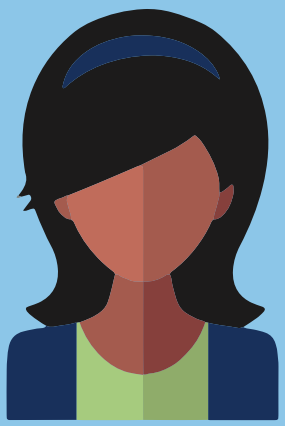
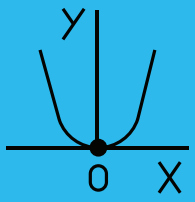
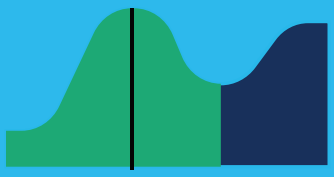
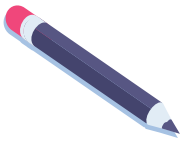
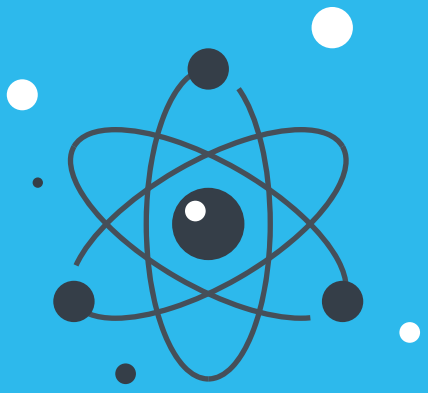


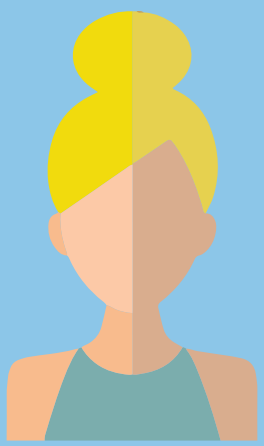


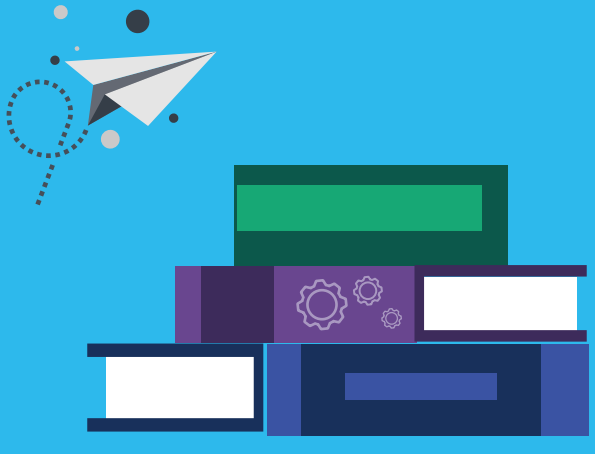






ACT National Curriculum Survey® 2020





ACT is an independent, nonprofit organization that provides assessment, research, information, and program management services in the broad areas of education and workforce development. Each year, we serve millions of people in high schools, colleges, professional associations, businesses, and government agencies, nationally and internationally. Though designed to meet a wide array of needs, all ACT programs and services have one guiding purpose—helping people achieve education and workplace success.

A copy of this report can be found at
www.act.org/research

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ACT National Curriculum Survey 2020®

ACT

The Criticality of the ACT National Curriculum Survey

The ACT® National Curriculum Survey® plays an essential role in delivering on ACT's 61-year-long commitment to ensure that our assessments are valid and relevant on a continual basis. Moreover, our use of the ACT National Curriculum Survey is but one part of numerous actions we take so that our assessments provide up-to-date information that enables students to be fully ready to embark successfully on rewarding college and career journeys.

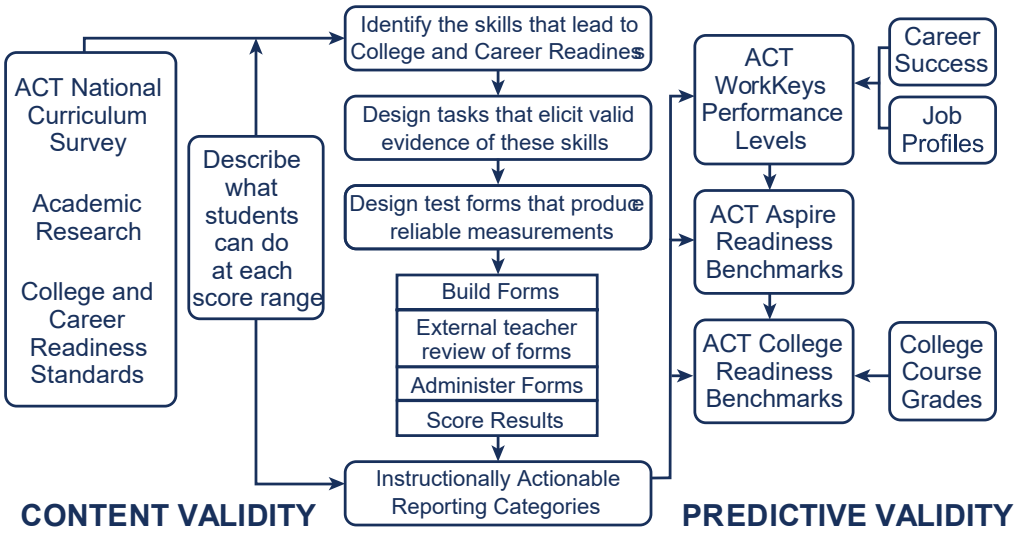
The ACT National Curriculum Survey is a one-of-a-kind nationwide survey, conducted by ACT every few years, of educational practices and college and career readiness expectations. ACT surveys thousands of K–12 teachers and college instructors—as well as, for the first time in 2020, K–12 administrators—for the purpose of determining what skills and knowledge in English/writing, mathematics, reading, and science are currently being taught at each grade level and which skills and knowledge are currently considered essential for college and career readiness. We also survey a sample of workforce supervisors and employees, to see how workplace skills priorities match with those of the educators.

ACT uses the results of the ACT National Curriculum Survey to guide the development of ACT assessment solutions, including the ACT® test, ACT® Aspire®, and ACT® WorkKeys®. ACT conducts this survey to ensure that its assessments measure the current knowledge and skills that instructors of credit-bearing, first-year college courses identify as important for success in each content area and that workforce supervisors identify as important for readiness for targeted workforce training and for success on the job.

ACT makes the results of each survey public in recognition that ACT data can help education and workforce stakeholders make more informed decisions about the skills needed to be successful in postsecondary education and the workplace.

The ACT National Curriculum Survey is a crucial step in the process ACT uses to build and regularly update a valid suite of ACT assessments that is empirically aligned to college readiness standards. The survey results directly inform the test blueprint for the assessment, which specifies the balance of test questions assessing different knowledge and skills within the domain of the test (see diagram below). Results from the assessments were used first to create and now to continually validate ACT's College and Career Readiness Standards as well as its College Readiness Benchmarks.

The Full Picture: Evidence and Validity



As the diagram above indicates, the development of ACT's assessments begins with a dual validity loop—one for Content Validity, and one for Predictive Validity. Included in the Content Validity loop is the ACT National Curriculum Survey. The predictive validity loop uses data from student college and career outcomes to identify which knowledge and skills are the strongest predictors of performance. Together, the Content and Predictive Validity Loops establish the test blueprints. This process ensures that our assessments always measure the knowledge and skills that are being taught in schools around the country and which are linked with evidence to college and career readiness.

ACT provides multiple sources of validation evidence to support the use of assessment results in determining where students are on their journey to becoming academically ready for college and career. ACT begins with researching its content validity, which is designed to answer the first of two critical questions: Does the test measure what it purports to measure? This process involves the validation of ACT's College and Career Readiness Standards, which are built on a foundation of years of empirical data and continually validated through the National Curriculum Survey as well as ongoing external standards reviews.

Equally important is predictive validity. Using actual course performance, we answer a second critical question: Does the test accurately and reliably predict performance? This process involves continually measuring the statistical relationship between multiple measures of college academic performance and the ACT scores of ACT-tested students. Consistent monitoring allows ACT to ensure that the answer to both of these questions is yes.

ACT's college and career readiness assessments have always been based on our own empirical research and longitudinal data. ACT's College and Career Readiness Standards are designed to represent the skills that matter most to success in college, as validated by this extensive research, and our assessments measure only those standards, because our research shows them to be a priority for success beyond high school.

ACT's assessments provide the essential information to help get and keep students on the path toward readiness in the most efficient manner possible. In an era where over-testing is a significant concern, that's an important distinction.

The science behind our assessments—the evidence base and ongoing research—is critical to answering the key question of what matters most in college and career readiness. The National Curriculum Survey demonstrates ACT's commitment to:

- use evidence and research to develop and validate our standards, assessments, and benchmarks;
- develop assessments, reports, and interventions that will help individuals navigate their personal path to success along a kindergarten-through-career continuum;
- maintain a robust research agenda to report on key educational metrics (The Condition of College and Career Readiness, The Condition of Career Pathway Readiness in the United States); and

ACT Assessment Development Principles

With this evidence established about what is important for academic success in K-12 and postsecondary education, the following principles have shaped and will continue to drive our development agenda:

1. Commitment to all standards in the *Standards for Educational and Psychological Testing.*
2. Report results in instructionally relevant ways that support clear interpretation within and across content areas.
3. Establish reasonable testing times by assessing what research and evidence show to be the most critical factors for success after high school.
4. Leverage technology to enhance student engagement, produce more meaningful results, and share results in a timely fashion.
5. Increase the emphasis on evidence-centered design, implementing best practices as they mature and improve our capabilities within the highest-quality design and development processes.
6. Include science as a core academic domain in our assessment batteries.
7. Reflect the reality—validated by research—that there are multiple dimensions of readiness and success.
8. Involve educators in the development of test content to ensure that it is fair, unbiased, and accessible to all students.

We use these principles to drive the development and continuous improvement of ACT's current and future education and workplace solutions. Along with our research agenda associated with them, we thereby enable ACT to fulfill its mission of helping all individuals achieve education and workplace success.

The ACT® Holistic Framework® is a holistic, research-based framework that integrates behavioral skills, education and career navigation skills, and dimensions uch as core academic skills and cross-cutting capabilities. The ACT National Curriculum Survey includes questions about which skills from the Holistic Framework are most integral to college and career success. The findings sections in this report as presented are aligned to the content domains of the Holistic Framework.

For more information about the Holistic Framework, see: Camara, O'Connor, Mattern, and Hanson, 2015.

Survey Sample and Process

For the ACT National Curriculum Survey, we invited participation from educators at the early elementary school, upper elementary school, middle school, high school, and college levels who teach courses in English/writing, mathematics, reading (including English language arts and social studies), and science (including Biology, Chemistry, Physics, and Earth/Space Science) in public and private institutions across the United States; we also invited participation from K–12 administrators, and from supervisors and employees at a large variety of businesses. Table 1 gives the numbers of survey respondents in each area.

Table 1. ACT National Curriculum Survey 2020 Respondents

Area	Number of Respondents
Early elementary school	1,214
Upper elementary school	1,213
Middle school	1,623
High school	1,619
K–12 administrators	405
College instructors	2,883
Workforce supervisors	405
Workforce employees	406
TOTAL	9,768

Educators were asked to rate discrete content knowledge and skills with respect to how important each is to student success in the content area at their respective grade levels. Specifically, K–12 teachers were asked to rate the importance of each content or skill in each class they teach, while college instructors were asked to rate the importance of each content or skill as a prerequisite to success in a given class they teach. In addition, we asked K–12 teachers to indicate whether or not they teach a particular content or skill and, if so, whether they teach it as a standard part of their course or as part of a review of material that should have been learned in an earlier grade.

All educators were also asked a number of questions about assessments, technology, and academic standards. These results appear in the appendices and are discussed in the companion report *Policy Implications from the ACT National Curriculum Survey 2020* (www.act.org/research).

Workforce participants were asked to rate discrete skills with respect to how important each is to entry-level success in the workplace.

ACT makes the results of each survey public in recognition that ACT data can help education and workforce stakeholders make better-informed decisions about the skills needed to be successful in postsecondary education and the workplace. Because some content areas were surveyed in larger numbers than others, the values displayed in educational-level totals were averaged across English language arts (including writing), math, science, and literacy in social studies. This ensured that no one content area would have more influence than another on the results.

Chapter 1: Core Academic Skills

A. English Language Arts and Literacy in Social Studies

This chapter highlights findings from two portions of the ACT National Curriculum Survey 2020: English Language Arts and Literacy in Social Studies. Respondents in the English Language Arts (ELA) portion included general education elementary school teachers and middle and high school ELA teachers. At the postsecondary level, respondents included instructors of introductory courses in English, literature, and rhetoric and composition.

Respondents in the Literacy in Social Studies portion included high school (middle school and high school) teachers of social studies (SS) courses such as history, geography, and civics. At the postsecondary level, respondents included instructors of introductory courses in social studies and humanities disciplines such as history, politics, sociology, and psychology.

Conclusion 1: Postsecondary instructors believe that ELA assessments provide useful information about college readiness.

Across both disciplinary areas, instructors believe that standardized assessments provide useful information about college readiness. The majority agreed or strongly agreed that valid information about student writing ability could be gathered through on-demand writing assessments (82% for ELA and 90% for SS) and/or selected response/multiple choice assessments (71% for ELA and 63.87% for SS). A large majority of instructors (71% and 74%) were also concerned that writing instruction would receive fewer resources if on-demand writing assessments were discontinued.

Five hundred forty-nine instructors (94%) indicated that their institutions use data from tests such as the ACT to determine student readiness for entry-level credit-bearing ELA courses. Of those 549, the majority (84%) agreed or strongly agreed that the test results indicate proficiency in skills essential for success in those courses, with a slightly smaller majority (77%) agreeing or strongly agreeing that these data help to identify students who would not be successful.

Conclusion 2: Postsecondary instructors believe that students are better prepared in literacy skills than ever before.

Postsecondary Instructors of introductory English and socials studies courses were asked to indicate degree of agreement with the statement “Students have been better prepared in ELA/writing in the last few years than they have ever been before.” Of 586 instructors of English courses (ELA instructors), 46% agreed and 25% strongly agreed. Of 274 instructors of social studies and humanities courses (SS instructors), 25% agreed and 32% strongly agreed. Responses were similar across the types of institutions offering the courses.

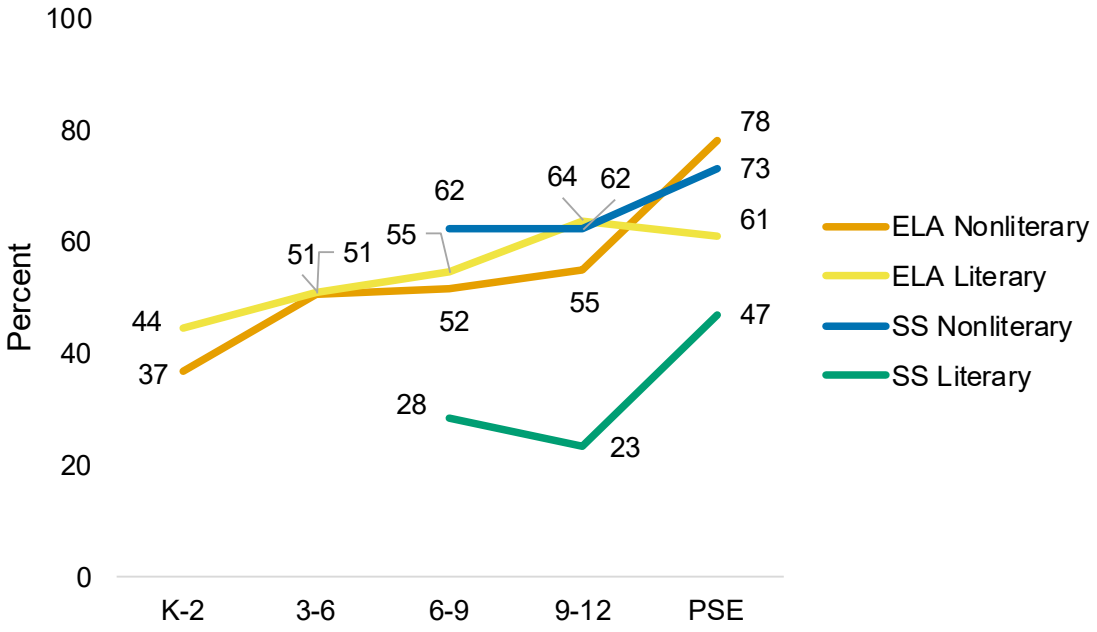
Conclusion 3: Students are studying a variety of texts needed to be college ready.

K–12 teachers and postsecondary instructors were asked to indicate what types of texts their students read and/or listened to. Among literary texts, students were most likely to read or listen to stories (including novels and myths) in ELA classes (at any grade) and middle school SS classes, and to read memoirs in high school and postsecondary SS classes. Among nonliterary texts, K–2 students were most likely to read or listen to expositions, as were high school and college students in ELA classes. Students in grades 3–5 and 6–8 were most likely to read or listen to biographies in English class. In SS classes, middle and high school students were most likely to read or listen to historical or official documents, while college students were most likely to read or listen to expositions.

K–12 teachers and postsecondary instructors were also asked whether their students studied those text types to a small, moderate, or large extent, with “large extent” defined as “an in-depth unit or recurring class sessions that, taken all together, constitute a significant amount of time and depth of study.” The extended study might incorporate reading, listening, and/or composing those texts. Responses, provided in Figure 1 below, indicate that students study both literary and nonliterary texts in all grades and both disciplinary areas.

K–12 English teachers are more likely to focus on literary texts, and postsecondary ELA instructors are more likely to focus on nonliterary texts; however, most ELA teachers and instructors indicate study of nonliterary texts as well. Across all grades, SS teachers and instructors are more likely to focus on nonliterary texts (Figure 1).

Figure 1. Percent of teachers and instructors indicating at least moderately extensive study of literary and nonliterary texts



Also emphasized by the Common Core State Standards, graphic and multimedia literacy have been incorporated into state standards. The revised ACT WorkKeys assessment includes a graphic literacy test, and in this survey postsecondary instructors indicate that graphic literacy is essential for college success. A large majority (82%, on average) of ELA and SS instructors agreed or strongly agreed that “Reading tests that measure readiness for college-level reading should include passages with graphic and quantitative elements (diagrams, graphics, charts, tables).”

Conclusion 4: With respect to literacy skills, postsecondary instructors believe students are least likely to have the skills needed to do research.

When asked about student preparation in literacy skills, both ELA and SS instructors indicated that students are least prepared for research. One hundred twenty-two ELA instructors (21%) and 111 SS instructors (28%) rated students as not prepared or poorly

prepared in research skills. These skills had the highest number of instructors indicating lack of preparation, although the majority of instructors (62% for ELA and 51% for SS) still rated students as prepared or very prepared in research skills.

Conclusion 5: High school and postsecondary ELA teachers emphasize different research skills.

