

Chapter 14

Strategies and Interventions for Promoting Cognitive Engagement



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Vignette 1

Nevaeh is a 16-year-old sophomore at Washington High School in an urban city in the Northeast. Nevaeh is very social and has many friends at school and in her neighborhood. She is on the school dance team and practices at least 2 hours every night. She also teaches a dance class for 4–6-year-olds twice a week at a local dance studio. She hopes to be a professional dancer or a dance teacher someday. Regarding school performance, Nevaeh has demonstrated proficiency on the state math, reading, and writing exams; however, she failed geometry and freshman English and is currently failing her sophomore biology and Algebra II class. She is behind in credits toward graduation and has a GPA of 1.75 (about a C-Average). Nevaeh’s teachers describe her as social, friendly, and polite but underachieving and unmotivated. When asked about why she believes she has failed courses, she explains that she is often bored in class, doesn’t see the relevance of what she’s learning to her future (“why do I need to know geometry to be a dancer?”), and doesn’t do her homework. She would rather spend time practicing dance or hanging out with friends than spending time on homework she doesn’t care about.

Discussion: What are Nevaeh’s strengths? In what ways is Nevaeh demonstrating engagement? In which subtype(s) of engagement does Nevaeh need improvement? In which indicators of cognitive engagement would intervention benefit Nevaeh? What strategies might you use to support Nevaeh’s engagement?

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Vignette 2

Raul is a 12-year-old 6th grader at Monroe Middle School in a Southwest suburban city. Raul is an extremely hard-working student who has learned the value of hard work and education from his parents who both regularly talk with Raul about how important getting an education is for his future. Raul loves video games and is good at them, and he wants to design games when he grows up. He believes that with effort and doing well in school he can achieve his goal. In school, Raul is earning mostly Bs and Cs in his classes. His teachers describe him as a hard worker (and explain that they give him credit for his effort, even when his work is not demonstrating mastery of the content), but as someone who needs extra support throughout a task to complete it. He has a difficult time starting a task, often feeling overwhelmed as he tries to figure out where to begin. He also has difficulty breaking tasks down into manageable chunks and is not sure what to do when he gets stuck, trying the same strategies over and over again. He spends time in tutoring before and after school for help with his homework.

Discussion: What are Raul's strengths? In what ways is Raul demonstrating engagement? In which subtype(s) of engagement does Raul need improvement? In which indicators of cognitive engagement would intervention benefit Raul? What strategies might you use to support Raul's engagement?

What Is Cognitive Engagement?

Definition

Cognitive engagement can be defined as students' investment in their learning, valuing of their learning, directing effort toward learning, and using learning strategies to understand material, accomplish tasks, master skills, and achieve goals (Reschly, Appleton, & Pohl, 2014). Cognitive engagement refers to both students' motivation to learn and the extent to which they act on that motivation and utilize cognitive and metacognitive strategies to regulate their learning (Fredricks, Blumenfeld, & Paris, 2004).

While the above is the definition we will use for the purpose of this chapter, there is no clear agreement on the definition of cognitive engagement across researchers. As noted by Reschly and Christenson (2012), there exists conceptual haziness about the construct of student engagement in general, due in large part to the fact that the study of student engagement is a relatively new field that draws on research from the perspectives of dropout prevention (e.g., Finn, 1989; Rumberger, 1995), school reform (e.g., NRC, 2004), and motivation (e.g., Skinner, Furrer, Marchand, & Kinderman, 2008), and overlaps with research from the field of psychology. These different perspectives have led to multiple definitions and subtypes of student engagement, including multiple conceptualizations of cognitive engagement which

suffers from some of the same conceptual haziness. Fredricks and her colleagues (2004) explain that research on cognitive engagement comes from research emphasizing a psychological investment in learning (e.g., Connell & Wellborn, 1991; Newmann, Wehlage, & Lamborn, 1992) and on research emphasizing self-regulated learning (e.g., Pintrich & De Groot, 1990; Zimmerman, 1990) while also overlapping with the academic literature on motivation (e.g., Ames & Archer, 1988; Brophy, 1987; Dweck, 1986).

While some researchers may prefer to focus on a particular perspective, Fredricks and colleagues (2004) argued that the study of cognitive engagement would benefit from the integration of each of these perspectives. As Appleton, Christenson, Kim, and Reschly (2006) contended, engagement and motivation may be separate constructs, but they are related, in that motivational beliefs are a necessary precursor to actively investing time and effort into a task and utilizing cognitive and metacognitive strategies. Motivational beliefs also aid in sustaining one's effort throughout a task. With these considerations in mind, this chapter is written from the premise that both motivation to learn and utilizing learning strategies are intricately entwined in the concept of cognitive engagement and that intervention, therefore, may target both aspects to foster greater engagement. So, while for research purposes it may be important to differentiate aspects of cognitive engagement such as investment, motivation, and self-regulation, there is less need to differentiate for the purposes of intervention and we benefit from considering all aspects of cognitive engagement as we design interventions.

Indicators

How do you know if a student is cognitively engaged in their learning? This is challenging because cognitive engagement is considered a “covert” subtype of engagement, meaning it is not readily observable or measurable—it is really about the internal processes happening within students' minds as they approach a learning task. However, despite being covert, educators may detect some of the following indicators of cognitive engagement through think alouds, discussions with students, surveys or questionnaires, or through written records of thinking, planning, and progress monitoring.

The indicators in Table 14.1 describe what one might expect to see or hear from students who are cognitively engaged. Recognizing the indicators of cognitive engagement that are present and absent for students will help to identify students who would benefit from interventions and also inform the selection of appropriate interventions (Sinclair, Christenson, Lehr, & Anderson, 2003). Students may be successful in school without exhibiting all of the indicators of cognitive engagement, but particularly if there are concerns with students' academic or behavioral engagement such as concerns about grades, attendance, or behavior, examining indicators of cognitive engagement may help inform interventions to increase cognitive engagement and in turn increase academic or behavioral engagement.

