# Research Guide (Grades 7–12)
# College and Career Competency: *Self-Efficacy*

## Definition

Self-efficacy refers to perceptions an individual has about their capabilities to perform at an expected level, achieve goals, and complete moderately challenging tasks (Noonan & Gaumer Erickson, 2018c, p. 23).

## Essential Components for Students

1. Focus on your effort, progress, and learning.
2. Take steps to increase confidence in your abilities.

## Strategies for Students

These strategies help students persist through challenging tasks and improve confidence in their abilities. The strategies are taught through instructional activities within the *Self-Efficacy Lessons [Primary, Intermediate, and Secondary]* (Noonan, Gaumer Erickson, Heger, & Haught, 2023).

1. Focus on my effort
2. Try again
3. Calm myself
4. Say, "I haven't learned _____ yet"
5. Exercise my brain
6. Learn from my mistakes
7. Remember hard things I've done
8. Give and accept praise
9. Accept feedback
10. Watch and learn from other

## Competency Sequence for Students

These targets provide a developmental sequence (Noonan & Gaumer Erickson, 2018b). As described in the Assessments section, these targets can be used to determine students' growth over time through a performance-based observation process.

| Self-Efficacy | |
|---|---|
| **Developing** | • Demonstrates an understanding that making mistakes is normal. |
| | • Continues work on a challenging task by trying different ways to solve a problem. |
| | • Demonstrates approaching a challenging task with recognition that ability grows with effort. |
| | • Describes mistakes as normal and as opportunities to learn. |
| | • Provides examples of growth mindset self-talk statements. |
| | • Describes some basic structures of the brain and understands that a brain can "grow" and change with practice. |

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| Emerging | • Explains the difference between a fixed mindset and a growth mindset. |
|---|---|
| | • Identifies times when their efficacy was strong and times when it was lacking. |
| | • Provides examples of how effort relates to accomplishing a challenging task and incorporates the concept to their own life. |
| | • Describes ways to increase self-confidence/belief in ability for various challenging tasks. |
| | • Demonstrates verbal persuasion and growth mindset self-talk. |
| | • Explains how our brain changes as it is challenged with new information (basics of neuroplasticity) and applies this to growth versus fixed mindsets. |
| Demonstrating | • Describes self-efficacy. |
| | • Describes relevant brain anatomy, such as how neural connections grow and change. |
| | • Self-assesses level of efficacy, effort, and amount of learning over time applied to specific tasks/knowledge. |
| | • Describes how ability can grow with effort in various situations. |
| | • Describes sources of efficacy, such as self-talk, previous victories and mastery experiences, emotional and physical signals, and vicarious experiences. |
| | • Utilizes mindful practices to self-calm and focus. |
| Generalizing | • Demonstrates an awareness of their level of efficacy for various challenging tasks. |
| | • Utilizes strategies from four sources of self-efficacy (mastery experiences, vicarious experiences, verbal persuasion, and physiological feedback). |

## Research

- Of many factors, self-efficacy has "the strongest positive and significant association" with life satisfaction (Moksnes et al., 2019, p. 226). It is also negatively correlated with many stressors, including peer pressure, school/leisure conflict, and school performance.
- Students with higher levels of self-efficacy will engage more, work harder, and persist longer when they encounter difficulties (Zimmerman, 2000).
- Academic self-efficacy, which is related to academic mindsets, is a student's confidence in their ability to successfully execute an academic task. Low academic self-efficacy can lead a student to give up early on a difficult task. Conversely, high academic self-efficacy can lead a student to willingly take on and persist with difficult tasks (Mercer et al., 2011; Schunk, 1985; Schunk & Pajares, 2001).
- Research shows that self-efficacy can predict academic achievement, use of appropriate social skills, rigorous course selection, challenging career choices, and exceptional athletic performance across age levels (Britner & Pajares, 2006; Schunk, 1991).
- Success in performing tasks increases self-efficacy, and failure lowers it; however, once strong self-efficacy is established, failure does not provide a setback (Schunk, 1991).
    - A student's initial self-efficacy, for example, when starting a new assignment, will be driven by the student's self-perceived ability, aptitude, and prior experiences. Progress toward goals signals to the student that they are becoming more skilled. This, combined with factors like teacher feedback, will impact performance, which in turn will increase self-efficacy, which enhances motivation, leading to a cycle of positive validation that supports continuous skill development (Schunk, 1991).