Results from a section of the survey specific to research suggest that postsecondary ELA instructors and high school ELA teachers may have different perspectives about the relative importance of different research skills. Across all grades and both discipline areas, survey participants were asked to select the three most important research skills from among a list of 14. Table 2 shows, for nine of the skills, the percent of teachers in each group that selected each skill. (The remaining five statements were omitted for space and clarity considerations.)

Table 2. Percent of Teachers in Each Group Who Selected Each Skill

Skill	ELA			SS		
	Middle	High	PSE	Middle	High	PSE
Develop a thesis or claim related to a research topic	15%	17%	10%	6%	8%	8%
Identify evidence in sources that directly supports or challenges claims	11%	10%	4%	7%	7%	4%
Summarize information obtained from sources	12%	7%	6%	11%	9%	10%
Evaluate the credibility of individual sources	9%	11%	8%	9%	12%	11%
Use effective search strategies to find information from various sources	7%	5%	13%	11%	10%	9%
Evaluate the relevance of information obtained	6%	7%	7%	9%	6%	12%
Develop focused inquiry questions around a research topic	6%	5%	16%	8%	9%	6%
Use appropriate methods or tools to obtain information	4%	5%	14%	10%	7%	11%
Analyze multiple sources to identify conflicting information	4%	5%	6%	7%	10%	8%

Note: highlighting (in gray) indicates the top three skills for each segment.

Within the same level (i.e., postsecondary ELA compared to postsecondary SS), teachers and instructors were likely to agree on at least one skill as being one of the three most important. Within SS, teachers and instructors in each level were also likely to agree on

at least one skill (although the skills differed across the pairs). However, within ELA, high school and postsecondary instructors show less agreement. None of the three skills most likely to be identified as most important by postsecondary ELA instructors was also most likely to be identified as most important by middle or high school ELA teachers.

The teachers were also asked which of these skills they taught most frequently (defined as "multiple times per week"). In all middle and high school groups, the top three most frequently taught skills were summarization (54%), methods and tools for obtaining information (43%), and evaluating the relevance of information (38%); only 24% indicated that they most frequently taught skills for developing focused inquiry questions around a research topic.

Postsecondary ELA instructors were most likely to identify inquiry and searching skills (i.e., using appropriate tools and strategies) as most important. Secondary ELA teachers were most likely to identify skills related to argumentation (i.e., developing and supporting claims) as most important, which is consistent with the CCSS emphasis on writing with sources and providing evidence to support claims. While subtle, these differences may suggest a concern among postsecondary instructors that students should be less concerned with proving a claim and more focused on exploring the complexities of a topic. Having more aligned expectations across the grade spans could help teachers prepare students for successful transition to college.

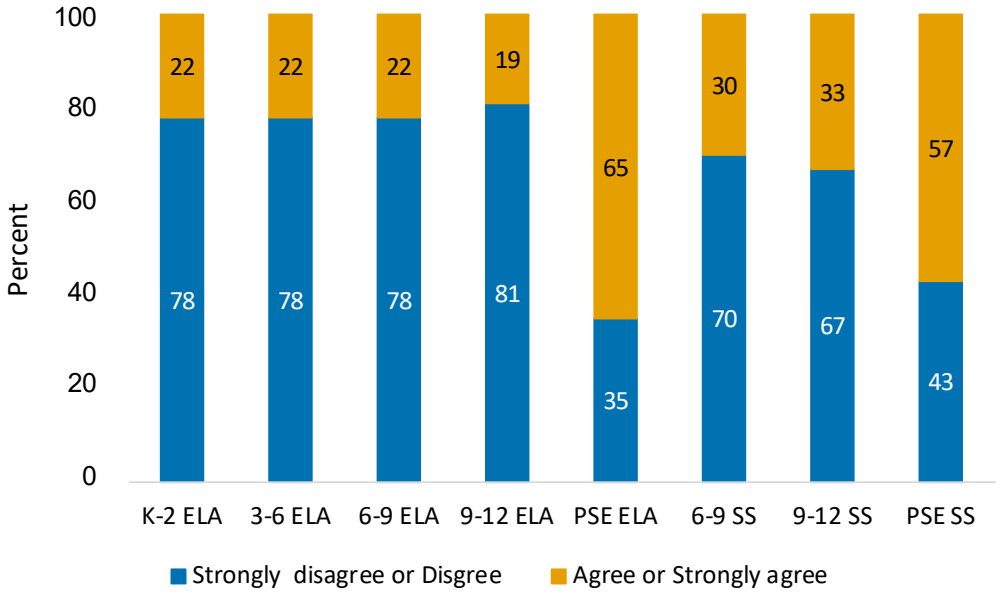
Conclusion 6: Postsecondary teachers are substantially more concerned than K-12 teachers about certain reading-test passages.

A survey question addressing reading-test passages revealed an unexpected difference in opinion between K-12 and postsecondary teachers. ACT strives to use authentic reading passages that students find accessible and interesting but that avoid sensitive topics that might upset students during a testing session. The survey included a question intended to gather educator perspectives on this issue of how students react to potentially sensitive topics in an educational setting. Teachers and instructors were asked to indicate their degree of agreement.

Maintaining the balance between student engagement and sensitivity is an important consideration for teachers when developing assessments and other learning resources. The survey data indicate, however, that K-12 teachers are more confident that sensitive content will not adversely impact student performance.

The survey included a question intended to gather educator perspectives on this issue of passage selection. Teachers and instructors were asked to indicate their degree of agreement with the statement "Reading passages that refer to sensitive historical experiences such as slavery or war negatively affect my students' performance on an assessment." The majority of K–12 ELA and SS teachers (67% or more across all groups) disagreed or strongly disagreed with this statement (Figure 2).

Figure 2. Percent of educators indicating degrees of agreement or disagreement with the statement, “Reading passages that refer to sensitive historical experiences such as slavery or war negatively affect my students’ performance on an assessment”



However, both ELA and SS postsecondary instructors (65% and 57%) agreed or strongly agreed with the statement. This difference may suggest that postsecondary instructors are more cautious about reading content while K–12 educators are more concerned with student interest in the reading. While this result must be interpreted carefully (for example, respondents’ definition of “sensitive experiences” could differ significantly), it underscores the complexity of the passage selection task for reading test developers.

B. Math

This chapter highlights findings from the Mathematics portion of the ACT National Curriculum Survey 2020. Respondents in this portion included teachers of elementary school mathematics; teachers of middle school mathematics, pre-algebra, algebra, and geometry courses; teachers of high school courses in pre-algebra, algebra, advanced algebra, pre-calculus, calculus, geometry, statistics, and trigonometry; instructors of developmental mathematics at the introductory college level; and instructors of credit-bearing first-year college courses in calculus, college algebra, college geometry, finite or discrete mathematics, introductory college mathematics/college preparation, pre-calculus, and probability and/or statistics.

Conclusion 1: In high school and college, and to a lesser extent in middle school, one of the consistently most important skills for students to know is how to use mathematical symbols correctly.

College

All postsecondary survey participants (instructors of entry-level college math courses) were asked to rate the importance of each of 15 skills as prerequisites to the courses they teach, on a scale from zero (not important) to 4. The list below shows rankings from most to least important, based on average importance rating.

We also asked college math instructors to indicate what percentage of their class had adequate preparation in each of these 15 prerequisites, using a five-point scale (under 10%, 11–25%, 26–75%, 76–90%, 91–100%). For the skills in the table above, an average of about 60% of instructors reported that at least 76% of their class was adequately prepared, and each of the skills had about the same average rating. The most highly rated skill in terms of student preparation was “Solving multistep arithmetic problems.

Table 3. Percent of PSE Teachers who Thought Students were Prepared for Each Skill

Skill	Importance Ranking	Percent Prepared
Solving Linear Equations in 1 variable	1	62
Using mathematical symbols correctly	2	66
Understanding the role of randomization in surveys, experiments, and observational studies	3	61
Finding an equation of a line with a given slope that goes through a given point	4	60
Following proofs as presented and answering comprehension questions about them	5	62
Adding, subtracting, multiplying, and dividing signed rational numbers	6	60
Using the Pythagorean Theorem	7	59
Understanding the concept of a function	8	59
Solving multistep arithmetic problems	9	61
Using concepts of area, perimeter, and volume in modeling and solving real-world problems	10	56
Solving problems using ratios and proportions	11	61
Determining the probability of a compound event by viewing it as a union of simple events	12	56
Finding the length of an arc of a circle, central angle measure of a sector of a circle, and area of a sector of a circle	13	59
Using function notation	14	58
Computing volume and surface area (e.g., cylinders, prisms, cones, pyramids)	15	57

In addition, we asked instructors who taught a particular type of course to rate a further set of 21 skills (a different set of 21 for each course type) according to importance of each skill as a prerequisite and percentage of students with adequate preparation.

For Pre-algebra courses, their instructors gave the highest average rating for importance as a prerequisite to "Reasoning with properties to make a conclusion," and the highest average rating for adequate preparation to "Determining the number of elements in a set or sample space by using structure (e.g., Fundamental Counting Principle, tree diagrams)."

For courses described as Algebra I, the skill with the highest average rating for importance as a prerequisite was "Adding, subtracting, and multiplying linear expressions," and the skill with the highest average rating for adequate preparation was the same skill. This is a sign that high school teachers are focusing on the right skills.

For College Algebra courses, the most common entry-level college math course, instructors rated "Writing expressions, equations, or inequalities to represent mathematical and real-world settings" as most important in terms of average importance as a prerequisite, and "Finding the domain and range of a function specified algebraically" had the highest average rating in terms of adequate preparation.

Instructors of Precalculus courses also rated "Writing expressions, equations, or inequalities to represent mathematical and real-world settings" as most important in terms of average importance as a prerequisite, and "Calculating or using a weighted average" was the skill with the highest average rating for adequate preparation.

And for Calculus courses, the skill instructors found most valuable as a prerequisite, in terms of average importance rating, was "Dividing polynomials to get quotient and remainder," while "Solving problems using the relationship between exponential and logarithmic functions" was the skill students were most prepared to use as needed for the course, in terms of highest average adequate preparation rating.

Statistics instructors rated "Finding the median, mode, and range of a list of numbers" as most important in terms of highest average importance as a prerequisite and as the skill with the highest average rating in terms of adequate preparation, another clear indicator that high school teachers focus on important skills.

High School

K–12 math teachers rated the importance of skills on the same importance scale: from zero (not important) to 4. High school teachers in different courses rated different skills. Note that the postsecondary teachers rated in terms of importance as a prerequisite. For K–12 teachers, the ratings are of importance.

For high school courses[1] described as Math 1 or Algebra I, the top rankings in terms of average importance are:

1. Using mathematical symbols correctly
2. Solving linear equations in 1 variable

[1]Instructors of these courses in a middle school are included in the later middle school section.

3. Solving multistep arithmetic problems
4. Writing expressions, equations, or inequalities to represent mathematical and real-world settings
5. Finding the slope of a line from its equation or graph
6. Understanding the concept of a function

Math 2 and Geometry courses get highest average importance ratings for the following skills:

1. Using the Pythagorean theorem
2. Using mathematical symbols correctly
3. Solving problems using ratios and proportions
4. Applying basic trigonometric ratios to solve right-triangle problems
5. Computing volume and surface area (e.g., cylinders, prisms, cones, pyramids)
6. Solving linear equations in 1 variable
7. Performing addition, subtraction, multiplication, and division on signed rational numbers
8. Writing expressions, equations, or inequalities to represent mathematical and real-world settings
9. Solving multistep arithmetic problems
10. Using concepts of area, perimeter, and volume in modeling and solving real-world problems

High school teachers of Math 3 or Algebra II courses gave highest average important ratings to:

1. Using mathematical symbols correctly
2. Solving multistep arithmetic problems
3. Understanding the concept of a function
4. Solving quadratic equations by factoring
5. Reasoning using the connections between zeros and factors of a polynomial expression
6. Transforming functions algebraically and graphically and understanding the connections (e.g., equation parameters, domain, graph characteristics)
7. Performing addition, subtraction, multiplication, and division on signed rational numbers

8. Writing expressions, equations, or inequalities to represent mathematical and real-world settings
9. Solving linear equations in 1 variable

For Math 4 or Calculus courses, the skills with highest average importance are:

1. Using mathematical symbols correctly
2. Transforming functions algebraically and graphically and understanding the connections (e.g., equation parameters, domain, graph characteristics)
3. Understanding the concept of a function
4. Using function notation
5. Writing expressions, equations, or inequalities to represent mathematical and real-world settings
6. Reasoning using the connections between zeros and factors of a polynomial expression
7. Applying the identity sin2x + cos2x = 1
8. Finding zeros of rational expressions and places the expression is undefined when reasonable to find factors
9. Deriving/validating trigonometric identities

The most important skill at all levels except Math 2 / Geometry (where it was a close second) was "Using mathematical symbols correctly," a topic new to the survey. While many elements of using mathematical symbols correctly are lower-level skills akin to spelling correctly, we interpret this high importance rating of the skill being an indicator to teachers of how well students are making sense of the mathematics they use. In future surveys, we might investigate the extent to which grading practices reward this skill relative to other skills. Are students given more points for using symbols correctly than for, say, finding the solution to a linear equation?

For each type of course, some of the most important skills are skills studied in prior courses. Without these skills, it is difficult or impossible to build the new understandings and skills for the current course. And using those prerequisite skills actually develops them further. Students make new connections, apply the skills in different ways, and come to understand more deeply. This reinforcement of skills is a part of achieving college and career readiness that is not typically recognized by state standards.

Middle School

For middle school math teachers, we give the rankings of the most important skills by course type.

Grade 6 Math teachers from middle schools[2] gave the following skills average importance ratings of 3.25 or more on the 0–4 scale:

[2]Grade 6 teachers from elementary schools are included in the later elementary school section.

1. Evaluating numeric expressions consistent with the order of operations
2. Determining reasonableness of solutions
3. Solving problems using ratios and proportions
4. Performing computations with positive fractions
5. Writing expressions, equations, or inequalities to represent mathematical and real-world settings
6. Evaluating algebraic expressions
7. Using mathematical symbols correctly

Middle school teachers of Grade 7 Math did not rate any skills to have average importance of 3.25 or higher. The most important skills had average importance between 2.75 and 3. Starting from highest average importance, the skills are:

1. Evaluating numeric expressions consistent with the order of operations
2. Solving problems using ratios and proportions
3. Solving linear equations in 1 variable
4. Performing addition, subtraction, multiplication, and division on signed rational numbers
5. Evaluating algebraic expressions

For courses described as Grade 8 Math or Pre-algebra, teachers gave the highest average importance ratings (3.25 or higher on the 0–4 scale) to:

1. Solving linear equations in 1 variable
2. Finding the slope of a line from its equation or graph
3. Finding the equation of a line with given slope that goes through a given point
4. Solving systems of linear equations algebraically and graphically
5. Evaluating numeric expressions consistent with the order of operations
6. Writing expressions, equations, or inequalities to represent mathematical and real-world settings
7. Evaluating algebraic expressions
8. Graphing and recognizing characteristics (e.g., intercepts, increasing/decreasing, slope) of linear functions
9. Using mathematical symbols correctly

And for middle school[3] Grade 9 Math or Algebra I courses, the skills with average importance ratings of 3.25 or higher have the following rankings:

1. Solving linear equations in 1 variable
2. Finding an equation of a line with given slope that goes through a given point
3. Solving systems of linear equations algebraically and graphically
4. Writing expressions, equations, or inequalities to represent mathematical and real-world settings
5. Evaluating algebraic expressions
6. Performing operations (add, subtract, multiply) on polynomials
7. Finding the slope of a line from its equation or graph
8. Solving quadratic equations by factoring
9. Graphing and recognizing characteristics (e.g., intercepts, increasing/decreasing, slope) of linear functions
10. Graphing and recognizing characteristics (e.g., intercepts, minimum/maximum) of quadratic functions
11. Using mathematical symbols correctly

As with high school topics, skills learned in prior grades/courses are included in the lists of most-important skills. “Using mathematical symbols correctly” ranks as important, but not nearly as important as ranked by high school teachers, even looking at the same Algebra I content.

Elementary School

1. For teachers in grades K–2, skills with average importance of 3.25 or higher (on the 0–4 scale) have the following rankings, from highest to lowest.
2. Recognizing 1–5 objects without actually counting (i.e., subitizing quantities)
3. Recognizing a bundle of 10 “ones” as 1 “ten”
4. Using counting-on as a strategy for addition

For elementary school teachers in grades 3–6,[4] the highest average importance ratings were between 3.0 and 3.25 (on the 0–4 scale). Their rankings, from highest to lowest, are as follows:

1. Locating positive fractions on the number line
2. Understanding what makes a good estimate
3. Using rounding strategies for computational estimation
4. Evaluating algebraic expressions

[3]Grade 9 teachers from high school are included in the earlier high school section.

5. Dividing using the standard algorithm
6. Evaluating expressions such as 12 – 3 × 4 consistent with the order of operations
7. Evaluating expressions with grouping symbols such as 12 – (5 – 2) consistent with the order of operations
8. Applying properties of operations (e.g., commutative, associative, distributive, but not necessarily using that vocabulary)
9. Reading and explaining a mathematical justification
10. Finding an error in a justification
11. Explaining an error
12. Using examples to support a valid argument
13. Using general statements when justifying (e.g., All even numbers are divisible by 2)

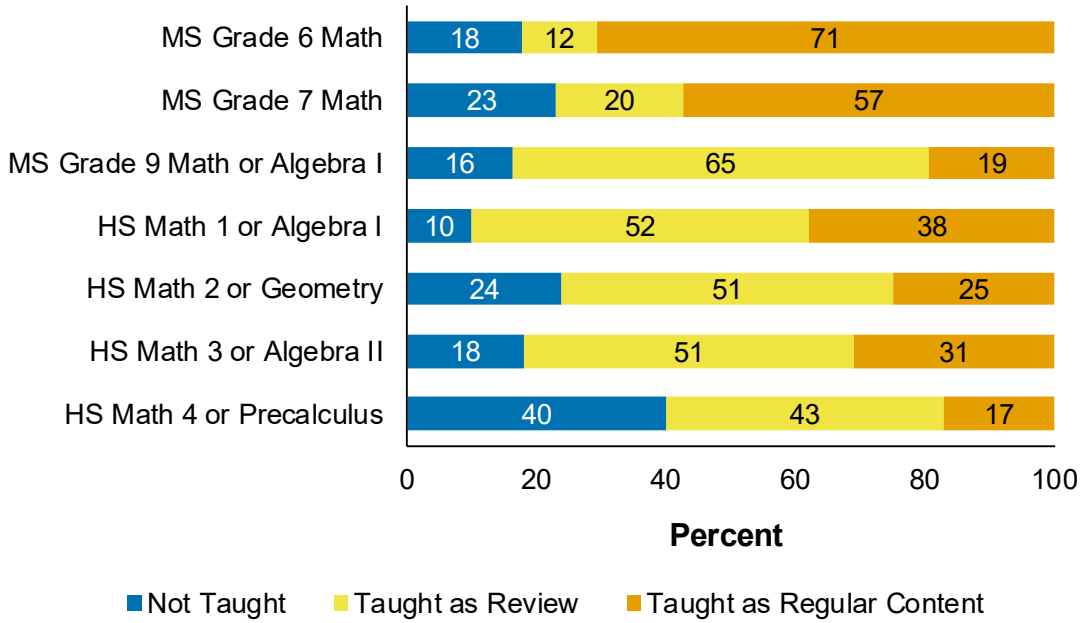
Conclusion 2: Many teachers reteach math skills first introduced in prior grades, raising questions about what constitutes "on-grade" learning.