Table 14.1 Indicators of cognitive engagement

Broad Indicators	Specific Indicators	Examples of Evidence of the Indicator that Could Be Gathered Students...
Investment in learning/ motivation to learn	Valuing of learning	<ul style="list-style-type: none"> • Say “I want to”—they want to engage in a learning task and can explain why • Articulate the relevance of the learning to their short-term and long-term goals • Articulate an appreciation for the learning that will result from completing a task • Demonstrate interest and enthusiasm in their learning • Enjoy challenging learning tasks
	Demonstrating self-efficacy	<ul style="list-style-type: none"> • Believe they have the skills, knowledge, and ability to succeed on a task or in learning • Believe they have control over their learning
	Setting personal mastery goals and attributing success to effort	<ul style="list-style-type: none"> • Set personal mastery goals in which they approach the task as an opportunity to improve their competence (rather than as an opportunity to perform better than others or complete the task to please the teacher) • Attribute success to things within their control such as effort and strategy use • Take academic risks and are willing to make mistakes knowing that they can learn from them
	Investing time, attention, and effort in learning	<ul style="list-style-type: none"> • Give up other activities (even preferred ones) to complete a task • Spend enough time on a task to demonstrate mastery • Maintain concentrated attention to the learning task • Exert mental energy on a task • Report trying hard on a task • Persist on the task, even when it gets difficult • Go above and beyond what is required for a task
Use of cognitive and metacognitive strategies to self-regulate one’s learning	Appraising the task and one’s ability to accomplish the task	<ul style="list-style-type: none"> • Determine the requirements of the task • Consider whether or not they have the skills to be successful on the task • Make a judgment about whether or not the task is relevant to their personal goals • Consider their interest in the task • Consider how much effort and time the task will take, what they may have to give up to complete the task, and whether or not they are willing to give the task their time and effort

(continued)

Table 14.1 (continued)

Broad Indicators	Specific Indicators	Examples of Evidence of the Indicator that Could Be Gathered Students...
	Planning	<ul style="list-style-type: none"> • Articulate long-term and short-term goals • Set specific, proximal goals related to the learning task • Create and record an action plan for completing a task and/or meeting a goal • Break down large projects into manageable chunks • Make a to-do list, use their agenda/ assignment book, calendar, or other means of tracking their tasks • Consider which strategies will help in completing the task
	Using specific study skills or learning strategies	<ul style="list-style-type: none"> • Utilize specific strategies such as note-taking, previewing texts, reading comprehension techniques, summarizing, outlining, mnemonic devices, and test preparation strategies • Remain focused on the learning task • Remove distractions
	Monitoring progress and adjusting strategies	<ul style="list-style-type: none"> • Self-monitor their completion and the accuracy of their completion of tasks • Self-monitor progress toward short-term and long-term goals • Engage in self-questioning to check for understanding, appropriateness of strategies selected to complete a task, productivity (amount completed), and accuracy (level of correctness) • Seek help when needed • Use strategies to stay motivated such as setting up self-rewards or engaging in self-talk
	Self-evaluating and reflecting	<ul style="list-style-type: none"> • Compare their performance to established expectations or rubrics • Compare their performance to past performance or a pre-assessment to check for improvement and growth • Evaluate whether or not they met their short-term goals • Evaluate outcomes to determine if their selected strategies for completing the task were the best strategies given the circumstances or whether different strategies should be employed in the future • Reflect on how they feel about their performance on the task and the final product

For example, for a student like Nevaeh, there are concerns about both her academic and cognitive engagement. She has poor grades and is behind in credits earned, and this appears to be the result of low cognitive engagement. She is demonstrating some indicators of cognitive engagement such as goal setting, evidenced by her long-term goals, and self-regulation skills, evidenced by her ability to complete a task if she puts her mind to it. We also know that there are some indicators she is not displaying such as not seeing the connection between her current academic work and her future goals and so not investing in her learning nor applying self-regulated learning strategies. Her lack of cognitive engagement seems to stem from not valuing the learning. Intervention efforts with Nevaeh then should start by building on the indicators that she is demonstrating and targeting the lack of perceived relevance of her schoolwork. In contrast, Raul sees the relevance of his schoolwork to his future goals and puts forth great effort toward completing a task, but he has difficulty employing strategies to control his learning. He is invested in his work but shuts down when he encounters daunting multi-step tasks or questions that he is unsure how to answer. Interventions with Raul would likely focus on teaching self-regulated learning strategies such as chunking assignments, study skills, and help-seeking to help Raul more efficiently master his learning tasks and goals.

Facilitators

In addition to indicators, facilitators of cognitive engagement, contextual factors that influence students' level of engagement, are also important to recognize because they have implications for designing interventions. The extent to which students engage cognitively in their learning is influenced by facilitators such as the classroom goal structure (e.g., Ames & Archer, 1988; Meece, Anderman, & Anderman, 2006), teacher expectations for student success (e.g., Rubie-Davies, 2010; Tyler & Boelter, 2008), peers' valuing of learning (e.g., Ryan, 2000), and families' expectations for their children (e.g., Murray, 2009; Taylor & Lopez, 2005). Note that these facilitators extend across contexts in which students learn and develop, and each is an alterable variable that can be considered as a target for intervention.

Particularly important in facilitating cognitive engagement is ensuring support for students' psychological needs. Students have innate psychological needs for autonomy, belonging, and competence (Ryan & Deci, 2000). In particular, when students' need for autonomy and competence are met, they are likely to be cognitively engaged in school. Practices that support autonomy and competence and serve as facilitators of cognitive engagement include such practices as ensuring learning is of interest to students, allowing students choice and voice in their learning, focusing on learning for the sake of learning (rather than for a grade or for a test), scaffolding learning to ensure students experience success throughout the process, as well as creating a classroom environment in which it is safe to make mistakes and try again (Ryan & Deci, 2009).

In returning to Raul, an example of a facilitator of cognitive engagement is his parents' valuing of education, which in turn impacts Raul's own valuing. A facilitator that could be targeted for intervention is the level of the work provided to him. Teachers may look at instructional match to ensure work is at Raul's level and not leading to frustration. When interventions are discussed later in the chapter, the focus will be largely on facilitators within the school environment, which researchers have agreed are critical to promoting cognitive engagement (e.g., Ames, 1992).

Why Is Cognitive Engagement Important?

In general, cognitive engagement has been linked with many positive outcomes for students including academic achievement (e.g., Greene, Miller, Crowson, Duke, & Akey, 2004; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996; Pintrich & De Groot, 1990; Rodríguez & Boutakidis, 2013); mental health (Roeser, Eccles, & Strobel, 1998; WHO, 2005); life satisfaction, well-being, and overall self-esteem (Maton, 1990). Reschly and Christenson (2012) also suggest that cognitive engagement influences students' academic and behavioral engagement. For example, when students see value in their learning, they are more likely to engage in observable behaviors consistent with school success such as attending class, completing homework, and earning credits.