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- Students develop self-efficacy based on inputs from four sources: 1) previous performance, 2) observations of others performing tasks, 3) verbal and nonverbal judgments and feedback, and 4) their emotional state (e.g., anxious, nervous; Britner & Pajares, 2006; Schunk & Pajares, 2001). Students will interpret and integrate inputs from these sources to form a belief about their capabilities.
- Farrington et al. (2012) define academic mindsets, similar to self-efficacy, as "beliefs, attitudes, or ways of perceiving oneself in relation to learning and intellectual work that support academic performance" (p. 28). Academic mindsets can be positive as well as negative. Positive academic mindsets can lead to improved academic performance by helping students **persevere** when tackling challenging problems and remain engaged in learning. As performance improves, positive mindsets are reinforced, leading to a positive mindset-building cycle. In contrast, negative mindsets can lead to a self-repeating cycle of poor academic performance. Academic mindsets are reflected in statements like:
    - I belong in this classroom/school.
    - My ability and competence grow with effort.
    - I can succeed at this task/assignment/challenge.
    - This work has value for me.
- The academic and learning outcomes that can be impacted by positive academic mindsets include increased use of applied **knowledge**; progress through school; and improved achievement, as measured by grades and test scores (Snipes et al., 2012).
- There is a positive correlation between technology-supported education and students' self-efficacy (Zhang, 2022). Teachers must match technology to students' competence, keeping in mind students' cognitive load—that is, the demands of the technology on students' working memory—balancing learning of the technology against learning the content of the class. Insofar as students can master difficult activities with scaffolding, the technology can provide performance feedback and reinforce growth through ongoing practice.
- A study of students in Grades 5, 8, and 11 showed that their perceptions of academic self-efficacy increased during junior high despite declining self-perceptions of academic competence. Researchers explain this seeming contradiction by noting that perceptions of academic competence are based on comparisons to peers, whereas self-efficacy is an internal belief in capability. Therefore, they suggest that teachers use instructional practices that minimize social comparisons (Zimmerman & Martinez-Pons, 1990).
- According to Britner & Pajares (2006), self-efficacy in science is associated with both achievement in science and science-related choices that students make across grade levels. "In science, students who have a strong belief that they can succeed in science tasks and activities will be more likely to select such tasks and activities, work hard to complete them successfully, **persevere** in the face of difficulties, and be guided by psychological indexes that promote confidence as they meet obstacles" (p. 486). If students work on a challenging task and experience success, they experience increased self-efficacy. Teachers can support self-efficacy by conveying to students that they are acquiring science skills and **knowledge** (Schunk, 1985).
- In research involving students of various mathematical abilities, it was shown that after controlling for ability, students who had higher self-efficacy solved more problems correctly (Schunk, 1985). The researchers also found that specific goals helped develop self-efficacy because the student could gauge progress (Schunk, 1984).
- Falco and Summers (2019) looked at career-related self-efficacy in STEM education, specifically in providing interventions for girls and other underrepresented students. By receiving explicit training in performance accomplishments, vicarious learning, anxiety management, and verbal

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persuasion, students in this study improved in measures of career decision (e.g., interest in pursuing challenging careers).

- Individualized learning environments in which instruction is customized to students' academic abilities and in which cooperation is emphasized over competition are more likely to increase academic self-efficacy (Pajares, 2006). Emphasizing effort rather than intelligence encourages students to see that ability as something that can be changed, and that accomplishment is the result of hard work.

## Assessments

- The *Self-Efficacy Questionnaire 7–12* (Noonan et al., 2023) is a self-report measure that asks students to respond to 24 items on a 5-point Likert-type scale from *Not Very Like Me* to *Very Like Me*. This questionnaire was designed for students in middle and high school. Accommodations should be provided when appropriate and may include reading the items aloud, explaining the items, or having a scribe fill in the response option. This questionnaire should not be used as a pre/post measure. As students learn more about self-efficacy, their internal frame of reference may shift, causing them to become more critical in their self-assessment; this phenomenon is called response shift bias (Bray et al., 1984; Drennan & Hyde, 2008). The following example items represent the two essential components:
  o If I worked at it, I could learn just about any skill. (Focus)
  o When I'm struggling to accomplish something difficult, I focus on my progress. (Steps)

  Results are immediately available for reflection. Teachers can access the questionnaire by setting up an account at www.cccstudent.org and following the instructions to create an assessment and administer it to students. Students (and teachers) can use individual questionnaire results to identify Self-Efficacy Strategies that students can focus on cultivating or strengthening.