When students have not developed the expected level of understanding and proficiency from a previous grade or course, schools and teachers should certainly provide support—typically by reviewing and reteaching some of the prior content—so that the students can catch up to where they need to be. But if we view such reteaching as part of the regular course content for the current grade or course, then expectations for the current course are effectively shifted downward. Many middle school and high school teachers in our survey, however, do report this reteaching as regular course content.

Consider the skill of "Performing basic arithmetic operations on signed rational numbers (integers, fractions, and decimals)." Typically, these operations are expected to be learned by grade 6. At grade 7 the focus is on applying the operations to solve real-life problems. Thus, teaching the operations after grade 6 should be considered review.

Figure 3 summarizes responses about "Performing addition, subtraction, multiplication, and division on signed rational numbers" from teachers of Grade 6 Math, where the topic would be expected as regular course content, and from later math courses through high school, where the topic would be expected to be not taught or taught as review.

Figure 3. Distribution of middle school and high school math teachers[4] according to whether or how they teach "Performing addition, subtraction, multiplication, and division on signed rational numbers," by middle-school or high school course type

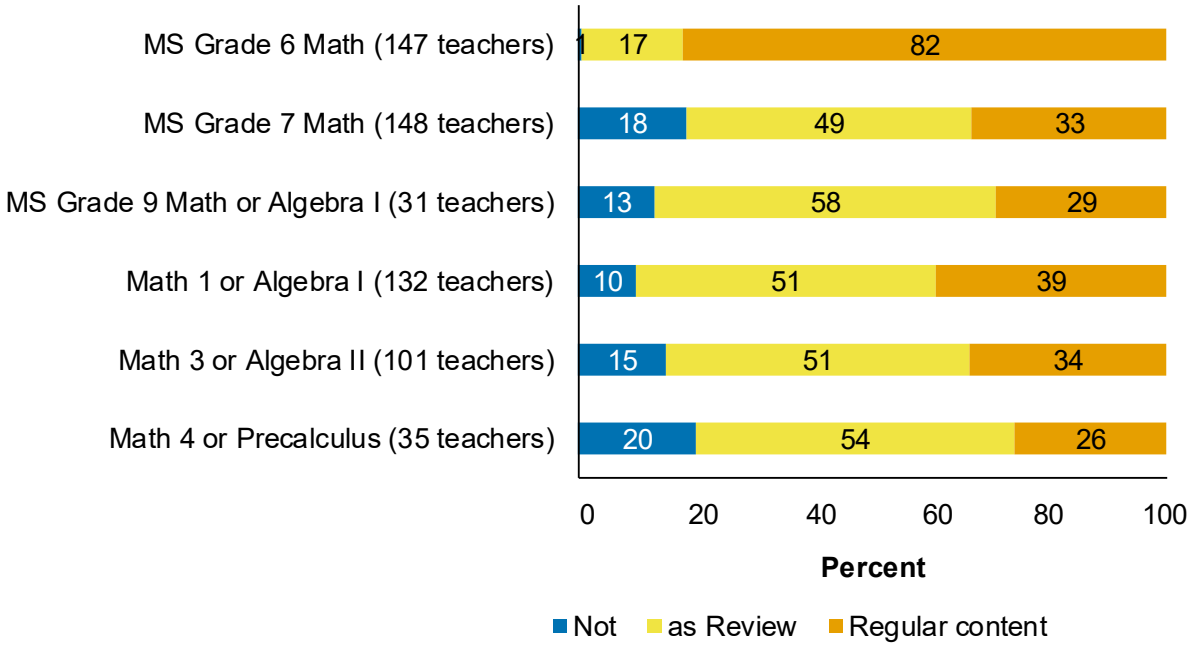


In middle school grade 6 Math, 71% of respondents reported teaching the skill as regular course content; in grade 7 Math, 20% reported teaching it as review and 23% reported not teaching it (presumably because the class had already mastered the skill). However, 57% of grade 7 Math teachers reported teaching the skill as regular course content—and in some high school courses, over one-third of teachers reported doing so.

It could be the case that many of the teachers reporting that they teach operations on signed rational numbers as regular course content beyond grade 6 Math (especially in high school) are thinking mainly of operations on fractions, which are signed rational numbers. Responses to whether or how teachers teach performing computations specifically on positive fractions suggest support for this possibility (Figure 4).

[5]This skill was not included in the survey instrument for middle-school grade 8 Math / Pre-algebra teachers.

Figure 4. Distribution of middle school and high school math teachers[5] reporting whether or how they teach "Performing computations on positive fractions," by middle-school and high school course type



Teachers who taught Grade 9 Math / Algebra I and the other high school math courses we surveyed teach computations on fractions as regular course content in even greater percentages than those who teach operations on signed rational numbers as regular course content. Even in Math 4 / Precalculus, more than one-fourth of teachers still report doing so.

Note that while we expected the survey respondents to consider positive fractions as included in signed rational numbers, the response percentages indicated teachers did not always answer this way. Perhaps the "signed" aspect indicated to some individuals that "positive" was not included. But, whichever interpretation, there is clear support for Finding 2.

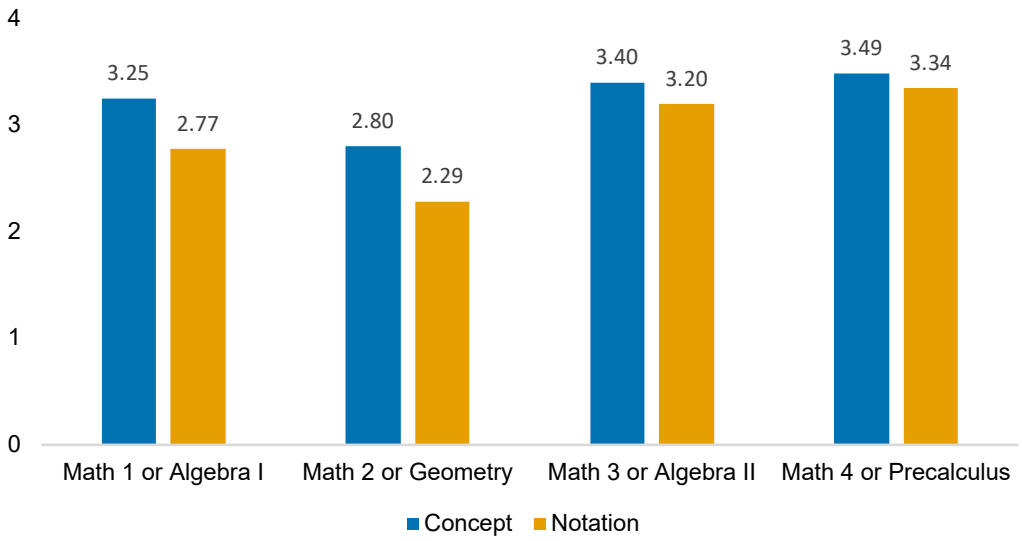
Using these operations during and after grade 7, whether on positive fractions or other signed rational numbers, is critical given that the skill has a high importance rating as a prerequisite for college math courses (see Finding 1). But there is a risk that if many teachers consider such work as regular course content, students may be missing out on some of the primary content for that course, content also important for college and career readiness, and content important as a prerequisite for being successful in the next mathematics course.

[6]This skill was not included in the survey instruments for teachers of middle-school Grade 8 Math / Pre-algebra or high school Math 2 / Geometry.

Conclusion 3: Skills related to functions are rated as being of high importance in most levels of high school math.

Functions, which provide a general framework to represent many relationships in math and the real world, and which appear as an organizing category in many state standards starting at grade 8, were rated highly for most high school courses (Figure 5).

Figure 5. Average importance ratings for "Understanding the concept of a function" and "Using function notation," by high school course type



The figure shows that, throughout high school, "Understanding the concept of a function" is rated as more important than "Using function notation." Both skills have their lowest ratings in geometry, although geometric transformations are important functions and students can develop their concept of function through the study of transformations in geometry.

Teachers who rated the importance of either of the key skills in the previous figure most highly (i.e., as a 3 or a 4) were then asked to rate a further set of skills related to the primary one (a different set for each key skill; those teachers who rated both skills as a 3 or a 4 were randomly assigned to one of the two sets).

Skills related to understanding the concept of a function are listed below, ranked from highest average importance to lowest. All ratings were by high school teachers who rated "Understanding the concept of a function" with importance 3 or 4.

1. Understand the input-output nature of a function—each input value has a well-defined output value
2. Understand the domain of a function as the set of valid inputs—inputs that have an output value

3. Find the domain of a function from a real-world context
4. Find the domain and range of a function specified algebraically
5. Decide whether a relation is a function when given its graph
6. Decide whether a relation is a function when given a set of ordered pairs that represents the function
7. Understand why the vertical line test works
8. Understand that functions are different if the domains are different even if defined by the same rule
9. Apply the vertical line test to decide whether a relation is a function
10. Understand why a sequence is a function
11. Understand that a function does not need to follow an algebraic rule

Skills related to function notation are listed below, ranked from highest average importance to lowest. All ratings were by high school teachers who rated "Using function notation" with importance 3 or 4.

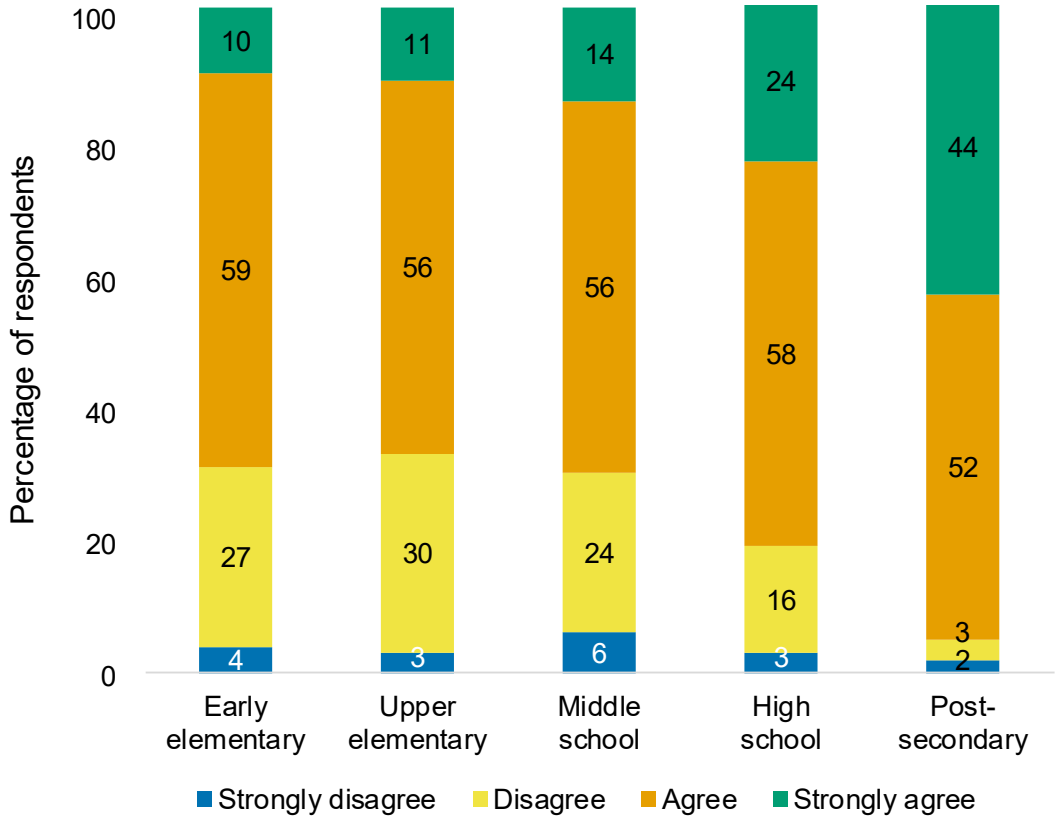
1. For a function f, understand that the notation f(3) represents a value and find function values expressed through this notation
2. For a function f, find an expression for, say, f(x – 2)
3. For a function f, find an expression for, say, f(x + h)
4. Given 2 functions, evaluate their composition at a given value of x
5. Given 2 functions, find an expression for their composition

Students use functions at all grade levels. They are only called out as a concept and organizing principle beginning about grade 8. For later mathematics courses, this concept becomes part of the language for understanding mathematics.

Conclusion 4: Math educators tend to believe that math requires a distinct set of reading skills and tend to teach those skills—while at the same time also tending to believe that math textbooks are not essential to learning course content.

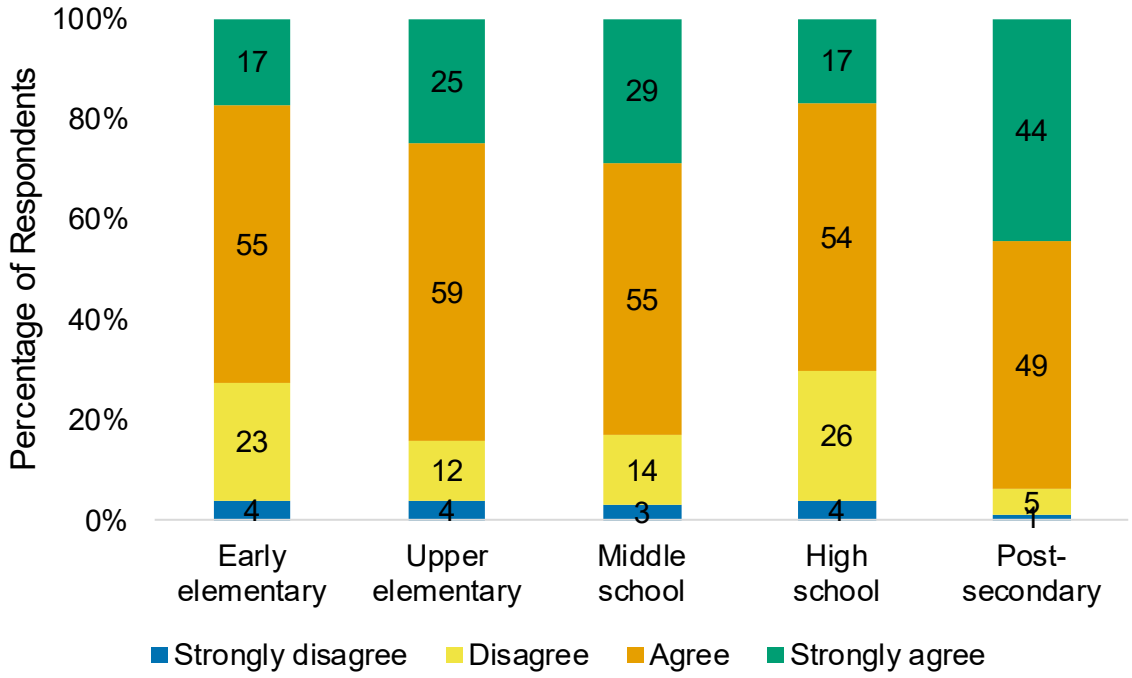
Math educators reported that reading in math differs from reading in other content areas; and this conviction increases with grade (Figure 6).

Figure 6. Distribution of of math educators agreeing or disagreeing with the statement, "Reading in math is different from reading in other content areas (e.g., science, social studies)," by grade range



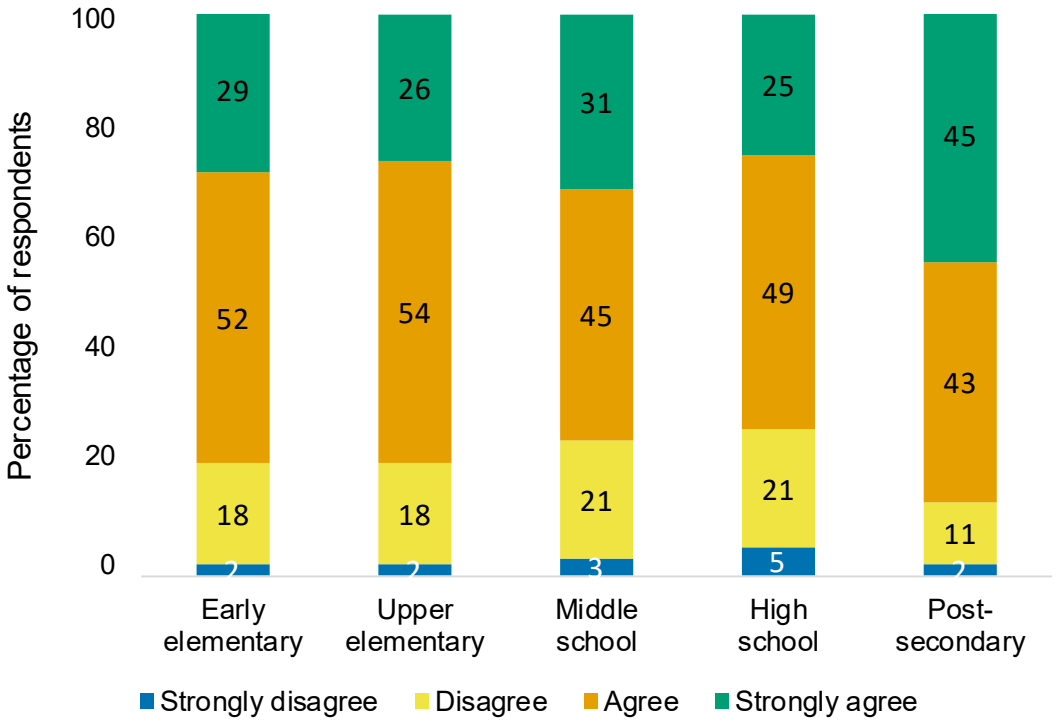
Given that math teachers consider parts of reading in math to be discipline specific, then math educators should make sure students are acquiring the appropriate "math-reading" skills. We asked educators about whether they teach the specific kind of reading needed for learning math, such as how to read a math textbook; to a large degree, it appears that they do (Figure 7).

Figure 7. Distribution of math educators agreeing or disagreeing with the statement, "I spend instructional time in class explicitly teaching students strategies for reading printed math texts for the purpose of learning math (e.g., specific reading strategies for reading a math textbook)," by grade range



However, despite the prior question's use of the example of a math textbook, most of the math educators we surveyed reported that most students do not need to read their textbooks (Figure 8).