To understand the importance of cognitive engagement more specifically, it is necessary to look at outcomes associated with each component of cognitive engagement: both students' motivation to learn and the extent to which students act on that motivation and utilize cognitive and metacognitive strategies to regulate their learning. In the following section, a description of each broad indicator of cognitive engagement and research supporting its importance is provided.

Motivation to Learn and Personal Investment in Learning

Motivation refers to students' desire to learn, to do well in school, and to pursue future goals (e.g., Covington, 2000; Deci & Ryan, 1985; Eccles & Wigfield, 2002; Zimmerman & Schunk, 2008). Motivation runs throughout cognitive engagement, for example in informing the tasks in which students choose to engage, the goals they set for themselves, their belief in their ability to succeed, the effort they put into completing a task, the strategies they choose for completing a task, the level of mastery they display in completing a task, and their satisfaction with their performance (e.g., Eccles & Wigfield, 2002; Zimmerman & Kitsantas, 1999; Zimmerman & Schunk, 2008). Motivation to learn goes hand-in-hand with personal investment, which is about acting on that motivation and putting forth time, effort, and mental energy into mastering knowledge, skills, and learning (Newmann et al., 1992). If students are personally invested in their learning, they are intrinsically motivated—they are committed to and actively engaged in taking control of their own deep

learning. Motivation to learn and personal investment are characterized by valuing of learning, demonstrating self-efficacy, setting meaningful goals and attributing success in meeting those goals to effort, and investing time and effort. Each of these components is malleable and therefore important to understand as they inform understanding of intervention efforts described in the next section.

Valuing of learning In considering if students value a given learning task, one might ask: Do the students see the task as relevant to their future? Do they see the task as having some inherent value? Are they interested in the task? Do they see the task as helping them learn and grow? Students who are cognitively engaged demonstrate valuing of their learning, including a perceived relevance and value of the learning task and interest in the task. If they value their learning, they are more likely to put in time and effort to complete the task (e.g., Ainley, 2012; Miller & Brickman, 2004; Wigfield & Eccles, 2000).

Researchers have demonstrated a relationship between the perceived relevance and value of learning and academic achievement (Greene et al., 2004; Miller et al., 1996), mastery goal orientation (Debacker & Nelson, 1999; Greene et al., 2004), use of self-regulated learning strategies (Miller & Brickman, 2004), persistence and effort in their learning (Miller et al., 1996), and school completion (Lovelace, Reschly, Appleton, & Lutz, 2014). For example, Miller and Brickman (2004) asserted that students who perceive their schoolwork as important to achieving their future goals are more likely to value the work and engage in self-regulated learning in order to move closer to reaching their proximal goals and ultimately their future goals. Lovelace and colleagues (2014) found that the higher a 9th-grade student's rating of their future aspirations and goals (as measured by the Student Engagement Instrument with items such as school is important for achieving my future goals, going to school after high school is important, my education will create many future opportunities for me), the more likely they were to graduate on time and the less likely they were to drop out of school.

Concerning task interest, Ainley (2012) contends that "when there is a match between students' individual interest and specific contextual affordances, students readily embrace the activity expressing enjoyment, concentration, and a desire to find out more" (p. 287). In other words, when students are interested in the task, they are more likely to invest their time and effort into completing the task. In addition to prompting initial engagement in the task, Ainley also argues that interest will help to sustain students' engagement in the task. In a study with 7th- and 8th-grade students, Ainley, Hidi, and Berndorff (2002) found that topic interest (in this case, whether or not a book appealed to students based on the title) led to an affective response for students that determined whether or not they would engage with the reading task. For some, lack of topic interest led to the students feeling bored or uninterested which in turn led to them discontinuing the task. For others, the title was interesting, prompting a positive affective response which made them more likely to engage in the reading task. Interestingly, researchers have found that if students have a general interest in school and learning then when given even a boring task they are able to engage in strategies to enhance their interest and

maintain their engagement in the task in order to complete the task (Sansone & Thoman, 2005; Sansone, Weir, Harpster, & Morgan, 1992).

Self-efficacy Academic self-efficacy refers to students' belief in their ability to succeed on a given learning task. The more students believe they can succeed on a task, the more likely they are to engage in undertaking the task (e.g., Bandura, 1986; Pintrich & Garcia, 1991; Schunk & Pajares, 2009; Zimmerman & Martinez-Pons, 1990). Self-efficacy is an important indicator of cognitive engagement because it serves as a determinant of whether a student chooses to actively engage in a learning task or not, affects performance during engagement of the task, and is changed based on self-feedback gathered during the task and self-evaluative feedback upon completion of the task (Schunk, 1989).

Descriptive research at the secondary level has confirmed consistently the relationship between self-efficacy and self-regulated learning and academic achievement (e.g. Pajares, 1996; Pintrich & De Groot, 1990; Schunk, 1991; Zimmerman, Bandura, & Martinez-Pons, 1992). In looking at several studies conducted with middle school students, Pintrich (1999) reported significant positive relationships between students' reported use of self-regulated learning strategies and their self-efficacy and between their self-efficacy and academic performance. In one such study, Pintrich and De Groot (1990) examined seventh-graders' self-efficacy, motivation, cognitive strategy use, effort management, and academic performance. They found that self-efficacy was significantly, moderately correlated with cognitive strategy use and self-regulation. Results from regression analysis indicated that self-efficacy and self-regulation were significant predictors of academic performance as measured by average grade on schoolwork artifacts. Zimmerman et al. (1992) utilized path analysis to study the relationship between academic self-efficacy, self-efficacy for self-regulated learning, and academic achievement. They found that academic self-efficacy affected academic achievement directly and indirectly by raising high school students' grade goals. Results indicated that when students had higher belief in their ability to perform well academically, they set higher academic goals for themselves, which in turn led to higher academic performance.

Students build self-efficacy over time by reflecting on their previous successes, and students who repeatedly experience failure on academic tasks can become discouraged learners (Schunk, 1991). While high expectations from school staff and family members are important, ultimately students must believe they have the ability and control over their learning in order to engage in the learning and succeed.