- The *Self-Efficacy Knowledge Test 7–12* (Noonan et al., 2023) is a curriculum-based measure that assesses students' knowledge of self-efficacy constructs and judgement of the most effective course of action when applying these constructs. The test includes multiple-choice, true/false, situational judgement, and short-answer items. The following are a few example items:
  o True or false: If you get straight A's in school, you automatically have strong self-efficacy.
  o Choose the best definition of self-efficacy.
    a. Believing that you can easily accomplish anything you attempt, because you're a quick learner and you often succeed in classes or other pursuits
    b. Self-esteem, which is confidence in yourself and an overall satisfaction with your abilities
    c. Believing in your ability to accomplish specific, challenging tasks—including understanding that your ability can grow with effort
    d. Believing in your ability to accomplish your goals in areas/subjects where you have a natural aptitude
  o Imagine that you are facing a challenge and you are not sure you can be successful. Name three things you could do to raise your belief in yourself.

  The knowledge test is directly aligned with *Self-Efficacy Lessons [Secondary]* (Noonan et al., 2023; see the first item under Instructional Practices, below), available for purchase at www.cccframework.org/competency-lessons-and-student-workbooks. The test can be used as pre/post measures prior to and after teaching the self-efficacy lessons. Accommodations should be provided when appropriate and may include reading the items aloud, explaining the items,

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and having a scribe fill in the response option. Once students have completed the knowledge test on www.cccstudent.org, teachers can view graphed results for individual students and aggregate results for all their students. Teachers can also download a raw data file.

- The *Self-Efficacy Performance-Based Observation* (Noonan & Gaumer Erickson, 2018b) is designed to be embedded within authentic situations, such as academic courses and extracurricular activities. The *Self-Efficacy Performance-Based Observation* can be used at purposeful intervals to monitor the development of each student. Based on observations across time or in specific situations, the educator rates each student's self-efficacious behaviors on the following scale:
  - *Beginning*: Not yet able to demonstrate without scaffolding;
  - *Emerging*: Minimal or superficial demonstration, prompting likely required;
  - *Proficient*: Sufficient demonstration, including self-appraisal and detailed, personalized application;
  - *Advanced*: Independent and consistent demonstration, teaches/prompts others; or
  - *Not Observed*: Documented if there has not been the opportunity to observe the behavior performed by an individual student.

  Example observed behaviors include the following:
  - Continues working on a challenging task by trying different ways to solve a problem.
  - Demonstrates approaching a challenging task with recognition that ability grows with effort.
  - Demonstrates verbal persuasion and growth mindset self-talk.

  Summary reports are automatically generated on www.cccstudent.org.

- The *Self-Efficacy Performance-Based Reflection* (Noonan, Gaumer Erickson, & Maclean, 2021), directly aligned with the performance-based observation, promotes students' reflection on their demonstration of self-efficacious behaviors within authentic situations. This four-item rubric guides students to determine their use of Self-Efficacy Strategies. Triangulating students' ratings with the performance-based observation results in a more comprehensive analysis of performance. The *Self-Efficacy Performance-Based Reflection* can be used at purposeful intervals to monitor the development of each student. Using the rubric, students reflect on their self-efficacy behaviors related to:
  - mastery experience,
  - verbal persuasion,
  - physiological feedback, and
  - vicarious experiences.

The *Self-Efficacy Assessment Suite: Technical Report* (Gaumer Erickson & Noonan, 2024) includes further background on self-efficacy constructs, administration procedures, validity and reliability evidence, recommended uses of the results, and descriptions of the assessment items.

## Instructional Practices

- *Self-Efficacy Lessons [Secondary]* (Noonan et al., 2023) outline more than 25 instructional activities across nine units:
  - Unit 1: Introducing Self-Efficacy
  - Unit 2: Understanding Your Current Level of Self-Efficacy
  - Unit 3: Approaching Challenges With a Growth Mindset
  - Unit 4: Viewing Mistakes and Setbacks as Opportunities to Learn
  - Unit 5: Reflecting on Past Accomplishments to Build Your Confidence

- o Unit 6: Giving and Accepting Feedback and Praise
- o Unit 7: Understanding How Your Emotions Impact Your Self-Efficacy
- o Unit 8: Building Your Self-Efficacy by Observing Others' Success
- o Unit 9: Self-Efficacy—Putting It All Together

The lessons include explicit instruction and application elements that teachers can modify based on students' experiences and needs. The lessons, accompanied by a PDF student workbook with worksheets that can be reproduced to facilitate learning, are available for purchase at www.cccframework.org/competency-lessons-and-student-workbooks.

