellectually of attending college but do not acquire this knowledge because they simply never aspire to college. While correlational data always allow for causal explanation in both directions, the fact that students with high

- Use goal-setting as a central organizer to engage students
- Create ways for students to set goals that state what they are going to learn or do, by when, and how they will measure success
- Encourage short-term and medium-term course goals
- Get students to link course goals to larger educational or life goals
- Display progress toward goal achievement graphically, along with goals achieved
- Suggest next goals
- Suggest strategies if goals are not being met

Figure 4. Strategies to build goal orientation and self-direction.

college knowledge demonstrated higher aspirations for several years before acquiring the college knowledge suggests that aspirations do create the motivational basis for learning about college options and requirements.

While some of these observations may seem commonsensical on the surface, it is important to remember that the vast majority of high schools do not have systems designed to systematically increase student aspirations. Individual teachers may exhort individual students, but the legacy of tracking and notions of ability grouping persist in many schools, the net result of which is that teachers and administrators tend to pay more attention to students' test scores than to their aspirations or the need to raise their aspirations as a prerequisite to raising their academic performance. Strategies to build goal orientation and self-direction are presented in Figure 4.

Self-Efficacy and Self-Confidence

In the four keys model self-efficacy is defined as students' confidence in their ability to complete increasingly challenging and complex academic and career tasks and be able to build on past experiences and success to maximize future successes. Self-efficacy and self-confidence or self-concept are different in that "self-efficacy is a context-specific assessment of competence to perform a specific task," whereas self-concept and self-confidence are beliefs in ability and self-worth that are not context-specific (Pajares & Miller, 1994, p. 194). Self-efficacy involves individuals' notion that they are able to exercise influence and control over their behavior (Bandura, 1977; Locke & Latham, 1990).

Students who attribute their academic success to their own ability and effort and who do not attribute failure to lack of ability tend to have higher academic skills and higher academic self-concepts (Bandura, 1997; Marsh, 1984). Student self-efficacy is related to engagement and performance on academic tasks, college performance, and college retention (Richardson et al., 2012; Robbins et al., 2004; Schunk, 1981; Zimmerman, 1989; Zimmerman et al., 1992). Like students with a mastery-oriented mind-set, students with high self-efficacy value learning over "looking smart" and respond to academic setbacks by increasing effort or trying new strategies (Dweck, Walton, Cohen, Paunesku, & Yeager, 2011). Greater self-efficacy also leads to greater

- Let students choose the means to re-learn challenging content
- Have options when possible
  - For example, different students could choose to re-learn challenging material via memorization, graphically with additional examples, through simulations, via alternative lecture, or with an online chat group
- Let students choose one or more options
- Add options based on experience with how students learn challenging content in each course

Figure 5. Strategies to build self-efficacy and self-confidence.

motivation and perseverance in challenging scenarios (Schunk, 1981; Zimmerman et al., 1992).

Educators can help students develop self-efficacy by facilitating performance accomplishments, which are successes that reinforce efficacy expectations and promote self-efficacy (Bandura, 1977). These performance accomplishments help to minimize individuals' anxieties around learning and the self-efficacy that they help develop will transfer to other scenarios and enable the individual to counter anxiety from past failures (Bandura, 1977). The type of feedback that educators give also affects students' self-efficacy: Past attributional feedback ("you've been working hard") leads to greater improvement than does future attributional feedback ("you need to work hard"; Schunk, 1981).

In a study investigating the effects of self-motivational factors of students' academic achievement, perceived self-efficacy for academic achievement and student goals accounted for 31% of the variance in students' grades (Zimmerman et al., 1992). In addition, the researchers found that the influence of students' prior grade attainment on current attainment was mediated by self-regulatory factors. Goal setting was key to students' attainment of grade goals—the higher the perceived self-efficacy, the higher the goals, and self-efficacy influenced the achievement of those goals. Strategies to build self-efficacy and self-confidence are presented in Figure 5.

Metacognition and Self-Monitoring

Central to the notion of taking ownership is awareness of and involvement in the learning process. This involves actively participating in the learning process and reflecting on that participation. Like the other student ownership of learning factors discussed here, metacognition and self-monitoring have relationships with outcomes such as K-12 student achievement, college student GPA, and college retention (Credé & Kuncel, 2008; Lindner & Harris, 1998; Marzano et al., 2000; Richardson et al., 2012). In a model of self-regulated learning, Lindner and Harris (1998) frame this skill as executive processing, which involves metacognitive, conscious, deliberative processing. This includes the process of analyzing the task, developing a strategy, monitoring cognition, and evaluating the strategy. Executive processing is significantly and positively correlated with GPA in undergraduate and graduate students (Lindner & Harris,

1998). There is also a relationship between performance-approach goals and deep cognitive strategies in college students (Wolters, 2004).