Goal orientation and growth mindset Learners' goal orientations, as defined by achievement goal theorists, refer to the different ways that learners approach, engage in, and respond to learning tasks (Ames, 1992). Researchers differentiate between two main types of goal orientations: mastery and performance goals (referred to alternatively as learning and ability or task-involved and ego-involved goals; e.g., Ames & Archer, 1988; Dweck & Leggett, 1988; Maehr & Nicholls, 1980). Mastery goals are those that orient the learner "toward developing new skills, trying to understand their work, improving their level of competence, or achieving a sense of

mastery based on self-referenced standards” (Ames, 1992, p. 262). Conversely, performance goals are those that orient the learner toward trying to prove their ability through doing better than others, surpassing expectations, or achieving success with little effort (Ames, 1992). Research has demonstrated consistently that students who approach learning with a mastery goal orientation engage in more self-regulated learning behaviors (e.g., Ames, 1992; Dweck & Leggett, 1988; Pintrich & De Groot, 1990), report higher levels of effort (e.g., Grant & Dweck, 2003; Miller et al., 1996; Wolters, 2004), and exhibit greater persistence at difficult tasks (Elliot & Dweck, 1988; Stipek & Kowalski, 1989) than do students who approach learning from a performance goal orientation. The research in this area for learners of all ages is vast and well-developed (Hulleman, Schrage, Bodmann, & Harackiewicz, 2010).

Related to students’ goal orientations are their mindsets. Mindset refers to students’ beliefs about whether intelligence and ability are fixed or malleable with effort, how they view failure and success, and the effort they put into schoolwork. Mindset is highly associated with goal orientation because students who operate from a growth mindset, or one in which they view their ability as changeable through effort and attribute success to effort and hard work, are more likely to set mastery goals for themselves, whereas students who operate from a fixed mindset, or the belief that they cannot change their ability and that their performance is determined by their ability, are more likely to set performance goals (e.g., Ames & Archer, 1988; Blackwell, Trzesniewski, & Dweck, 2007; Dweck & Leggett, 1988). Researchers have demonstrated that when students attribute previous academic successes and failures to their own level of effort, they are more likely to put forth effort again in the future (e.g. Ames & Archer, 1988; Dweck & Leggett, 1988; Weiner, 1986). Effort and mindset are also strongly related to self-efficacy, with students with higher self-efficacy being more likely to put forth effort to achieve their goal (e.g. Pintrich, 1999; Pintrich & De Groot, 1990; Tuckman & Sexton, 1990). Therefore, much of the research on effort and mindset also overlaps with goal orientation and self-efficacy, and some sample findings have already been presented.

Investing time, attention, and effort in learning The aforementioned motivational beliefs—valuing of learning, self-efficacy, mastery goal orientation, and growth mindset—are determinants to students investing their time, attention, and effort in their learning or into a given learning task. A model that aligns with these motivational beliefs and helps to guide understanding of why or why not a student would choose to engage in putting forth effort into a learning task was proposed by Eccles and colleagues (1983) and known as the expectancy-value model of motivation. The model, put into formula format as $\text{Motivation} = \text{Expectancy} + \text{Value} - \text{Cost}$, describes the factors that students internally process and weigh when determining whether or not to actively participate in the task.

Expectancy They consider their expectancy for success on the learning task (similar to self-efficacy)—do they have the skills and ability to do the task, do they believe their effort will lead to learning, do they believe they know what is expected

of them and can meet those expectations, and do they believe they have the support they need if they experience difficulty?

Value Students also consider and weigh the value of the learning task—are they personally interested in the task, does it connect to their goals, does the task allow for choice and personal control, and do they see the task as resulting in learning that will help them grow and develop? When considering value, students may also look outside the intrinsic value of the learning and consider whether the learning will bring them some extrinsic benefit such as a good grade or reward, as well as if they will experience a positive interaction with their peers or teacher through engaging in the task.

Cost Though included in the model when first proposed, more attention has been brought to cost in recent years (Barron & Hulleman, 2015; Hulleman et al., 2010). Cost refers to what a student might have to give up to engage in the learning task or other negative consequences of engaging in the task. Students must consider the amount of effort and time needed for the activity, the other activities that are competing for their time and energy, and the activities they may miss out on. They also must consider how they will react to the learning task—will it bring anxiety or stress or will it be physically uncomfortable? Each of these costs is weighed against the predicted benefits to determine whether or not a student will put forth energy, effort, and time into a task.

As students are internally weighing these factors, they are already cognitively engaging with the learning task. The result of their weighing determines whether they keep that engagement going and to what extent they engage or put in time, effort, and energy. Should they choose to continue engaging, throughout the task they will continually weigh whether the benefits offset the costs, and when they encounter difficulties, they will especially lean on their motivational beliefs in determining whether or not to persist.

Persistence, or student's continued cognitive engagement and putting forth effort despite encountering obstacles, is linked to self-efficacy, goal orientation, and mindset. Students who believe they can work through the obstacle, who believe their effort and hard work will eventually pay off, and who set mastery goals are more likely to persist in their behavior toward achieving a goal (e.g., Duckworth & Seligman, 2005; Elliot & Dweck, 1988; Grant & Dweck, 2003; Miller et al., 1996; Wolters, 2004). This persistence is related to positive school outcomes for students. For example, Duckworth and Seligman (2005) studied 8th graders' self-discipline (ability to persist, delaying gratification, controlling impulses) and found it to be positively correlated with outcomes such as grades and standardized test scores. Martin and Marsh (2008) found that high school students' academic buoyancy (students' ability to persist in the face of typical academic setbacks) is related to a reduction in negative outcomes such as anxiety, fear of failure, and uncertain control.

Use of Cognitive and Metacognitive Strategies to Control One's Learning

The other broad indicator of cognitive engagement is the use of strategies to self-regulate one's learning. In discussing investing time, attention, and effort in learning, we have already begun the discussion of acting on motivational beliefs. Indeed, strategies used to control effort and persist are examples of self-regulated learning strategies. Self-regulated learning has been defined as students strategically directing their thoughts, feelings, and behaviors toward attaining personal learning goals (Schunk, 2001). Examples of strategies include analyzing tasks, setting goals, planning, organizing the environment, eliminating distractions, rehearsing, summarizing, monitoring progress, and self-reflecting on one's learning (Zimmerman, 1989). Certainly, motivational beliefs are part of this self-regulation of learning. The higher a student's self-efficacy, the more they value the learning task, and the more driven they are by mastery, the more likely they are to use strategies to control their learning; and reciprocally, as they engage in using strategies, the higher their self-efficacy, the greater their interest in learning, and the more appropriate their learning goals are (e.g., Cleary, 2006; Pintrich & De Groot, 1990; Schunk & Zimmerman, 1994).