Figure 8. Distribution of math educators agreeing or disagreeing with the statement, "Most students in my class can effectively learn the math without having to learn from a textbook," by grade range



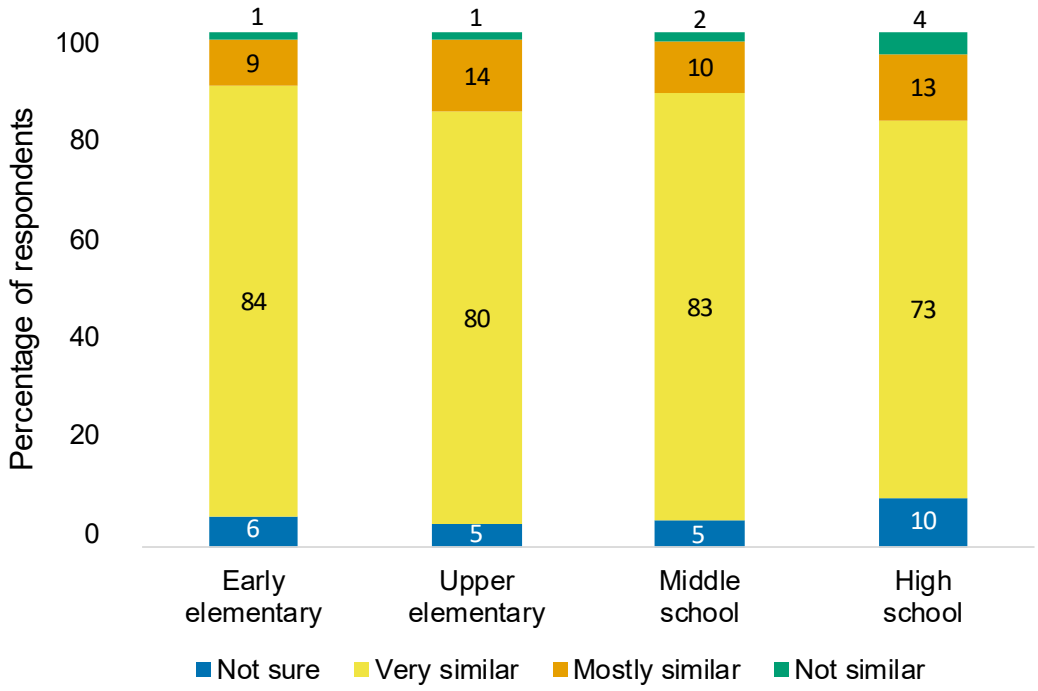
Some of the explanation for this may be that online resources are available as a substitute for textbooks, or that the respondents believe their in-class presentations make the concepts sufficiently clear for most students. Reading to learn mathematics is a useful skill, but the textbook is not the only source used to teach it

Conclusion 5: K–12 math teachers mostly report that the Common Core standards for math are very similar to their state math standards, while math educators in all grade ranges mostly report that the Common Core standards also need revision.

The Common Core State Standards were released a decade ago. Since that time, the 2012 and 2016 ACT National Curriculum Surveys found that at first the elementary, middle, and high school math teachers were more familiar with the math standards than were postsecondary math instructors, which makes sense because the standards were designed for the K–12 grades. Now, however, the postsecondary respondents are, on average, either are moderately (36%) or very (54%) familiar with the Common Core State Standards for Mathematics.

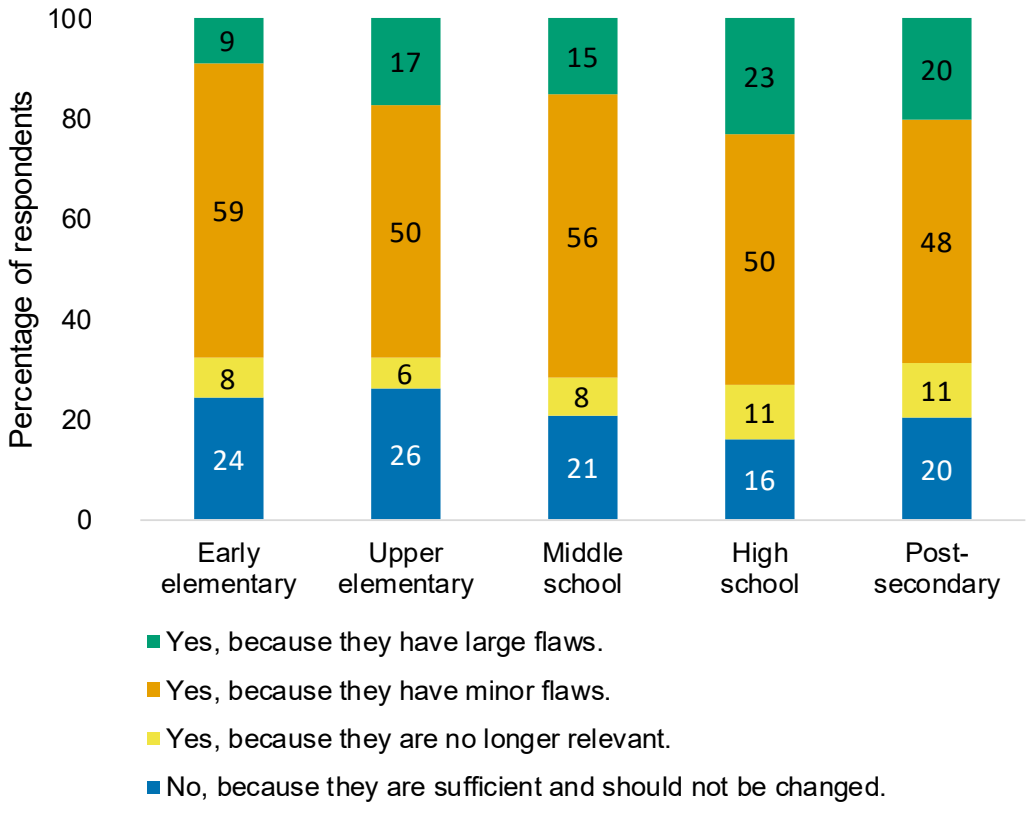
The current survey asked K–12 math teachers how similar their state's math standards are to the Common Core. They reported that state standards tend to be very similar to the Common Core (Figure 9).

Figure 9. Distribution of K–12 math educators' responses to the question, "How similar are your state math standards to Common Core?," by grade range



The Common Core State Standards for Mathematics are now over a decade old. We asked all math educators whether these standards should be revised, and why. (Figure 10).

Figure 10. Distribution of math educators' responses to the question, "Should the Common Core math standards be [reviewed and][6] revised, and why?," by grade range[7]



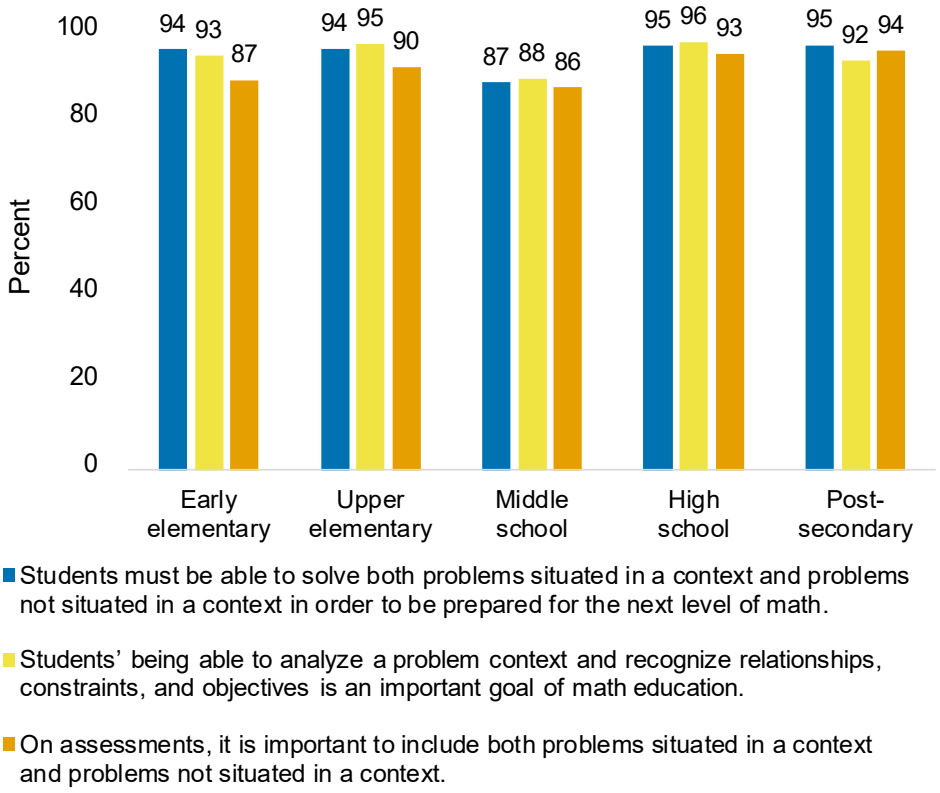
[7]The postsecondary survey included the phrase in brackets.
[8]The postsecondary survey phrased the third response option "No, because they are no longer relevant," and we believe this represents the same sentiment as the option shown for the other grade bands.

Roughly 80% of respondents said yes: about 50% indicated that the current standards have minor flaws, about 20% indicated that they have large flaws, and about 10% indicated the standards are no longer relevant.

Conclusion 6: Math educators generally consider "problems in context" to be of high importance.

Although what we are choosing to call "problems in context" (often commonly known as word problems or story problems) sometimes come under scrutiny for reasons ranging from cultural bias to silliness, they are a vital part of the math curriculum in all grade ranges. We asked math educators to agree or disagree with three statements related to this kind of problem (Figure 11).

Figure 11. Percentage of K–12 math educators' agreeing or strongly agreeing with statements about problems in context, by grade range



Overall, the results show that math educators generally consider problems in context to be highly important, with at least 86% of each group of respondents agreeing or strongly agreeing with each statement. Because problems in context nearly always require reading, this would appear consistent with the educators' overall responses, in Finding 4, that math requires a distinct type of reading and that they teach their students strategies for accomplishing it.

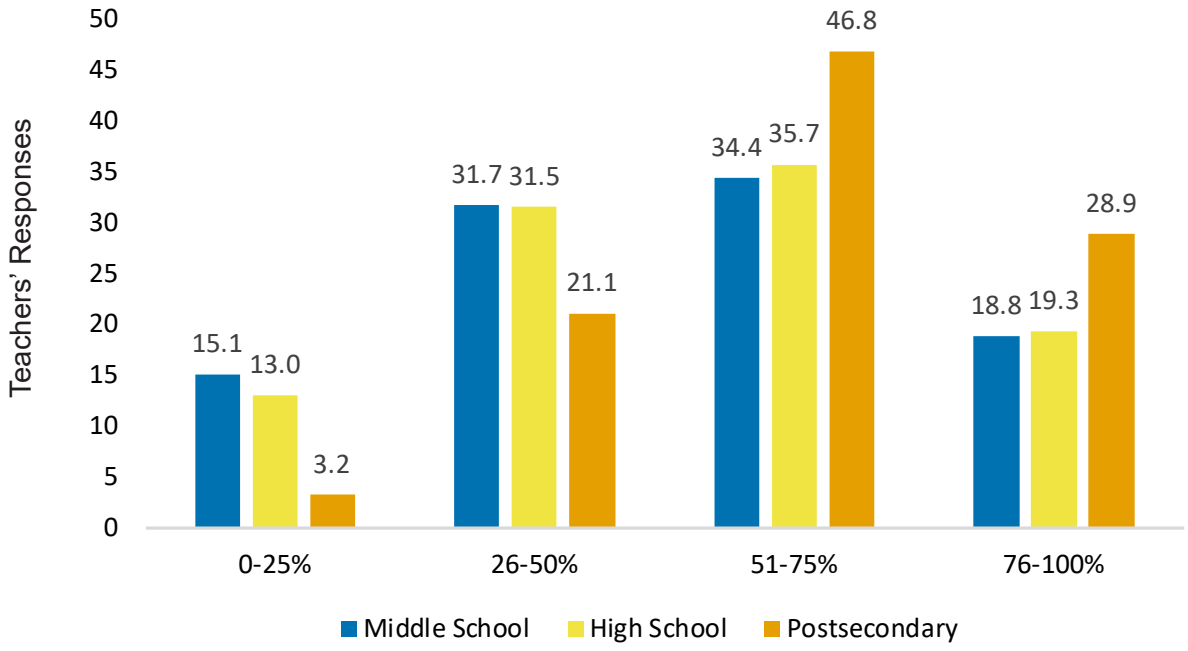
C. Science

This chapter highlights findings from the Science portion of the ACT National Curriculum Survey 2020. Respondents in this portion included teachers of elementary-school science; teachers of middle school earth science, life science, and physical science; teachers of high school biology, chemistry, earth science, and physics; and instructors of credit-bearing first-year college courses in biology, chemistry, earth science, physics, and physics in an engineering context.

Conclusion 1: Science educators tend to be optimistic about their students' preparation to succeed in courses they teach.

Educators across grade bands were asked: What percentage of students entering your course are prepared to succeed in the course? Generally, most science educators reported that most of their students are prepared to succeed, with postsecondary instructors having the most positive views of their students (Figure 12). This positive picture of student readiness provided by postsecondary instructors is not, however, consistent with the results of the past several National Curriculum Surveys. It is difficult to know whether this apparent change resulted only from better student preparedness[8] or also from one or more other factors such as lower expectations of what students need to bring to their courses, changing undergraduate population, or changes in course rigor.

Figure 12. Teachers' evaluations of how many of their students are prepared to succeed in the course



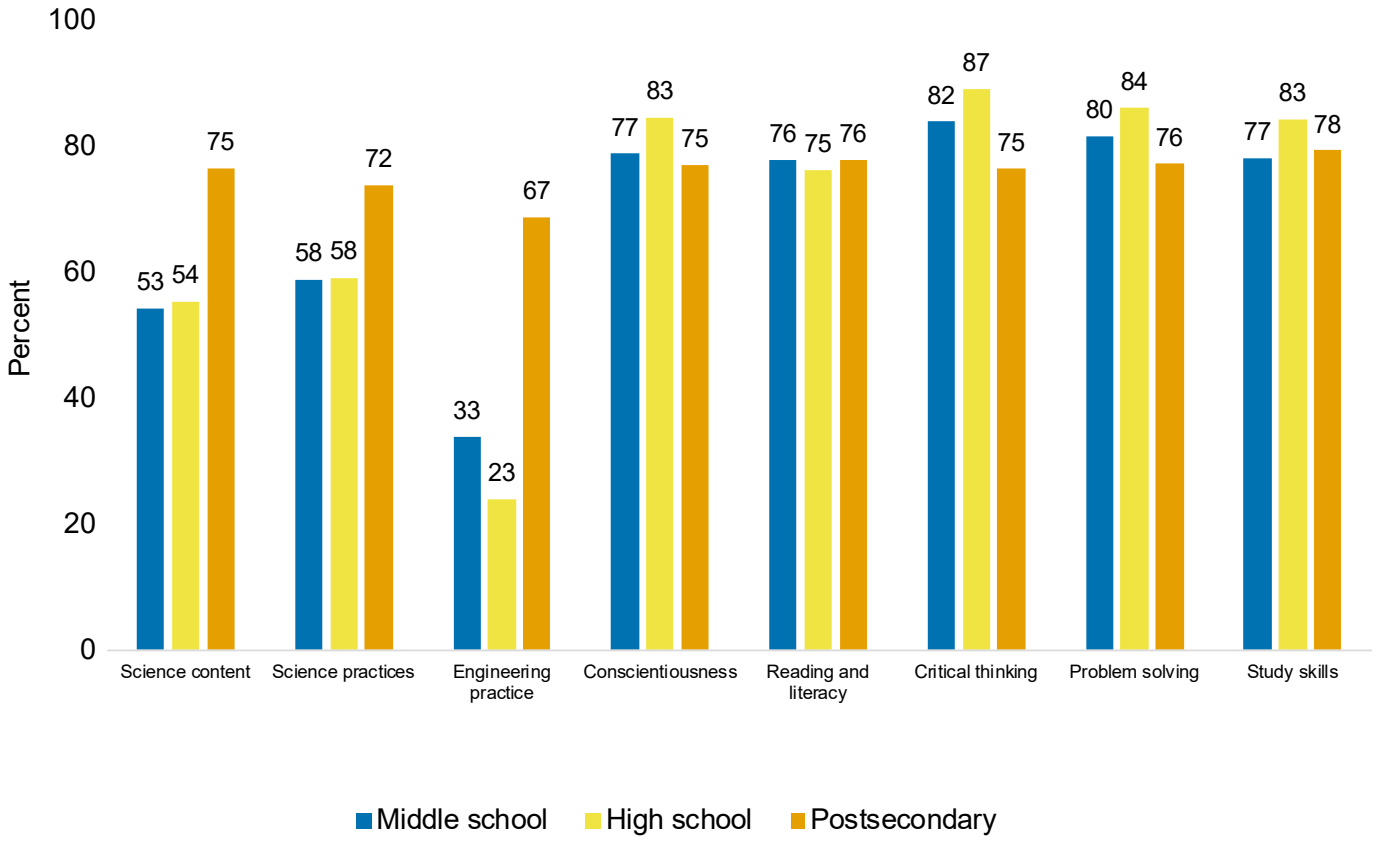
[8]See Finding 2 below.

Middle school teachers frequently commented that students have not spent enough time learning science in elementary school, which is supported by the data from the last two National Curriculum Surveys as well as data available from other sources (e.g., Blank, 2013; Sowder & Harward, 2011). Not only is this likely to leave many students ill prepared for middle school science courses, the impact carries forward given the spiraling nature of science standards and the progressive nature of how students learn science concepts.

Conclusion 2: Teachers in both middle school and high school do not consider weakness in science content or in science practices as the biggest obstacles to success in their courses.

These thoughts hold despite the call for more exposure to science at the elementary level. For both grade bands, teachers reported that the same five weaknesses would likely or very likely contribute to a poor outcome in the course: critical thinking, problem solving, conscientiousness, study skills, and reading and literacy skills (Figure 13). Postsecondary results were similar. It is important, though, to point out that not only do these capabilities underpin attainment of science content and practices, they likely also underpin success in any learning domain. (In fact, similar findings about these capabilities were reported for both math and ELA.)

Figure 13. Percentages of educators indicating that weakness in an area will likely or very likely lead to a poor outcome in their science courses



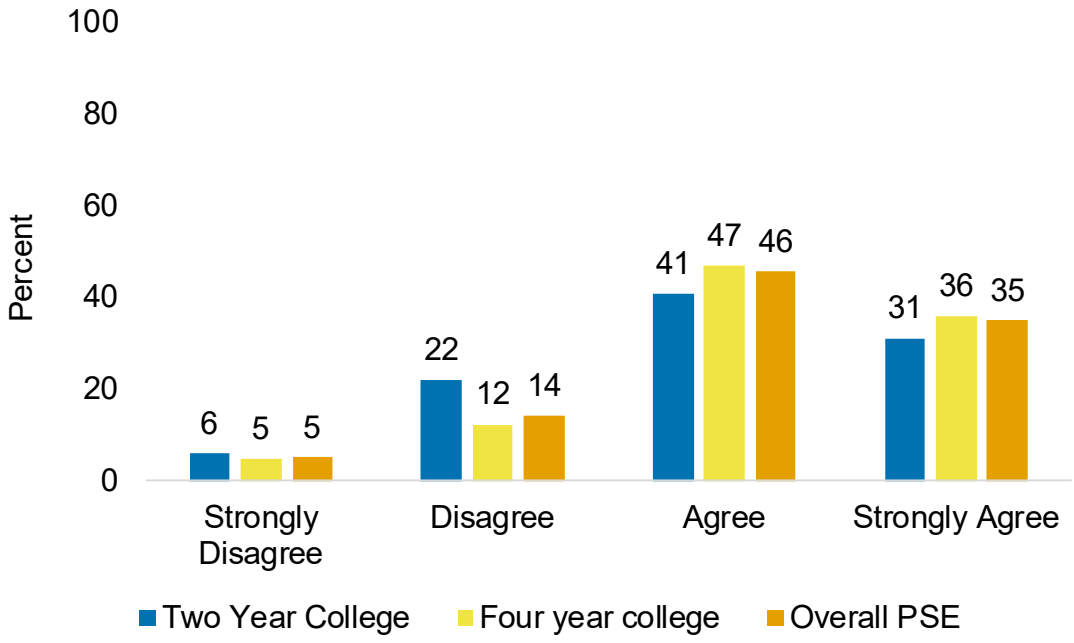
These results are similar to those from the 2015 National Curriculum Survey, which found these same crosscutting capabilities (so described in the ACT Holistic Framework) most likely to contribute to a poor outcome in science courses.