- The most successful interventions (in terms of statistically significant impact on academic outcomes) are those that emphasize that intelligence grows with effort (Snipes et al., 2012; Dweck et al., 2014). For example, offering students information on the physiology of the brain and emphasizing how the brain is like a muscle that grows more connections (i.e., gets stronger) when the individual works on a challenging task will reinforce the message that extra effort can produce successful outcomes. Teachers can encourage this growth mindset by praising effort and growth rather than ability.
- Instructional strategies that lead to higher levels of self-efficacy include (Schunk, 1985):
  - o Modeling the application of certain cognitive skills, such as explaining out loud how you solved a mathematics problem. Students build self-efficacy when a teacher demonstrates a mistake's usefulness by explaining what they can learn from it.
  - o Having a peer model how they coped with solving a difficult problem, again by verbalizing the steps followed and discussing the outcome.
  - o Training students in understanding and applying learning strategies. For example, in a remedial listening comprehension program, teachers modeled comprehension strategies, then had the students practice by verbalizing a strategy before they applied it to a question. The self-verbalization worked as a form of rehearsal, building students' belief in their ability to complete the task independently.
  - o Offering explicit performance feedback so that students' attention is intentionally focused on the skills and **knowledge** they are acquiring. For example, conveying where the student is making progress is especially important when they are learning complex skills where they quickly learn some components but not others. Specific feedback by the teacher can highlight the correct components and help the student address the problem areas. The teacher feedback can be provided verbally or with charts. The most important thing is that the feedback be clear and timely.
- Shipherd (2019) found a shift in participants' performance self-efficacy in presenting experimental participants with the Tower of Hanoi puzzle. While the participants relied on verbal and imagined experiences in the first trials, they relied on mastery experience and verbal information in the final trials. The implication for practice is that educators can help students find different strategies at different points in a task, supporting students' belief that they can reach their goal.
- Usher et al. (2019) found that students' self-efficacy strategies changed over time. For example, for students in their second year of high school in a rural school, mastery experiences increased students' math and science self-efficacy. It also increases or decreases with a change in environment—for instance, when a student moves from a place where they're the only one who knows the answers to a place where they're the only one who doesn't. Usher et al. recommend that teachers "build opportunities for frequent mastery experiences and include performance feedback at regular intervals. Methods shown to be effective for enhancing students' learning and motivation in math and science include hands-on experience in advanced coursework and authentic, place-based practice with community partners" (p. 47).

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- Interventions that promote positive academic mindsets can be relatively brief but still have long-term effects. This is because the interventions affect the self-repeating processes that cause results to accumulate over time (Yeager & Walton, 2011). An example of a brief but effective intervention is having struggling students meet with older students to discuss challenges with academic success that they encountered while transitioning to a new environment (e.g., middle school to high school), and how they overcame the challenges and improved their grades. This helps the struggling students understand that poor performance is normal in a transition, that poor grades do not reflect lack of ability, and that the grades can improve as the student adjusts to the new environment.
- "Learning environments that construe ability as an acquirable skill, deemphasize competitive social comparison, and highlight self-comparison of progress and personal accomplishments are well suited for building a sense of efficacy that promotes academic achievement" (Bandura, 1993, p. 125). Conversely, certain teaching practices can lower students' self-efficacy. Results from a three-year study of students in Grades 2–4 suggest that certain classroom instructional practices, such as grouping students by ability, rewarding correct answers versus effort, and having high expectations of some children and low expectations of others, can impact how capable children believe themselves to be, lowering self-efficacy (Hughes & Chen, 2011).
- Successful approaches to reinforcing positive academic mindsets include (Dweck et al., 2014):
  - Setting high standards that promote a growth mindset and learning goals:
    - Early intervention when difficulties arise (in school year, in transition) is important.
    - Teachers should avoid overpraising for mediocre work.
    - Standards must be perceived by the student as attainable.
  - Providing cognitive and motivational scaffolding:
    - Personalize high-quality feedback that includes encouragement to continue.
    - Support students to rephrase self-criticism. Instead of saying, "I'm not good at this," say, "I've learned this part, but I still need to work on this" (Dweck, n.d.).
    - Support student autonomy through cues that emphasize good performance as a result of the student's effort.
    - Support intrinsic **motivation** by emphasizing relevance of the activity to personal growth. For example, discuss how the activity that the student is undertaking directly supports the goal of getting a job, going to college, or contributing to the community.
  - Helping students feel connected and supported:
    - Express interest in the student's social/family environment.
    - Establish small groups of peer learners who can work on problems as a community of learners.

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