Self-regulated learning strategy use has been related consistently to academic achievement and other positive school outcomes, especially in secondary students. Researchers have found that self-regulated learning strategy use by high school students significantly correlated with and positively predicted students' academic achievement (Cleary, 2006; Greene et al., 2004; Zimmerman & Martinez-Pons, 1986). Cleary (2006) also discovered that high school students who reported greater use of strategies also reported fewer maladaptive behaviors. In regard to middle school students, Pintrich and De Groot (1990) found that 7th-grade students who reported the greatest levels of self-regulated strategy use also reported the highest levels of achievement, and Wolters and Pintrich (1998) found that students use of strategies predicted their semester grades in core subjects. Finally, Wang and Eccles (2012) examined students' engagement trajectories from grades 7 to 11 and found that as students' cognitive engagement declined (specifically their use of self-regulatory strategies), their GPA and educational aspirations for the future also declined.

The benefits of cognitive engagement to student learning and student success in school are undeniable. This being the case, let's explore how to promote students' cognitive engagement.

How Can We Promote Cognitive Engagement?

The good news is that intervention studies have repeatedly demonstrated that motivational beliefs can be fostered and self-regulated learning strategies and processes can be taught and learned (e.g., Blackwell et al., 2007; Harris & Graham, 1999;

Hattie, 2009; Meece et al., 2006). Knowledge of the indicators and facilitators of cognitive engagement serves as a basis for designing interventions that promote cognitive engagement by helping us understand the need to target both students' will to engage in a learning task and their skill in using self-regulated learning strategies to do so. Planning appropriate and effective interventions, therefore, requires understanding students' specific needs in regard to their will and skill. For example, as mentioned previously, Neveah's need is one of will. She has demonstrated she has the skills to self-regulate her learning when she commits to doing so, but intervention should focus on increasing her investment to ensure she is engaging cognitively consistently across subjects. For Raul, his need is skill development. He is motivated to learn but lacks the strategies to be able to self-regulate his learning.

Strategies and interventions presented here target both will and skill and are organized by indicators (though intervention targets described also include facilitators). Thinking in terms of the Multi-tiered Systems of Support/Response to Intervention frameworks, the strategies and interventions provided here are appropriate for application school- or class-wide to serve all students, as well as appropriate to be tailored to serve small groups or individual students based on their specific needs. At the end of the section is an overview of formalized intervention programs targeting the development and implementation of self-regulated learning strategies.

Strategies and Interventions to Promote Motivation to Learn and Personal Investment— “Will”

Valuing of learning Two key targets for intervention when considering students' valuing of learning are (1) ensuring students have identified their interests and long-term goals that are of value to them and (2) designing learning tasks to ensure relevance, value, and interest.

Long-term goal setting When students have personal goals in mind, they are more likely to see the relevance of a task and work harder and longer to finish it (Greene & Miller, 1996). Having personal goals can also help students direct their choices, attention, and effort toward activities that will help them achieve their goals and can give students more positive feelings and satisfaction while they are in school or completing school work (Zimmerman, 2008). Goals can help give struggling students the motivation they need to engage in school. Strategies to encourage long-term goal setting include:

- Facilitate future-oriented thinking. Help students vision their future and set long-term goals to achieve that vision.
 - Guide students in expressing their “possible selves” for the future (Borkowski & Thorpe, 1994).

- Some students have difficulty imagining their possible futures. Help students to understand what possibilities might exist for them in the future (Miller & Brickman, 2004; Oyserman, 2008).
- Start helping students identify their dreams for their future early in their education so that they have multiple opportunities over time to imagine possible futures for themselves.
- Instruct students in setting short-term goals that will help them to achieve their long-term goals.
- Allow autonomy in goal setting. When students decide what their long-term goals are for themselves, they are more likely to commit to them (Brophy, 2004).
- Help students to see the connection between their current attitudes and behaviors and their long-term goals and future selves (Simons, DeWitte, & Lens, 2004).

Design learning tasks to ensure relevance, value, and interest When developing learning tasks for students, consider the following:

- Get to know students' short-term and long-term goals.
 - Design learning tasks that are directly linked to those goals.
 - Discuss possible connections between the tasks and students' goals.
 - Explain the purpose of classroom activities and how they can help students in achieving their long-term goals.
- Design and implement authentic, real-world tasks to teach curricular standards. Authentic work, or work that students perceive as meaningful, valuable, significant, worthy of effort, and that is connected to the real world, fosters cognitive engagement (Newmann et al., 1992).
- Work with students to identify their interests and then incorporate students' interests into academic tasks when possible. Student interest in the academic task is another source of motivation to engage and sustain engagement with the academic task (Ainley, 2012).
 - Provide a *hook*—meaning they are activities that immediately trigger students' interests and draw them into engaging in the tasks by being novel, attractive, challenging, or uncertain; and/or provide a *switch*—meaning they are activities that engage the students by offering opportunities for the students to engage in activities that are related to their interests or valued activities (Ainley, 2012).
 - Teach students strategies for enhancing interest in tasks they may perceive as boring, such as turning the task into a game, working cooperatively with others, and making connections between the task and their own interests.
- Allow students choices in the method and pace of learning.
- Where possible, work with teachers to allow students who perform poorly on tests to improve their work, as this turns evaluation into a learning opportunity for students. If teachers use external rewards for student performance, encourage

them to individualize these to the students who need them most as motivation to put forth effort (Ames, 1992).

Self-efficacy Students acquire information to help them assess their self-efficacy through four main sources: their past or present performance on tasks, observations of peers or other models, persuasion, and physiological or emotional reactions (Bandura, 1997). Supporting students in developing their self-efficacy involves helping students reflect on their existing sources of information about their ability to succeed as well as creating opportunities to gather information from sources. Schunk and Mullen (2012) suggest the following strategies to foster student self-efficacy:

- Work with students to set reachable, short-term goals so that they can experience success. Increase the level of challenge in these goals over time. If they can experience even small successes, their self-efficacy is likely to increase.
- Provide specific, relevant, ongoing feedback to students about their performance so that they have real-time information on which to judge their self-efficacy.
- Provide students with specific feedback that praises effort and the use of specific strategies in learning a skill or completing a task. This promotes students' feeling of control over their learning.
- Allow students to observe and work with students similar to themselves who can model how to learn target skills. Students who observe students like them being successful are more likely to feel like they too can be successful.