Middle and high school science teachers considered weakness in science practices to be slightly more problematic than weakness in science content knowledge. Engineering practices were the lowest contributor for all three bands. Conversely, postsecondary instructors considered science content knowledge to be slightly more important than science practices—as they did in the immediately preceding National Curriculum Survey—but 68% of postsecondary instructors reported that more than half their students were prepared to succeed based on science content knowledge compared to 57% for science practices. It is important to note that the differences in importance between science content and science practices were much smaller than the discrepancy between engineering skills and either science content or science practices.

Conclusion 3: Postsecondary science instructors believe college readiness has improved.

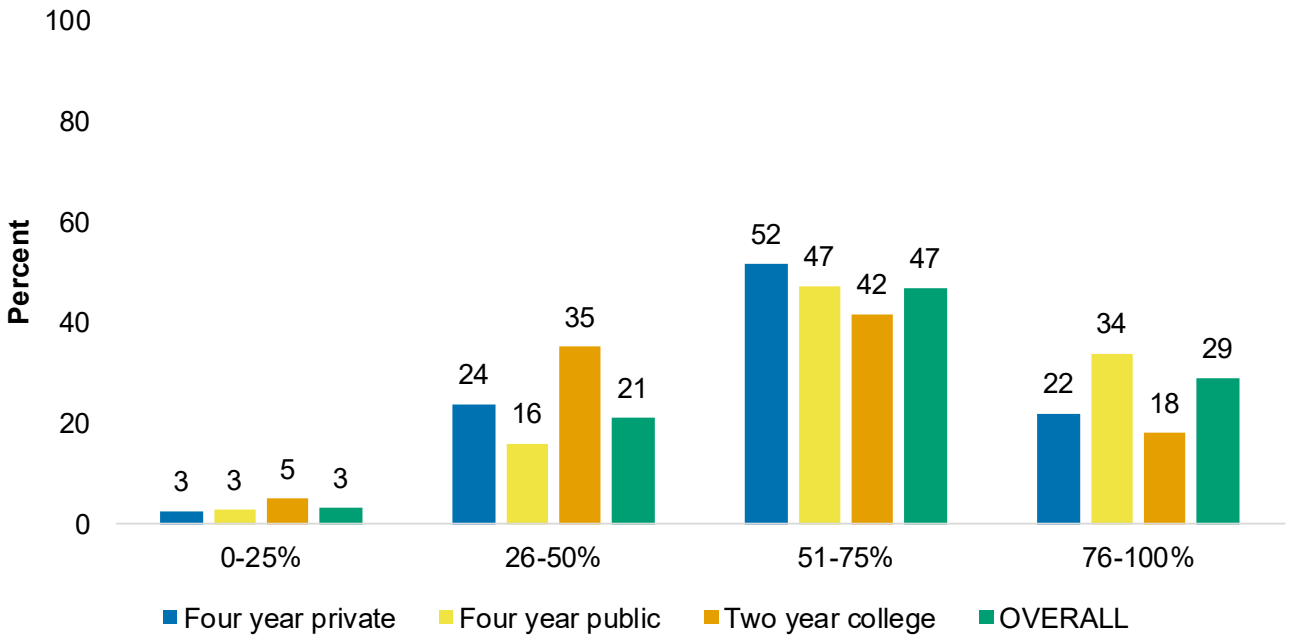
Postsecondary instructors were asked whether or not they agreed with the statement: Students have been better prepared in science in the last few years than they have ever been before. The results show that over 80% of these instructors agree or strongly agree (Figure 14). Additionally, 54% of instructors indicated that students were better prepared because of science education reforms such as the National Research Council (NRC)'s Framework for K–12 Science Education and the Next Generation Science Standards (NGSS).

Figure 14. Postsecondary instructors' degrees of agreement or disagreement with the statement, "Students have been better prepared in science in the last few years than they have ever been before"



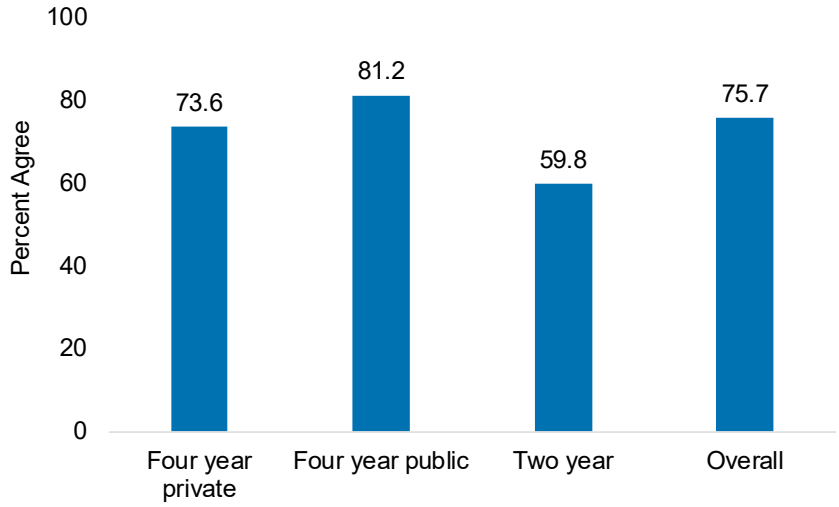
Postsecondary instructors were asked the question: What percentage of students entering your course are prepared to succeed in your course? Their responses are summarized in Figure 15.

Figure 15. Postsecondary instructors' degrees of agreement or disagreement with the statement, "What percentage of students entering your course are prepared to succeed in your course?"



These results show that postsecondary instructors consider not only that their entering students are better prepared than in previous years but also that the majority of these students is actually prepared to succeed: 76% of all the instructors believe that more than half of their students are prepared for success in their courses (Figure 16: Percentages of postsecondary instructors who reported that they believe more than half of their students are prepared for success in their courses).

Figure 16. Percentages of postsecondary instructors who reported that they believe more than half of their students are prepared for success in their courses



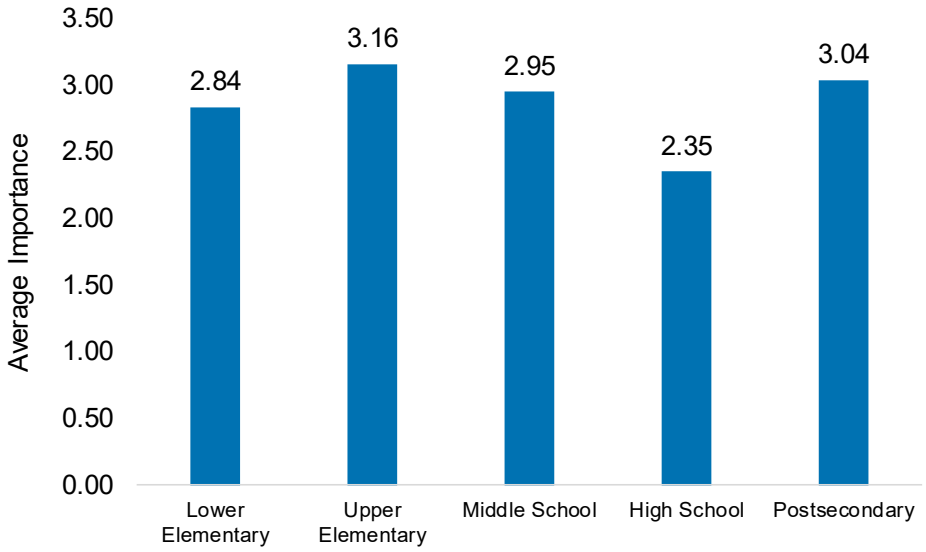
One other noteworthy point about all three sets of findings: in general, faculty at two-year colleges tend to report their students' levels of preparation more unfavorably than those at four-year colleges. Given the rapidly growing sector of STEM (Science, Technology, Engineering, and Math) jobs that require less than four years of education (Rothwell, 2013; National Science Board, 2014), steps should be taken to increase the readiness of students at all kinds of postsecondary institutions to succeed in entry-level science courses.

Conclusion 4: A gap may exist between the estimated importance of engineering practices and how often they are taught.

A lot has been written over the last several years about the increased need for engineering instruction in K–12 classrooms. Advocates often argue that doing so will better prepare students for future jobs in STEM, which is projected to be the fastest growing portion of the economy over the next twenty years. Others focus on how students can use principles of engineering and design thinking to solve problems, both in their own lives and in the lives of their communities and the world at large. Both the NRC Framework and the NGSS specifically call for engineering to be taught across multiple practices and all content domains. However, based on the responses of both K–12 and postsecondary science educators, there appears to be a gap between how important teachers say that engineering practices should be and how often they are actually taught.

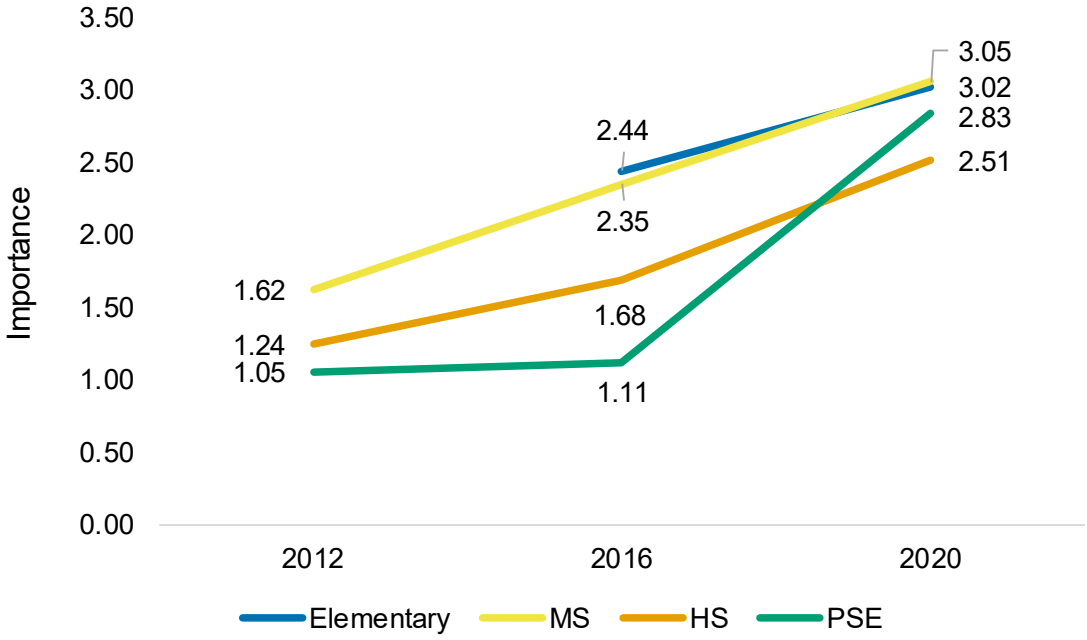
There were three questions on the postsecondary survey about the importance of engineering, one pertaining to the activities used for instructional time and two about science practices. The K–12 survey had these same three questions, as well as two others about the importance of engineering content in the science classroom within the context of other science content knowledge. Figure 17 shows the average responses for these questions by grade band.

Figure 17. Average importance of engineering in the 2020 National Curriculum Survey, based on responses to five engineering-related questions and measured on a scale from 0 (least important) to 4



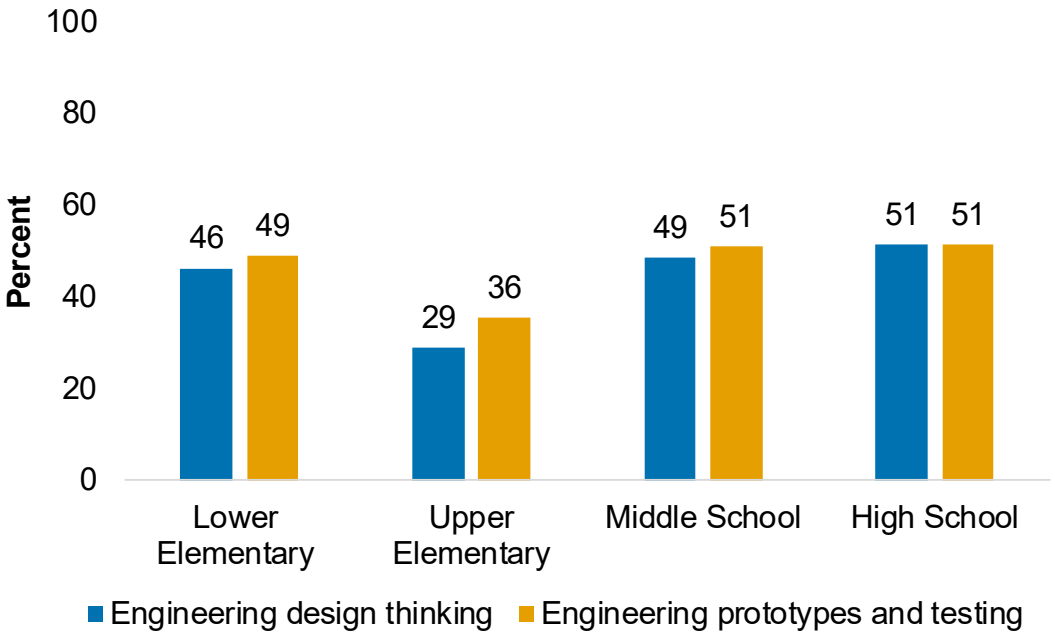
Upper elementary teachers responded most positively, and high school teachers responded least positively. When these results are compared to those from past surveys, they show that the importance of teaching engineering has continued to increase since the National Curriculum Survey first included questions about teaching engineering in 2012 (Figure 18).

Figure 18. Change in importance of engineering in the ACT National Curriculum Survey, 2012–2020, measured on a scale from 0 (least important) to 4



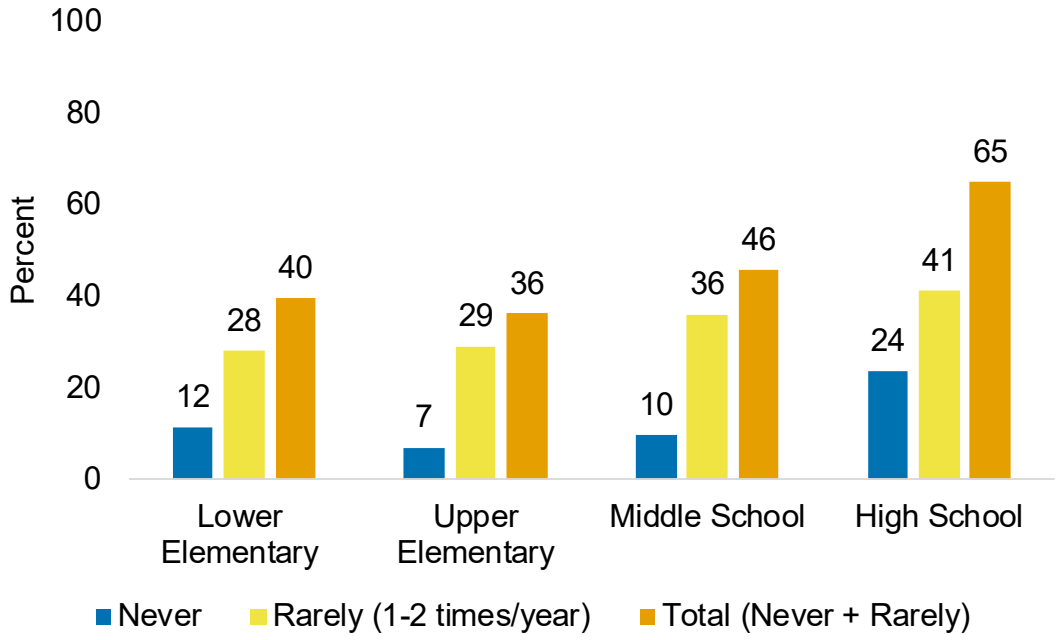
There has been a relatively steady increase across the K–12 grade bands as more and more states have adopted new science standards based on either NGSS or the NRC Framework, as well as a large recent increase among postsecondary instructors. At the same time, survey responses also indicate that many K–12 teachers are not teaching engineering. There were four questions about whether or not engineering design thinking or prototype testing were taught; the percentages of K–12 teachers who reported not doing so are shown in Figure 19. For all but upper elementary, at least 40 percent of teachers report that they do not teach these engineering topics.

Figure 19. Percentages of K–12 teachers who reported not teaching engineering design thinking or prototype testing



When asked how often students engage in activities focused on engineering and design, many K–12 teachers across all grade bands reported that they never or rarely (1–2 times per year) do so (Figure 20). It is notable that the percentages of high school teachers reporting this are substantially higher than those for the other grade bands.

Figure 20. Percentages of K–12 teachers reporting that their students "rarely" and/or "never" engage in activities focused on engineering and design

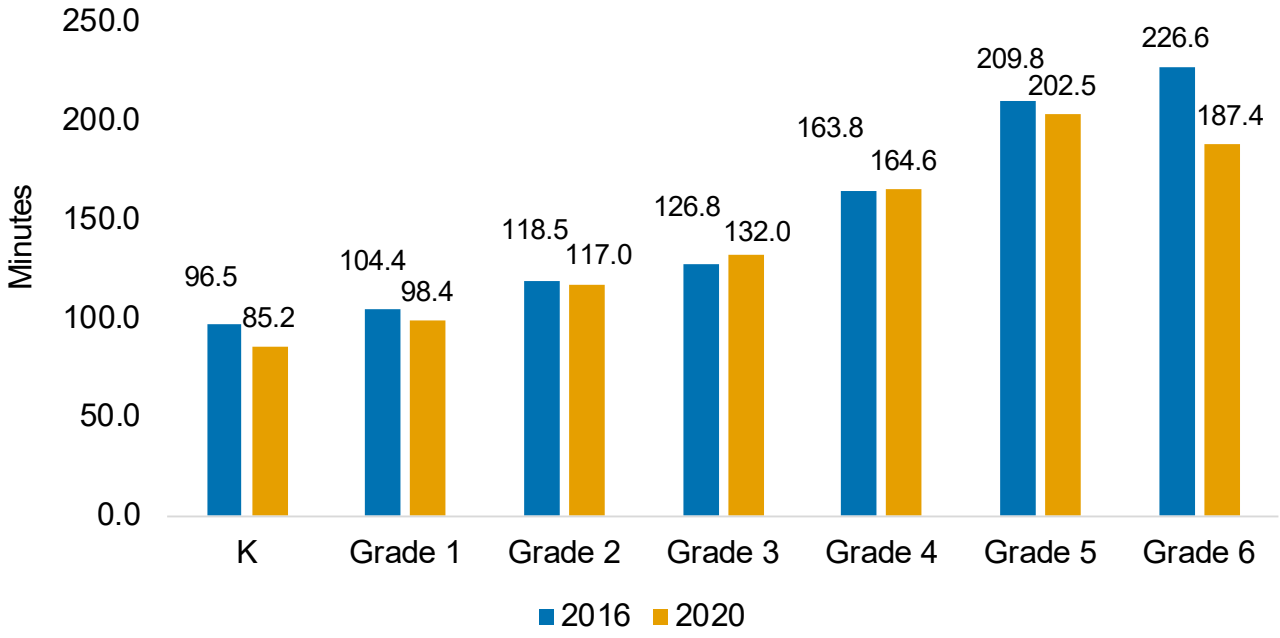


Taken together, the survey results related to engineering suggest that while the perceived importance of engineering in science courses has increased, these perceptions are not yet being reflected in the classroom.