Metacognition involves both self-reflection about cognition and the regulation of cognition through the development of strategies (Vrugt & Oort, 2008). As discussed, when students pursue learning or mastery goals, the emphasis is on developing a deep understanding of the material. This process is not about demonstrating what the student already knows, as in the pursuit of performance goals. Instead, it is about the student engaging with material and persisting in the face of challenge. This process of engagement in learning leads to greater metacognition because students reflect on what they are learning and develop learning strategies based on that self-reflection (Ames, 1992; Vrugt & Oort, 2008). Students who can recognize when they are not being effective learners and who adapt their approach accordingly avoid making the same mistakes repeatedly or approaching tasks mindlessly. These students can use "think-alouds" and other techniques to externalize their inner monologue to learn more efficiently and effectively.

The ability to select strategies indicates movement from novice to expert as a learner. Novices develop surface strategies that are largely procedural in nature, while experts employ innovative and sophisticated strategies that involve critical thinking and deep processing (Alexander, Fabricius, Fleming, Zwahr, & Brown, 2003; Conley, 2012; Vrugt & Oort, 2008). Surface strategies are not without merit. They are required for any task requiring rote memorization (e.g., for multiple-choice exams), and some theorists believe they are central to the development of foundational content knowledge (Elliot, McGregor, & Gable, 1999; Vrugt & Oort, 2008). A surface approach to learning does have a relationship with undergraduate GPA. However, the relationship between GPA and deep approaches to learning is stronger (Richardson et al., 2012). Strategies to build metacognition and self-monitoring are presented in Figure 6.

Persistence

Persistence is related to but different from resilience (Luthar, Cicchetti, & Becker, 2000; Rutter, 2006), and also encompasses the notions of grit (Duckworth, Peterson, Matthews, & Kelly, 2007) and academic tenacity (Dweck et al., 2011). The body of literature around the construct of resilience has focused for the most part on individuals who have endured tremendous hardships such as having parents who are mentally ill or on drugs, experiencing catastrophic life events, living in violent inner-city environments, and other adversities (Garmezy, Masten, & Tellegen, 1984; Luthar, 1991; Luthar et al., 2000; Masten, Best, & Garmezy, 1990; Rutter, 2006). While researchers in this area assert that resilience is not a fixed personality trait, the individuals who develop resilience are those whose particular life circumstances have forced them to become adaptable in the face of significant adversity (Luthar et al., 2000). By this definition, individuals who have not faced adversity cannot demonstrate resilience.

Grit (Duckworth et al., 2007) and academic tenacity (Dweck et al., 2011) both involve sustained hard work toward a goal. These constructs differ from resilience in

- Provide data and information related to learning skills
  - Compared to class
  - Compared to typical students at that grade level
- Objective measures:
  - Time spent studying
  - Number of pages written
  - Resources in the system accessed and used
- Subjective measures:
  - Self-rating of interest, learning strategies employed
  - Teacher comments or observations
  - Self-evaluation of effort

Figure 6. Strategies to build metacognition and self-monitoring.

that they do not require the individual to face significant adversity. Rather, they are mind-sets that foster persistence in the face of challenge. Grit and academic tenacity are tied to gains in student achievement, as is conscientiousness (Duckworth et al., 2007; Duckworth & Quinn, 2009; Dweck et al., 2011). However, grit and tenacity differ from conscientiousness in that they go beyond self-control or the deferral of immediate gratification and involve the passion for long-term goal obtainment (Duckworth et al., 2007; Dweck et al., 2011). Students with high self-control but low grit are not as successful: students need both self-control and grit to sustain hard work (Duckworth et al., 2007; Duckworth & Quinn, 2009).

Persistence can be developed systematically and mastered by all students. It does not require experiencing adversity, although it is a particularly powerful skill for students experiencing adversity to have. At the heart of persistence is the passion for a goal and the ability to self-regulate to achieve that goal (Conley, 2014). Students with persistence control their own learning, overcome obstacles on their own, and know when to seek help. They believe that most everything worthwhile—particularly learning—takes time and effort, and they value working hard as well as working "smart" (Dweck et al., 2011). Students with persistence have a mastery-oriented mind-set, have specified learning goals, and have developed the self-control to defer immediate gratification to pursue those learning goals (Dweck et al., 2011). Students with persistence have the mind-set to overcome challenges; these students see failure differently than those with low persistence and a fixed mind-set.

It is important to note here that emphasizing student persistence is not the same as blaming the victim or putting all the responsibility on the student and none on the teacher or school. Academic persistence assumes high-quality academic experiences that give students a reasonable probability of success if the persist when challenged. Clearly, persistence is also effective in less-than-optimal learning situations as well, but the assumption here is that the positive effects of persistence are maximized when schools present learners with challenging but realistic learning scenarios in which persistence aids in their success but is not necessary to overcome poor teaching.

The Other Achievement Gap

This ownership of learning model, with its elements of motivation and engagement, goal setting, self-awareness, self-monitoring, and persistence, predicts student achievement and standardized achievement test scores, high school grades, college and graduate school GPA, and college retention, and success later in life (Credé & Kuncel, 2008; Duckworth et al., 2007; Duckworth & Quinn, 2009; Dweck et al., 2011; Richardson et al., 2012; Robbins et al., 2004; Rutter, 2006; Zimmerman & Schunk, 2001). However, as will be noted later, the educational system does little to collect or use data on these elements in any systematic fashion, relying almost entirely on redundant and overlapping measures of English and mathematics and ignoring the component in these measures that can be attributed to ownership of learning.