Goal orientation and growth mindset Interventions to promote a mastery goal orientation and a growth mindset can target students' beliefs and skills directly and/or the classroom structure which can serve as a facilitator.

Mastery goal orientation

- Help students to establish mastery goals that are associated with a desire to learn new things, interest in the subject material, working hard, and using feedback to improve their achievement on the next assignment. Support this by providing mastery-oriented learning opportunities—those that require them to learn a new skill and demonstrate improvement rather than just earn a grade or a score.
- Teach students to set “Personal Best” goals. These are specific goals in which students set goals to improve upon their own learning or score. For example, if a student is practicing his spelling words and spells 12/20 correctly that becomes his personal best score. When he goes to attempt another round of spelling the words, he may set a goal to beat his personal best and improve his score to 14/20 words. These goals allow students to experience both success and challenge in their learning (Ginns, Martin, Durksen, Burns, & Pope, 2018).
- Allow students who perform poorly on tasks, assignments, projects, or tests to improve their performance by using feedback they've been provided and applying different strategies, knowledge, or skills.

- Help students develop action plans to achieve their goals. Action plans should include the goal, action steps to reach the goal, supports and resources they may need to reach the goal, and how they will know when they've achieved their goal.
- Provide students the push they need to get started and keep going. Students are motivated to act on their goals as a function of: (1) how likely they are to be successful (expectancy) and (2) how much they think they will benefit from it (value). The student believing he/she will succeed does make it more likely that the student will succeed (Wigfield & Eccles, 2000).
- Integrate "TARGET" (Ames, 1992; Epstein, 1989) into lesson planning. Ames developed the system based on classroom dimensions that encourage students to take on either a mastery or performance goal orientation. TARGET reminds educators to structure their class for a mastery orientation by ensuring that *tasks* are meaningful and relevant, that *authority* is shared between the teacher and students, that all students are *recognized* for progress and effort, that *grouping* is heterogeneous and flexible, that *evaluation* is criterion-referenced, and that *time* is flexible in the class allowing for self-pacing when needed.

Growth mindset For a more extensive summary of strategies and interventions to promote a growth mindset in students, see Chap. 16 in this edition.

- Explicitly teach that the brain is a muscle that can grow and change and that intelligence is malleable (Blackwell et al., 2007).
- Create a classroom environment that makes it safe to make mistakes. Help students see failures or mistakes as learning opportunities.
- Praise effort and strategy use rather than intelligence (Mueller and Dweck, 1998).

Investing time, attention, and effort in learning As discussed earlier in the chapter, valuing of learning, self-efficacy, mastery goal orientation, and growth mindset are determinants to students investing their time, attention, and effort in their learning; therefore, interventions described above can be implemented to encourage students to take action and invest in their learning. Additional consideration is given here related to the "cost" component of the expectancy theory of motivation as well as to persistence.

Expectancy theory of motivation In returning to the formula for motivation based on the expectancy theory, $\text{Motivation} = \text{Expectancy} + \text{Value} - \text{Cost}$, strategies to promote expectancy and value have already been shared, what has not been discussed and is rarely discussed, are interventions related to cost. Costs are what tend to get in the way of a student being motivated enough to put forth effort for a learning task. For students, the costs may be just the sheer amount of time, effort, and work going into the task (task effort cost); the amount of effort and time not going toward a preferred task (outside effort cost); the things that they give up completely or miss out on due to their engagement in the task (loss of valued alternatives cost); and the negative emotions that arise due to the task or other costs (emotional cost; Flake, Barron, Hulleman, McCoach, & Welsh, 2015). Weighing these costs internally is an indicator of cognitive engagement. So what are some possible difficulties

students may encounter with weighing costs and how might educators help them past those barriers?

- Students may have difficulty internally processing through the costs and benefits. Perhaps they can't see past the costs to even be able to see the benefits. Engaging in dialogue with students and helping them outwardly process through the costs and benefits will teach students how to do this scaffolding internally in the future and help support them in putting forth the necessary effort in the moment.
- The emotional cost of a task may be so high that it clouds the ability to consider benefits or act on the task. For example, a student facing a test may experience significant anxiety. That anxiety may keep them from being able to cognitively process the value of taking the test. Helping the student develop coping strategies may help to mitigate the emotional cost.
- Students may be impulsive or unable to delay gratification, so the cost of missing out on something or putting energy toward something that is less preferred consistently keeps them from engaging in learning tasks. Helping students slow down, consider short- and long-term consequences of their choice to engage or not, and practicing delaying gratification may all support the students in weighing options more carefully and making the choice to engage.

Persisting Maintaining time, attention, and effort in learning throughout a learning task and especially in the face of challenges is difficult for many students. Persistence may be difficult simply because it is hard to maintain a high enough level of motivation and effort to complete a task, or because another activity is more interesting (returning to the expectancy model, the costs outweigh the benefits). Some of the following strategies from Wolters (2003) may be useful in helping students persist in their learning:

- Help them to be aware of their level of motivation and notice when it dips. This may help students begin to recognize when they need to implement strategies for persisting.
- Teach students to set proximal goals and to reward themselves when they reach those goals.
- Help students to break large tasks into smaller parts that are easier to tackle.
- Help students structure the environment to minimize distractions.
- Teach students to engage in self-talk, reminding themselves of their goals and the benefits associated with meeting those goals.
- Modify the task so that it is more interesting for the student or help them to modify for themselves. For example, turn the assignment into a game.

Each of these suggestions for promoting persistence entails teaching students a strategy for controlling or regulating their motivation and effort throughout a task, meaning they are self-regulated learning strategies. These interventions then are bringing us into promoting necessary student skills for cognitive engagement.