Conclusion 5: There has likely been little to no increase over the past few years in the amount of time K–6 teachers spend on science instruction.

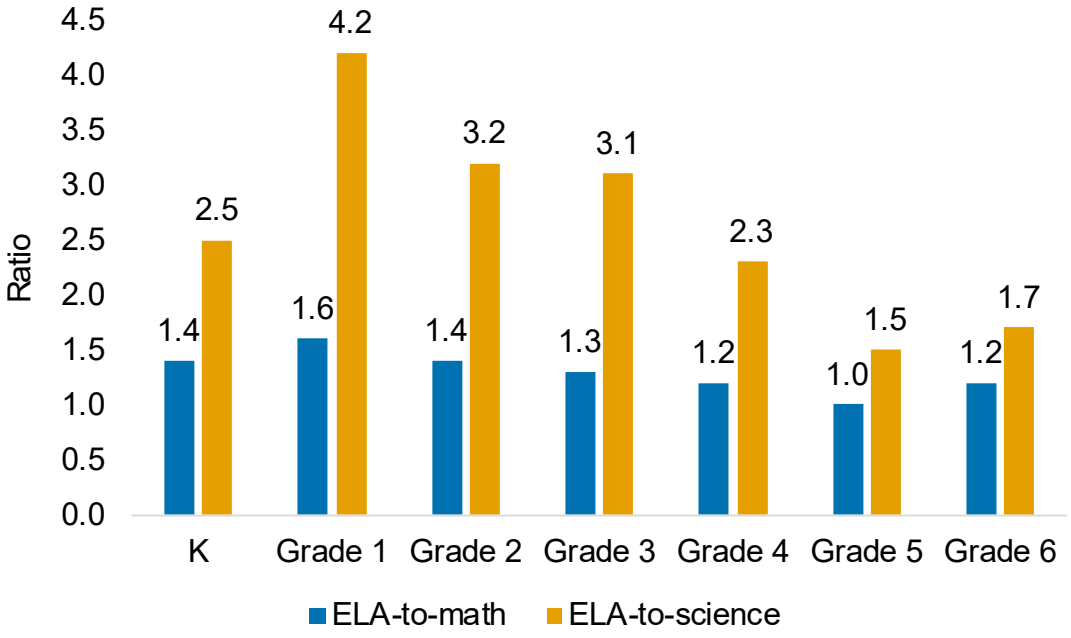
Instructional time is an important component in providing students opportunities to learn. Many reports have shown that science instructional time has decreased since the passage of the federal No Child Left Behind Act of 2001 (NCLB), which emphasized literacy and math more than science (Blank, 2013; National Center for Education Statistics, 2010). An overwhelming majority of states has more recently adopted new standards based on the NRC Framework and/or the NGSS, both of which include more ambitious learning targets in science, especially at the elementary- and middle-school levels, than did NCLB. Thus it should follow that instructional time devoted to science would need to increase accordingly. Unfortunately, results from the National Curriculum Survey 2020 show virtually no change in mean instructional time for science across the elementary grades compared to that seen in the 2016 Survey (Figure 21).

Figure 21. Average instructional time in science in grades K–6, in minutes, as reported in the 2016 and 2020 ACT National Curriculum Surveys



Furthermore, there remains a large gap between mean instructional time for science on one hand and math and English Language Arts (ELA) on the other. Figure 22 gives the ratios of average minutes of ELA instruction per week in grades K–6 to those of math and science.

Figure 22. Ratios of average minutes of instruction per week in grades K–6, ELA-to-math and ELA-to-science



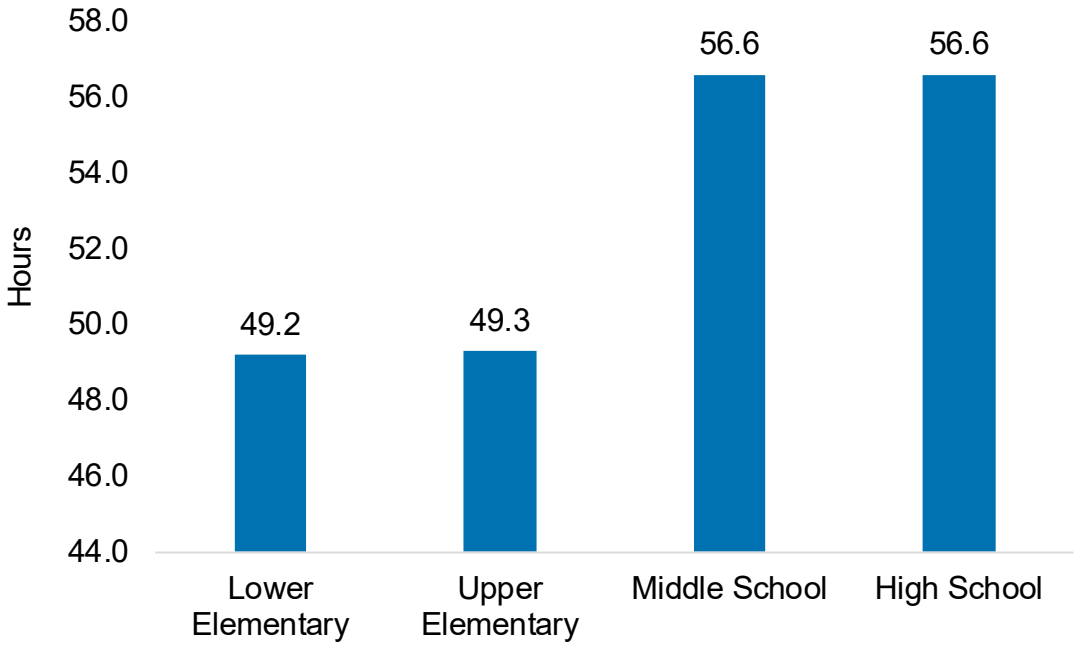
The ratios suggest that the average amount of time spent on ELA instruction is much more similar to that spent on math than that spent on science—in some grades, the ELA-to-science ratio is more than double the ELA-to-math ratio. Only in grades 5–6 are the ratios roughly comparable. Other studies confirm this shift in instructional time away from science and its potential implications (see, e.g., Blank, 2013).

The new standards movement in science demands that students start developing fundamental science knowledge, skills, and practices early, and then those standards spiral across grade levels. Not having adequate science instructional time in the early grades can influence the percentages of students who are not on target for college and career readiness in science in the later grades.

Conclusion 6: Some K–12 science teachers may not be getting sufficient professional development in certain aspects of science instruction.

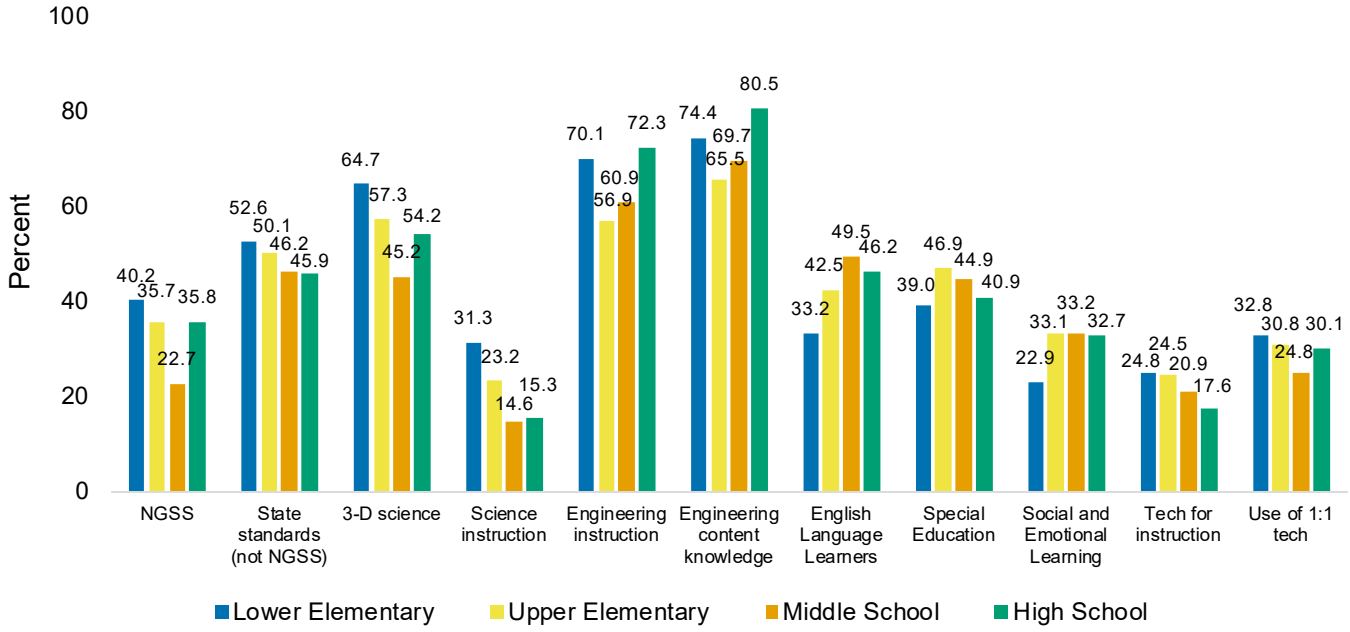
K–12 science teachers were asked about the professional development (PD) they had engaged in, on any topic, over the last two years. Overall, the amount of PD engaged in by the teachers was similar across the four grade bands (Figure 23).

Figure 23. Average numbers of hours of professional development (PD) reported by K–12 science teachers



However, when the amount of time engaged in PD is broken down by topic, it reveals some seemingly troublesome findings regarding the absence of PD in topics regarding science instruction, engineering knowledge and instruction, three-dimensional science, or science standards (NGSS or others). For several of these topics, more than 50% of teachers reported that they had not received any PD in the last 2 years (Figure 24). This was particularly the case for early grades and, for engineering, across all grades.

Figure 24. Percentages of K–12 science teachers who reported engaging in no professional development during the last two years, by selected topics



Sixty-six percent of all teachers reported no PD for instruction on engineering, 74% reported no PD for instruction on engineering content, and 56% of all teachers reported no PD on three-dimensional science. If teachers are going to be more successful in teaching the new three-dimensional science standards, especially those that focus on engineering, they will need to receive the appropriate training to do so.

Chapter 2: Cross-Cutting Capabilities

This chapter highlights findings from a section of the ACT National Curriculum Survey 2020 that contained questions on cross-cutting capabilities. Apart from some exceptions noted in the footnotes below, all survey participants were asked to respond to these questions.

At the same time that core academic skills have been viewed as essential components of college and career readiness, a broader range of skills has also been identified as extremely important for preparing individuals to succeed in college and workforce settings (Camara, O'Connor, Mattern, & Hanson, 2015). In the ACT Holistic Framework, these latter skills are called cross-cutting capabilities (CCCs). CCCs are defined as general knowledge and skills necessary to perform essential tasks across academic content areas, and include technology and information literacy; collaborative problem solving; thinking and metacognition; and study and learning capabilities. We asked K–12 teachers about the importance of these skills to success in school and whether the skills were taught in their courses.

K–12 teachers[9] and postsecondary instructors were asked to rate, on a scale from 0 (not important) to 4, the importance of the following CCCs to success in the courses they teach:

- Applying relevant existing knowledge and skills to novel tasks
- Adapting to changes in task requirements
- Identifying when a given approach to solving a problem isn't working
- Revising plans, goals, or priorities to account for new information
- Identifying the characteristics of a problem
- Identifying the strengths and weaknesses of alternative solutions to a problem
- Predicting the consequences of decisions
- Working effectively in a team of individuals with varying skill sets to accomplish a goal
- Responding with corrective action when an initial plan for completing a task fails
- Effectively allocating time to complete tasks by their deadlines
- Anticipating possible obstacles to successful completion of a task
- Putting together information from multiple sources to solve a problem
- Effectively researching solutions to problems using internet resources[10]
- Effectively prioritizing competing tasks with similar deadlines

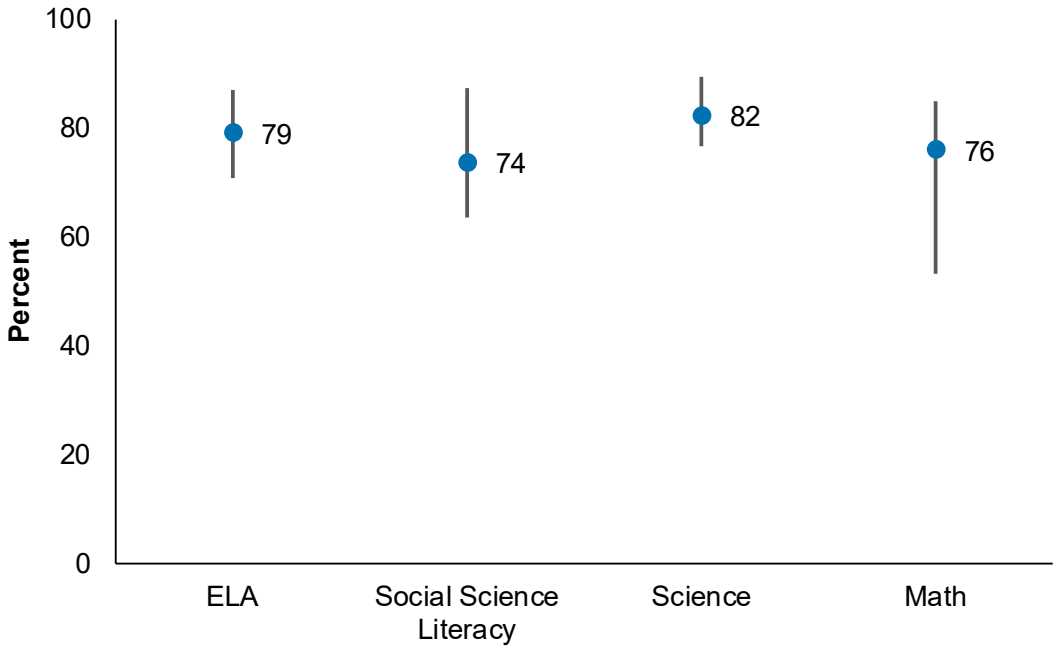
[9]Teachers of social science literacy in grades K–6 were not asked to complete this portion of the survey.
[10]Teachers in grades K–6 were not asked to rate this or the following CCC.

Cross-Cutting Capability Findings

Conclusion 1: High percentages of educators report that CCCs are of high importance.

Aggregated percentages, by subject area, of educators who rated the importance of every one of the twelve or fourteen CCCs as a 3 or a 4 (the two highest ratings) are given in Figure 25. The lines for each domain category span from the minimum to the maximum percentages across all grade levels and CCCs, with means represented by a point on each line.

Figure 25. Aggregated minimum, average, and maximum percentages of educators who rated the importance of all the given CCCs as a 3 or 4

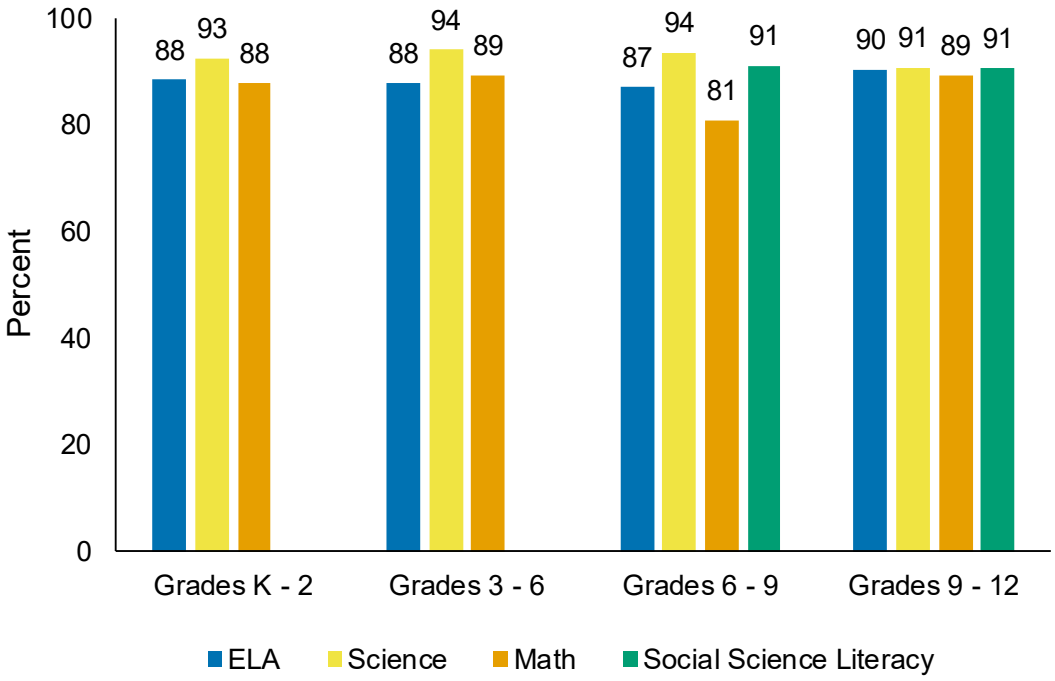


The figure shows that about 52% to about 89% of educators, depending on content area, rated all of the CCCs as a 3 or a 4, with the means ranging from about 74% to about 82%.

Conclusion 2: High percentages of K–12 teachers believe that CCCs are just as or more important to student success in their courses than content knowledge.

The K–12 teachers were also asked about the relative importance of CCCs and content knowledge as contributors to student success in courses in a given content area. Figure 26 presents, for respondents in each of 14 pairings of grade level (early elementary, upper elementary, middle school, and high school) with content area (ELA, science, social science literacy, and math), the percentages of respondents rating all of the CCCs as being of equal or greater importance than content knowledge for student success in the relevant coursework.