This issue becomes particularly important in contexts where achievement gaps exist. The formula being followed by many well-intentioned educators to close gaps in performance on measures of academic content knowledge is to intensify content transmission through more time devoted to teaching or reteaching content in areas identified as deficient on tests, particularly tests of English and mathematics knowledge. While an intensive content-focused program of study has its place in an overall approach to close achievement gaps, such a program is not likely in and of itself to be sufficient because of differences in student skill level as learners and the degree to which individual students own (or can own) their learning. Students who do not automatically buy into the belief that they should learn what teachers tell them to learn need much greater incentive to perform at the higher levels needed to close achievement gaps. Enabling these students to understand the importance of ownership of learning and then providing them with curricular and instructional frameworks in which they can take ownership of their learning is a key ingredient in any program designed to close gaps in reading, writing, and mathematics performance.

College and careers require students to take ownership of their learning and their lives. When students have little or no experience setting goals for themselves and then striving to achieve them through academic work in school, they are at a tremendous disadvantage when they enter college or career preparation programs where they are expected to be motivated and in charge of their learning.

Measuring Ownership of Learning

As a practical matter, student ownership of learning has not been measured very directly or extensively at the high school level, although most teachers are likely to have impressionistic, anecdotal information on students, information that, paradoxically, is likely to be quite accurate. Creating a measurement technology to quantify ownership of learning will take some time, effort, and expense. However, it may not be necessary to build formal assessment systems equivalent in complexity and technical adequacy to current high-stakes tests of content knowledge to derive the information necessary to gauge student ownership of learning. A great deal of insight can be gained by giving students more opportunities to explore their interests and set

challenging goals for themselves, and then documenting their aspirations and the actions they take to achieve their goals. These sorts of behaviors cannot really be faked, especially over time. For example, initial insights into student skills in areas such as time management, metacognition, and self-monitoring can be gathered by analyzing problem solving performance on tasks that require students to have these skills to complete them successfully. Similarly, persistence can be inferred from the amount of time and the number of attempts students make to complete tasks that cannot be done in one step or at a single sitting. In other words, many aspects of student ownership of learning can be inferred from a variety of academic performances instead of attempting to measure them directly.

In addition, curriculum and instruction need to be examined to ascertain the degree to which they promote student ownership of learning in the first place. While the Common Core State Standards offer a useful framework of knowledge and skills highly aligned with college and career readiness (Conley, Drummond, de Gonzalez, Rooseboom, & Stout, 2011), little attention has been paid yet to how students will be engaged at the deeper levels necessary for them to master this more challenging content. One obvious solution is to build their ownership of the material by having them explore the ways the Common Core informs a wide range of possible futures, one or more of which will hopefully be motivating and engaging. Students then need to set explicit goals for themselves, goals that incorporate the Common Core State Standards as means to the ends they are pursuing, and then engage in instructional activities that are aligned with their goals and aspirations.

Conclusion

Central to student ownership of learning are high aspirations and goals clearly aligned to achieve them. Students' ability to motivate and engage in learning to persist in achieving key goals along with their ability to reflect on their progress can lead to increased self-efficacy and self-confidence as students learn that they can reach their goals by exerting effort. This then supports greater metacognition in the pursuit of learning goals that require students to reflect on their learning and develop learning strategies.

College and career readiness is enhanced when students demonstrate these behaviors. They can be taught. They are key to mastering complex content. Some proportion in the unexplained variance on assessments of content knowledge is likely the result of differences in these metacognitive variables. Improvements in student test scores require not just more time spent studying content knowledge but development of these metacognitive skills as well. Teaching methods that focus on the decontextualized presentation of content and do not pay sufficient attention to student motivation, engagement, goals, self-efficacy, metacognition, and persistence are less likely to result in student learning gains.

When students have this motivational framework in place, it serves to generate a gap between the current and the desired state of being for students. This discrepancy creates an action potential—the probability that students will act to close that gap.

Students then need a robust metacognitve tool box of the type described in the owner-ship model—a strong sense of self-efficacy that they can indeed achieve their goal through hard work, the ability to self-monitor their performance and adjust as needed, and the willingness to persist when they encounter a setback or unexpected challenge. Students with this skill set can cope with the demands of learning environments in which they must be more actively involved to succeed. They can use their strong foundation of content knowledge in sophisticated ways to comprehend complex material and solve challenging problems. In short, they can function as self-directed learners who are able to achieve their goals.

These are true 21st-century skills that will become increasingly valuable in an era when initiative and drive will be highly prized and rewarded characteristics in the workplace. They will also be extremely valuable as individuals encounter situations in their lives that require them to adapt by adding new skills or mastering new knowledge. The world that today's young people are entering is one that will continue to change rapidly and that will make demands on them to be true lifelong learners. Their ability to take ownership of their learning will be key to their success not only in school but throughout their lives.

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