Strategies and Interventions to Promote Self-Regulated Learning Strategy Use—“Skill”

A meta-analysis of self-regulated learning strategy use indicated that students of all ages, elementary through adult, can be trained in using self-regulated learning strategies and that such training helps students develop an arsenal of strategies from which to choose while attempting different academic tasks in different learning contexts (Hattie, 2009). While some students may be able to take these strategies and apply them independently with ease, others may struggle with when to use which strategy and in which situations. For example, while they may easily self-regulate in playing a video game (setting goals for themselves prior to playing, planning out their strategy, monitoring their performance as they play, reflecting on what went well and what could have gone better at the end of a stage or “life”, and then trying again), they may have difficulty applying the same strategic thinking as they approach a math worksheet. Many students would benefit from being explicitly taught and guided through the phases of self-regulated learning which correspond to strategic thinking before, during, and after engaging in a learning task (Zimmerman, 2000).

The intervention ideas presented here are organized by phase of self-regulated learning and by strategy (Zimmerman, 1989, 2000). Also provided is a student-friendly graphic representation of the three phases with questions that can help guide them through each phase of self-regulated learning (Fig. 14.1). This diagram may be used by students on their own as they approach a particular task or it may be used with someone supporting and guiding them through the phases verbally. The second approach has the benefit of making an internal process external and provides the opportunity for the educator to model thinking and prompt student thinking. As students gain experience using the diagram to guide them, the hope is that they will eventually internalize the process and be able to engage in self-regulated learning without need for visual or verbal prompting.

- *Forethought phase—planning* (Before I begin). Teach students the following strategies/skills:
 - *Task appraisal*. Teach students how to approach the task and prepare to get started. Help them to consider the requirements of the task, whether or not they have the skills to be successful on the task, their interest in the task, the amount of time and effort the task will take, what they may have to give up in order to complete the task, and whether or not they are willing to give the task their time and effort.
 - *Short-term and long-term goal setting* (see previous section for more specific ideas). Help students set specific goals for the task. Also, help students see the connection between the task and their future or long-term goals.
 - *Planning*. Guide students in creating an action plan for achieving their short-term, task-specific goals.

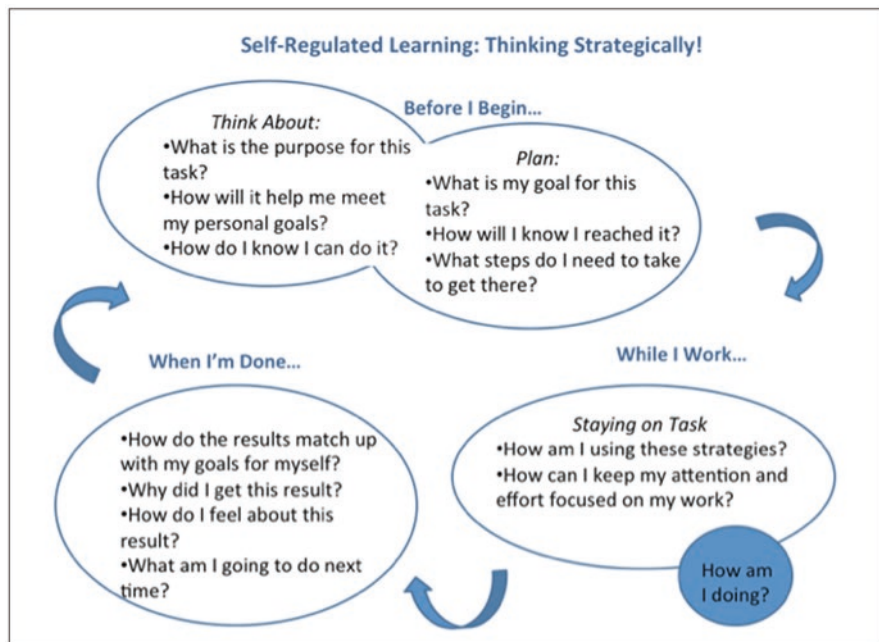


Fig. 14.1 Guide for discussing phases of self-regulated learning with students. (Source: From Pohl, Nelson, and Christenson (2012). *Check & Connect Mentor Resource Guide*. Printed with permission from the authors)

- *Organizing*. Teach students how to organize their materials, prioritize their activities, and manage their time. Teach chunking large assignments into manageable chunks.
- *Environmental structuring*. Help students to eliminate distractions in their environment or find a place that will best support them in meeting their goals. Do they need dim light or bright light? Music or no music? Should they keep their cell phone in the other room? What environment will be most conducive to learning for them?
 - This is a strategy that may be especially helpful to involve parents in supporting. Parents can assist students with structuring the home environment for learning by helping ensure they have a quiet, distraction-free place to work.
- *Performance control phase—managing and monitoring one’s learning* (While I work).
 - *Study Skills*. Teach study skills that will aid in mastery of learning goals and completion of the learning task with accuracy. Study skills are strategies that

help students learn, process, and remember new information. Some examples of study skills include (e.g., Gettinger & Seibert, 2002; Zimmerman, 1989):

- *Note-taking*—Teach different formats for effective note-taking such as Cornell notes, q-notes, two-column notes, concept mapping, and outlining.
 - *Previewing text to increase reading comprehension*—Teach students to preview readings by looking for text clues such as the title, headings, and subheadings, and non-text clues such as pictures, tables, and diagrams.
 - *Rehearsing and memorizing*. Teach students how to practice or rehearse information. Teach strategies for memorization such as mnemonic devices.
 - *Keeping records*. Encourage students to record events or results. For example, help students keep a list of words they come across that they don't know as they read. This will help them monitor their progress and know when or how to adjust strategies.
 - *Self-evaluate*. Prompt students to pause regularly in their work to check for understanding and accuracy and that they are on the right track for meeting their goals or the expectations of the task. Also encourage them to alter their strategies if what they are doing is not getting them the desired results.
- *Self-management strategies to maintain motivation and persist on the task*. When students get stuck, encounter a challenge, or grow tired or distracted, they may need support in selecting strategies that will help them stay motivated and stay on task. Teach students specific strategies to help them persist such as:
- *Self-talk*. Help students to engage in self-instructing or positive self-talk that will motivate them to keep going. For example, they may remind themselves of the value of the task or the benefit they will receive when they complete the task. Or they remind themselves that they've done something similar before or that they have the skills they need to be successful.
 - *Self-consequating*. Teach students to set up a reward for meeting their goals. For example, if they study for another hour, they can take a break for 20 minutes and use their cell phone to connect with friends.
 - *Make the task interesting*. Help the students find ways to make the task more interesting by turning it into a game or competition or looking for ways the task connects to their interests.
 - *Help seeking*. Some students may not know how to ask for help or who to ask, or they may be uncomfortable asking because of how they might be perceived. Help students understand that asking for help is a valuable skill. Teach them how to ask for help, especially how to be specific and

identify their point of confusion, and discuss options of who they can ask for support with different tasks, whether it be a teacher, parent, or peer.