Figure 26. Percentages of K–12 teachers rating CCCs as being of equal or greater importance than content knowledge for success in the courses they teach

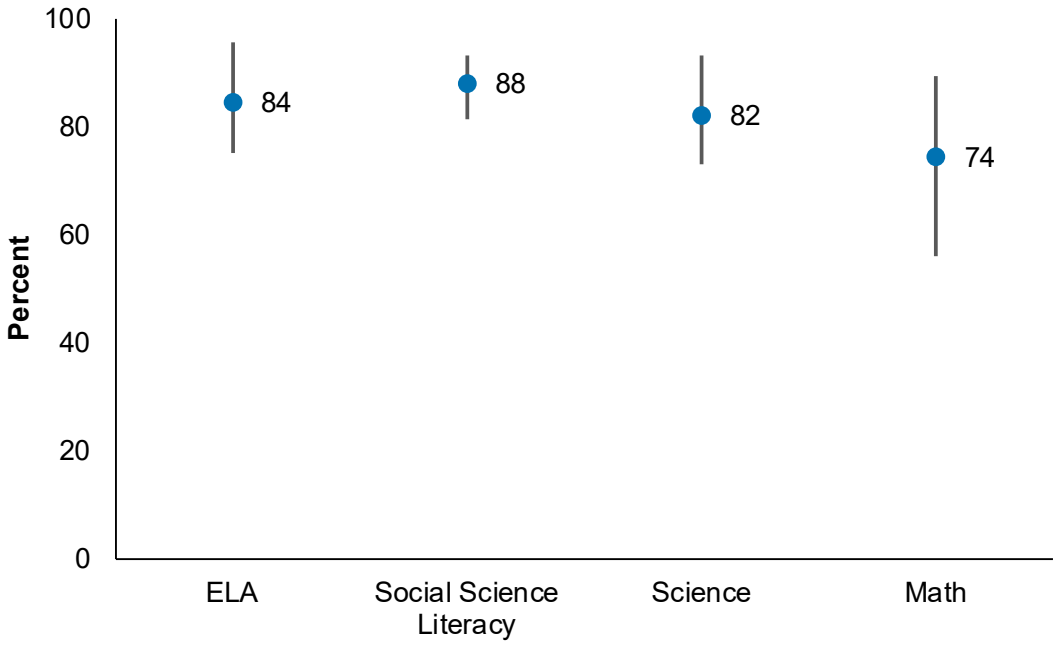


The percentages were between about 80% and about 93% in each of the grade level/ content area pairings.

Conclusion 3: High percentages of K–12 educators teach CCCs.

Finally, K–12 teachers were asked to report whether or not they taught each CCC, as either regular course content or review. Figure 27 presents the results, aggregated in the same ways as the results in Figure 25.

Figure 27. Aggregated minimum, average, and maximum percentages of K–12 teachers who reported teaching all of the CCCs



The figure shows that about 56% to about 96% of teachers, depending on content area, reported teaching all of the CCCs, with the means ranging from about 74% to about 88%. Comparing these ranges to those in Figure 11 would suggest that some of the respondents taught all of these skills even when they rated some of them to be of relatively low importance.

Chapter 3: Behavioral Skills

This chapter highlights findings from a section of the ACT National Curriculum Survey 2020 that contained questions on behavioral skills (known more generally as social and emotional skills). All survey participants were asked to respond to these questions.

Respondents were asked to consider what kinds of social and emotional skills were important to assess and teach in the context of both school (K–12 teachers and administrators; college instructors) and work (employees and supervisors). The responses are arranged by sample, including K–12, Postsecondary, and Workforce.

There was widespread agreement across all samples that the all of the social and emotional skills outlined should be both assessed and taught. The skills included: 1) acting honestly, 2) getting along with others, 3) keeping an open mind, 4) maintaining composure, 5) socializing with others[11], 6) sustaining effort, and 7) leadership. Additionally, most educators agreed that it was the job of schools to teach social and emotional skills in K–12 (83%) and college (82%).

Social and Emotional Skills in K–12 Education

Most K–12 teachers and administrators surveyed agreed that it is possible to teach and assess social and emotional skills in school, with 83% believing that schools should teach them (Table 2). Additionally, approximately 88% agreed that schools should make financial investments in interventions for students' social and emotional skills, and 79% agreed they should do the same for assessing these skills. A large majority of K–12 educators and administrators also agreed that improving the school climate would lead to improved social and emotional skills for students (95%) and vice versa; 96% agreed that improving skills in students would lead to a better school climate.

[12]After the administration of the ACT National Curriculum Survey 2020, the term "socializing with others" was updated to "social connection" to better reflect feedback from educators. While the term was updated, the definition of this social and emotional skill remains the same: a person's preferred level of social interaction, behavior in interpersonal situations, and optimism.

Table 4: Percentage of K–12 teachers and administrators who somewhat agreed, agreed, or strongly agreed with statements related to social and emotional skills

Statement	Elementary	Middle	High	Admin	Average
It is possible to assess social and emotional skills.	78%	73%	74%	79%	76%
School districts should make financial investments in assessments of social and emotional skills.	74%	74%	73%	80%	75%
It is possible to teach social and emotional skills in school.	95%	91%	90%	94%	92%
School districts should make financial investments in interventions for social and emotional skills.	91%	87%	84%	89%	88%
It is the job of the schools to teach social and emotional skills.	85%	78%	82%	85%	83%
An improved school climate will lead to improved social and emotional skills in students.	96%	95%	95%	94%	95%
Improved social and emotional skills in students will lead to an improved school climate.	98%	96%	96%	95%	96%

Which Skills Are Important?

Most K–12 teachers and administrators agreed that all of the social and emotional skills presented in the survey were important to both assess (Figure 28) and teach (Figure 29). Overall, administrators were more likely to agree with the importance of assessing and teaching these skills than K–12 teachers. Additionally, nearly all administrators agreed that these skills were at least somewhat important to teach, with over 99% agreement in all areas. While there was less agreement related to assessing these skills, the majority of both teachers and administrators still agreed it was important.

Figure 28. Percentage of K–12 teachers and administrators who reported that it is somewhat important, important, or very important to assess particular social and emotional skills

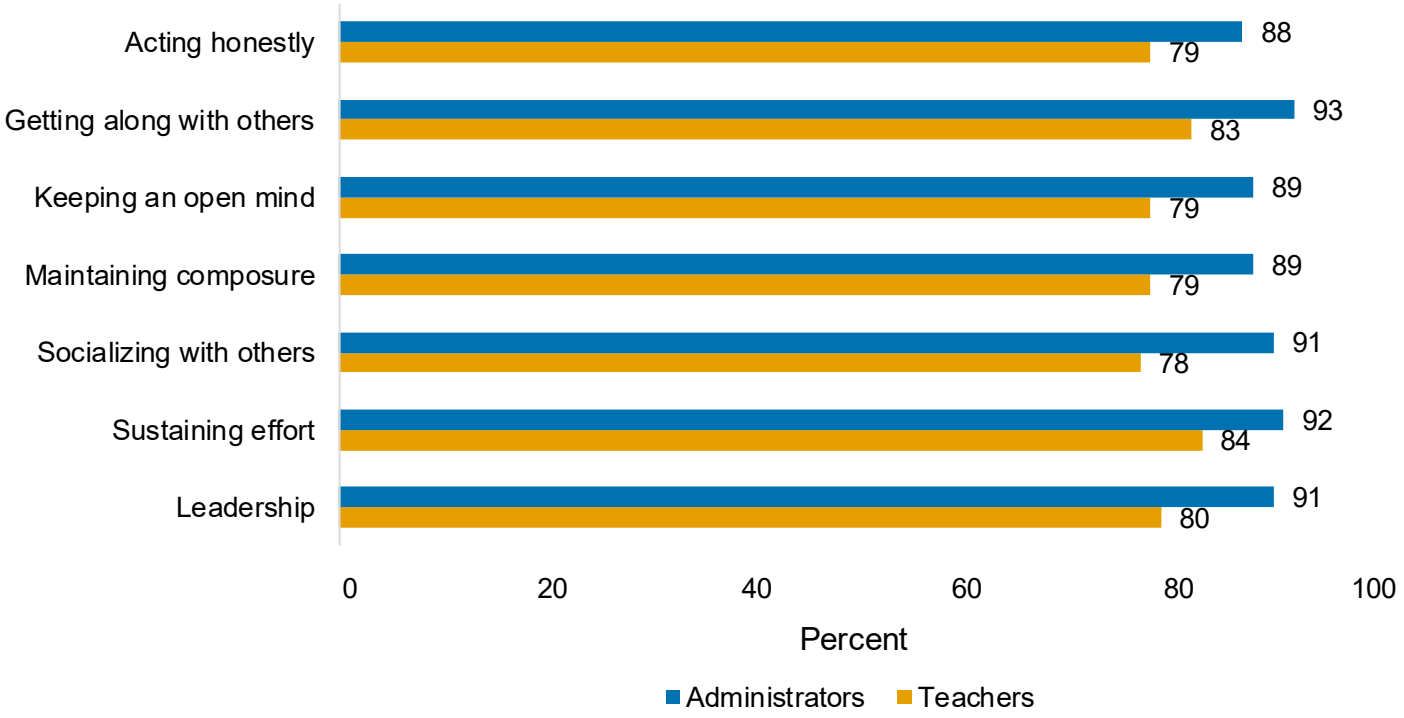
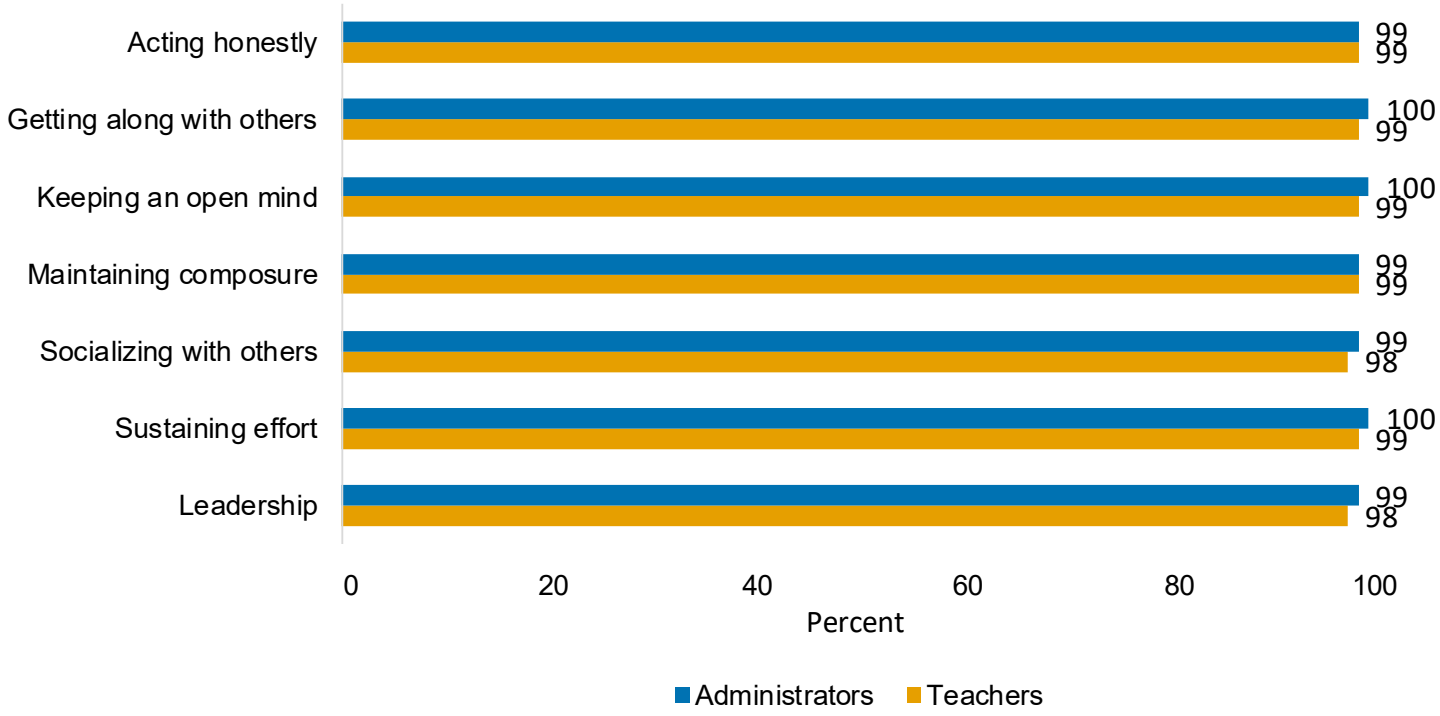


Figure 29. Percentage of K–12 teachers and administrators who reported that it is somewhat important, important, or very important to teach particular social and emotional skills



Social and Emotional Skills in Postsecondary Education

Most postsecondary instructors surveyed agreed that it is possible to teach and assess social and emotional skills in college, with 82% believing that colleges and universities should teach them (Table 3). Additionally, approximately 87% agreed that colleges and universities should make financial investments in interventions for students' social and emotional skills, and 84% agreed they should do the same for assessing these skills.

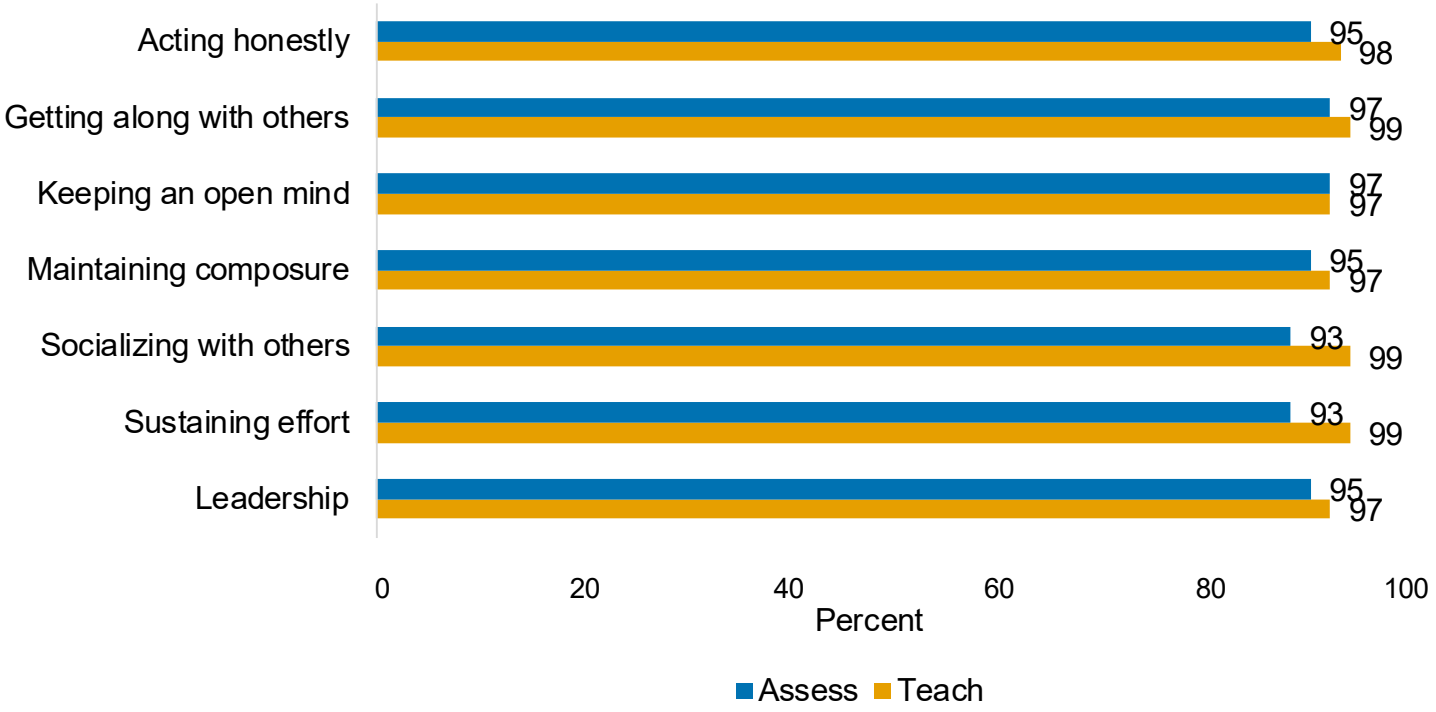
Table 5. Percentage of postsecondary instructors who somewhat agreed, agreed, or strongly agreed with statements related to social and emotional skills

Statement	Percent Agreement
It is possible to assess social and emotional skills.	89%
Colleges and universities should make financial investments in assessments of social and emotional skills.	84%
It is possible to teach social and emotional skills in college.	91%
Colleges and universities should make financial investments in interventions for social and emotional skills.	87%
It is the job of colleges and universities to teach social and emotional skills.	82%

Which Skills Are Important?

There was widespread agreement that all of the social and emotional skills presented in the survey were important to teach, with over 97% of the postsecondary educators agreeing that these skills were either somewhat important, important, or very important to teach (Figure 30). While there was slightly less consensus related to assessing these skills, the vast majority still agreed it was important.

Figure 30. Percentage of postsecondary instructors who reported that it is somewhat important, important, or very important to assess, and to teach, particular social and emotional skills



Social and Emotional Skills in the Workforce

Importance of Social and Emotional Skills: Assessment and Training

A majority of employees (Figure 31) and supervisors (Figure 32) agreed that social and emotional skills were important to assess and train in the workplace.