- *Self-Reflection* (When I'm done)
 - Provide opportunities for students to reflect on both their process for completing the task and the outcome. Help them consider what went well, what could have gone better, and what they might do differently next time. Aid them in also considering whether their time and effort were worthwhile and whether they would be willing to invest that time and effort again in the future.

Formalized Interventions to Promote Cognitive Engagement

There exist few formal evidence-based interventions to promote components of cognitive engagement and even fewer with a strong evidence base. A brief overview of three formalized interventions with varying levels of evidence is presented in Table 14.2 with information about the intervention's purpose, target population, frequency and duration, description, and major research findings.

Table 14.2 Formal interventions to promote cognitive engagement

<i>Brainology</i> (Information drawn from https://www.mindsetworks.com/programs/brainology-for-schools)	
Purpose	Blended learning curriculum designed to teach students the understanding that their intelligence and abilities are not fixed and can be developed through effort.
Target Population	4th- to 7th-grade students Both high and low-achieving students Students in a full range of educational settings
Duration/ Frequency	Two times per week for 45 minutes
Program Description	Brainology is an interactive program that shows students how their brains—like their muscles—become stronger with effort and practice. With the help of animated characters, students learn about how the brain functions and learns, along with healthy habits, study techniques, self-regulation strategies, and other essential non-cognitive skills that help them to become effective learners. <ul style="list-style-type: none"> • Students interact with online content independently. • Teachers reinforce concepts with classroom lessons. • There is one online session for every 4 classroom lessons.
Research	Results from several studies show that students receiving the Brainology intervention earned statistically significantly higher GPAs, were more likely to attribute academic failure to lack of effort and study, earned higher scores on a standardized reading assessment, and reported higher engagement, greater life satisfaction, self-efficacy, and valuation of learning compared to students not receiving the intervention. (Romero, Paunesku, & Dweck, 2010; Paunesku, Goldman, & Dweck, 2011a, 2011b; Schmidt, Shumow, & Durik, 2012). Through an 2015 award from the IES Social and Behavioral Context for Academic Learning Program, researchers are now studying the efficacy of <i>Brainology</i> to improve students' growth mindset and academic learning.

(continued)

Table 14.2 (continued)

<i>The Self-Regulation Empowerment Program (SREP)</i> (Information drawn from Chap. 15 in this volume)	
Purpose	Designed to provide support in engaging students in cycles of strategic action and reflection through modeling, feedback, and guided practices.
Target Population	Academically at-risk middle and high school students
Duration/Frequency	Multiple times per week, typically over the course of 3–4 months
Program Description	SREP is a comprehensive psycho-educational intervention program designed to empower academically at-risk middle school and high school students to take on greater responsibility and strategic control over their learning and academic behaviors. Using a variety of instructional modules and guidelines, SREP coaches provide instruction in foundational SRL knowledge and seek to optimize students' motivation, strategic skills, self-awareness, and skills to adapt effectively when challenged during coursework. An important feature of SREP is that the instruction is directly linked with a particular content area or course. This feature enables students to develop and practice their SRL skills as they encounter challenges and obstacles inherent in those authentic learning contexts.
Research	Researchers have found that students receiving the intervention demonstrated a boost in their classroom test scores and showed a statistically significant increase in strategic thinking and reflection pre- to post-intervention (Cleary, Platten, & Nelson, 2008; Cleary & Platten, 2013; Cleary, Velardi, & Schnaidman, 2017).
<i>Self-Regulated Strategy Development (SRSD)</i> (Information drawn from IES What Works Clearinghouse SRSD Report https://ies.ed.gov/ncee/wwc/)	
Purpose	Designed to improve students' academic skills through a six-step process that teaches students specific academic strategies and self-regulation skills.
Target Population	Students in grades 2–12; particularly effective with students with learning disabilities
Duration/Frequency	At least three times a week, and usually last 20–60 minutes
Program Description	The intervention begins with teacher direction and ends with students independently applying the strategy, such as planning and organizing ideas before writing an essay. More specifically, the six steps involve the teacher providing background knowledge, discussing the strategy with the student, modeling the strategy, helping the student memorize the strategy, supporting the strategy, and then watching as the student independently performs the strategy. A key part of the process is teaching self-regulation skills, such as goal-setting and self-monitoring, which aim to help students apply the strategy without guidance. The steps can be combined, changed, reordered, or repeated, depending on the needs of the student.
Research	Results from numerous studies with elementary and secondary students with and without disabilities demonstrated that the Self-Regulated Strategy Development is effective in helping students to improve their quality of, knowledge of, approach to, and self-efficacy in writing. The What Works Clearinghouse recognizes SRSD as having potentially positive effects on writing achievement for students with learning disabilities based on 9 studies that met their standards for consideration.

Summary

Cognitive engagement refers to students' investment in their learning, their motivation to learn, and the extent to which they use strategies to regulate their learning. Cognitive engagement, along with affective engagement, is a covert subtype of student engagement which is difficult to observe, but nonetheless important in promoting academic and behavioral engagement.

Despite cognitive engagement representing internal processes, there are indicators of whether or not students are engaging cognitively which can be detected through conversations with students; students recording of their thinking before, during, or after a task; or through questionnaires. Indicators include students' interest in their learning, perceived relevance of the learning, belief in their ability to be successful, willingness to put forth time and effort, setting of goals, and use of strategies to monitor their thinking and performance during a task. Each of these indicators represents alterable variables, so ideal targets for intervention. Additional targets for intervention are facilitators, or contextual factors, that influence whether or not a student engages such as the classroom goal structure, the praise a teacher gives, and the beliefs peers hold about the value of learning.

Interventions and strategies to promote cognitive engagement can target students' will and help them develop the motivational beliefs to be willing to commit to and invest in their learning and can also target students' skill and support them in developing the cognitive and metacognitive strategies to self-regulate their learning. And while there are few formal interventions, there exist many strategies and more informal interventions that can be implemented classwide, with small groups, or with individuals to support their cognitive engagement. The next two chapters present additional information on interventions to support self-regulated learning and growth mindset.

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