Figure 31. Percentage of employees who reported that it is somewhat important, important, or very important to assess, and to train, particular social and emotional skills

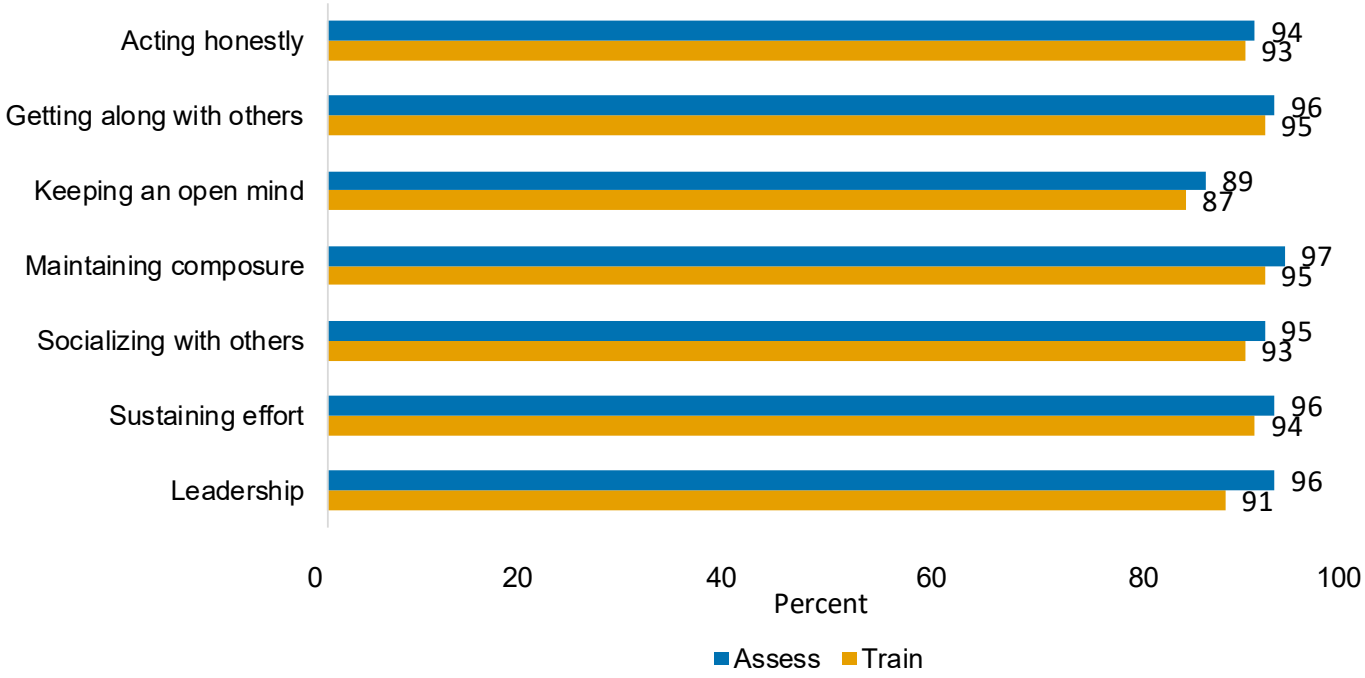
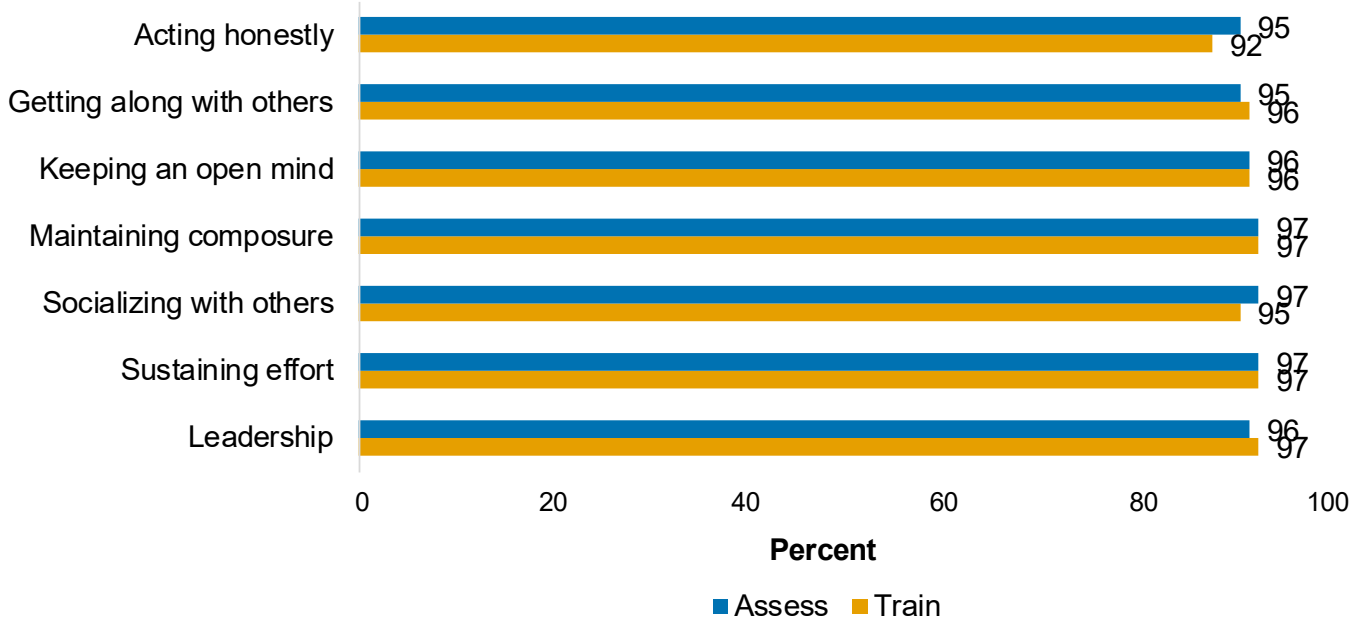


Figure 32. Percentage of supervisors who reported that it is somewhat important, important, or very important to assess, and to train, particular social and emotional skills



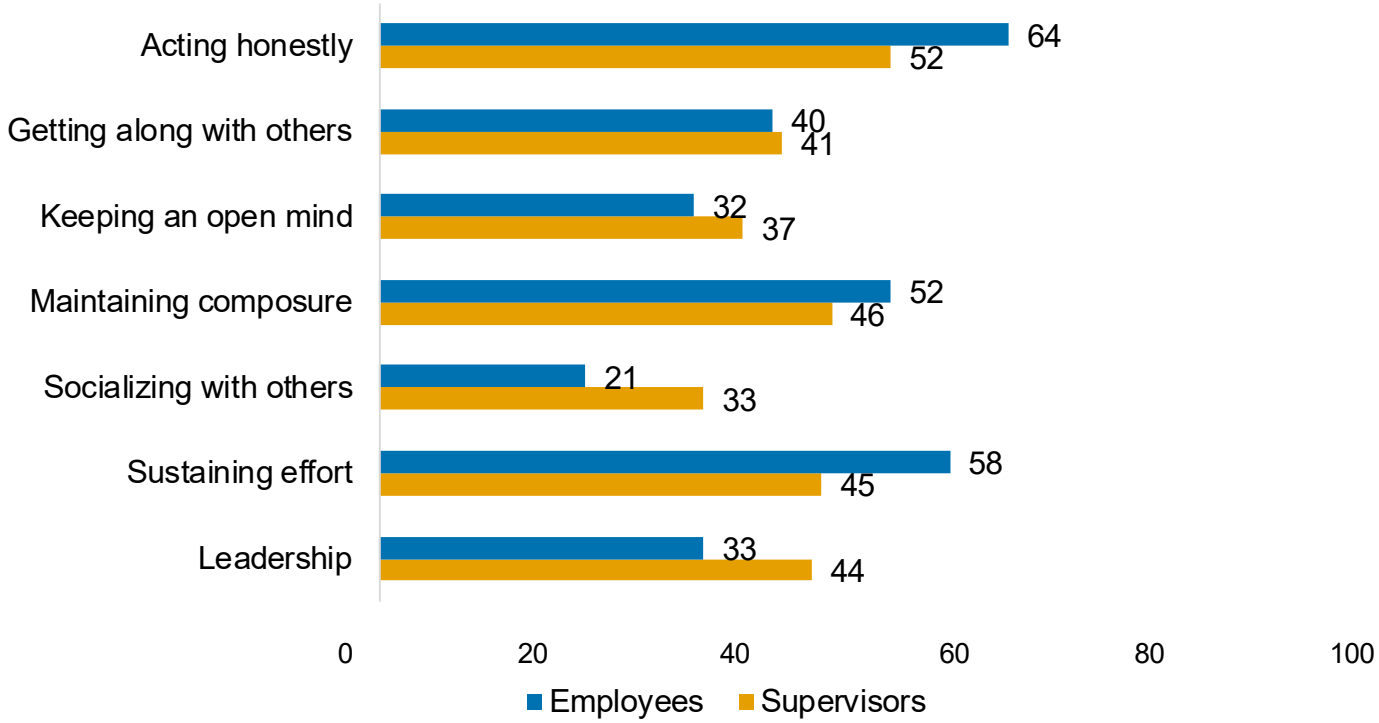
In general, supervisors were more likely to agree that these skills were important to assess and train. Overall, the highest percentage of employees felt that maintaining composure was an important characteristic to assess and sustaining effort was an important characteristic to train. Ninety-eight percent of supervisors agreed that getting along with others was an important skill to assess, but the highest percentage of supervisors felt that maintaining composure, sustaining effort, and leadership were important to train.

Relative Importance of Skills

Employees and supervisors were asked to rank the importance of social and emotional skills from most to least important when hiring an employee in a similar position to their own or a position they oversee (Figure 33).

Employees and supervisors both ranked acting honestly, maintaining composure, and sustaining effort as most important. This suggests that employees and supervisors understand the value and need to persist through challenges, remain calm, and act honestly in the workplace. The rankings for the two groups are presented in the figure below.

Figure 33. Percentage of times that employees and supervisors ranked particular social and emotional skills as first, second, or third most important when hiring an employee for a position similar to their own (employee) or for a position they oversee (supervisor).



Chapter 4: Education and Career Navigation Skills

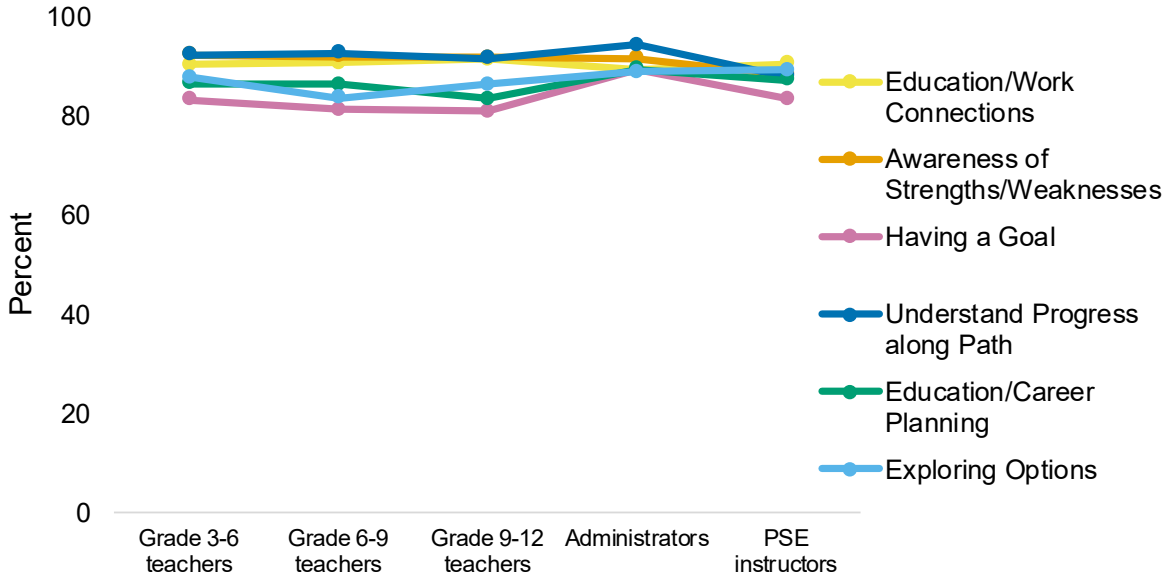
This chapter highlights findings from a section of the ACT National Curriculum Survey 2020 that contained questions on education and career navigation skills. All survey participants were asked to respond to these questions.

Education and Career Navigation Findings

Conclusion 1: A large majority of grades 3–12 educators and administrators and postsecondary instructors recognizes the importance of teaching navigation factors.

Overall, more than three-quarters (ranging from 81% to 94%) of K–12 educators and administrators indicated that education and career navigation factors are important to teach (Figure 34). Examining education and career navigation knowledge and skills separately, the highest percentages of teachers and administrators (more than 90%) across grades 3–12 considered it important or very important to teach students about the variety of education paths they can take (92% to 94%) and about being aware of their strengths and weaknesses (92%). Over 80% of postsecondary instructors recognized the importance of teaching students about these two navigation factors. Most teachers (90% to 91%), administrators (89%), and postsecondary instructors (90%) also rated making connections between education and future work as important to teach. A large majority of administrators (89%) also thought it important to teach about Education/ Career Planning, Exploring Options, and Having a Goal, with slightly fewer but still overwhelming percentages of teachers across grades 3–12 (ranging from 81% to 88%) and postsecondary instructors (ranging from 83% to 89%) considering these navigation knowledge and skills important.

Figure 34. Percentages of educators and administrators rating education and career navigation factors important to teach (based on ratings of very important or important)

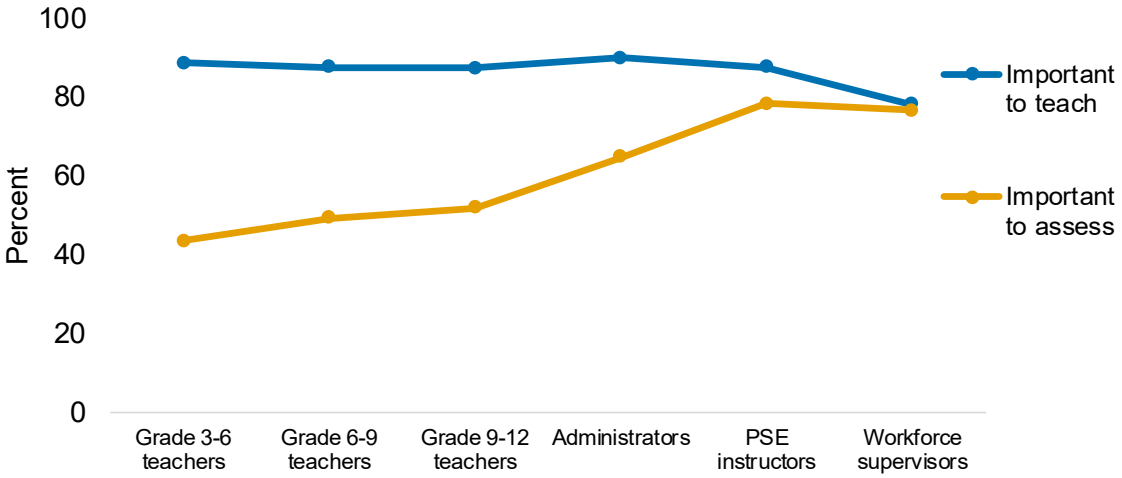


This pattern suggests that K–12 and postsecondary educators are keenly aware of the need for students to learn important navigation knowledge and skills throughout their education. As a complex process, education and career navigation requires different knowledge and skills across the K–Career continuum, and intentionally developing these navigation knowledge and skills is associated with positive education outcomes across different grade levels (Bobek & Zhao, 2015). In elementary school, for example, engaging in different learning experiences helps students learn about themselves and identify potential careers of interest (Welde, Bernes, Gunn, & Ross, 2016). Elementary-school students who are open to learning and doing new things are more likely to feel confident in completing academic tasks (Beghetto, 2009). Middle school students who received interventions related to understanding the connection between school and the world of work, and exploring occupations in conjunction with high school planning, demonstrated better academic achievement and increased self-esteem (Legum & Hoare, 2004). Helping high school students set school-related goals and plans to attain these goals is more likely to increase their academic-related perceptions, beliefs, and strategies (Radcliffe & Bos, 2013). High school students who have college aspirations and start planning early are more likely to meet college admission requirements and to complete the college application process (Cabrera & La Nasa, 2001). College students who have a specific career goal in mind are more likely to connect that goal with the steps to take in college that will help them reach the goal and allow them to become better prepared for future careers (Smith, Pettinga, & Bowman, 2012). Engaging college students in the career planning process and helping them to connect their skills with potential jobs can also increase their career-related confidence (Stringer, Kerpelman, & Skorikov, 2011). Educators and administrators across grade levels recognize the benefits that navigation knowledge and skills bring to their students.

Conclusion 2: A large majority of educators and administrators considers navigation factors important to teach, with far fewer of them rating these factors important to assess; postsecondary instructors and workforce supervisors recognize the importance of both teaching and assessing navigation knowledge and skills.

The pattern of ratings (Figure 35) shows that an overwhelming percentage of teachers and administrators across grades 3–12 (ranging from 88% to 90%) considered it important or very important to teach navigation knowledge and skills in school. When asked how important it is to assess these navigation factors, approximately one half of educators (ranging from 44% to 52%) and two-thirds of administrators thought it important or very important. While a similar percentage of postsecondary instructors (88%) rated it important to very important to teach navigation knowledge and skills, more than three quarters of them (79%) also considered it important to assess these navigation factors. Over three-quarters of workforce supervisors acknowledged the importance of both training (78%) and evaluating (77%) employees' navigation knowledge and skills.

Figure 35. Percentages of grades 3–12 educators and administrators, postsecondary instructors, and workforce supervisors rating navigation factors as important or very important to teach and important or very important to assess



Academic knowledge alone is not enough for education and career success. Keeping students engaged in activities that connect academics to college and career is necessary (Curry, Belser, & Binns, 2013). Researchers suggest starting the development of navigation skills and knowledge as early as elementary and middle school because it takes time to prepare young learners to understand education and career concepts and to get ready to make informed choices (Harkins, 2001). In elementary school, navigation activities could focus on building students' self-awareness and occupational awareness (Harkins, 2001). Middle school educators could promote continual dialogue about college and career throughout regular classroom lessons and demonstrate the contextual application of these knowledge and skills (Curry, Belser, & Binns, 2013). In high school, effective navigation activities can include guiding students to analyze their past, present, and future experiences to identify unique skills and abilities, providing extensive opportunities for career planning, and engaging students in exploratory research about college and career information and options (Welde, Bernes, Gunn, & Ross, 2015). In college, providing students opportunities to apply career knowledge in a practical setting can increase students' understanding of career paths (Coulter-Kern, Coulter-Kern, Schenkel, Walker, & Fogle, 2013).

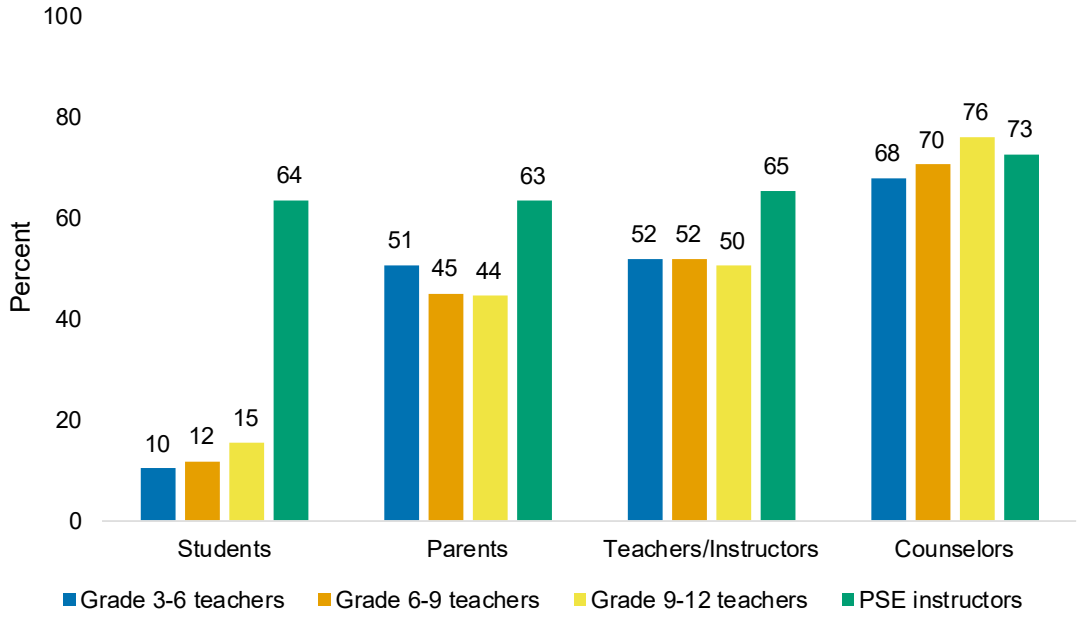
In addition to teaching navigation knowledge and skills, it is essential to assess these factors, which are not covered by academic assessments. Appropriate assessments could help educators understand another dimension of students' college and career readiness, tailor interventions to the needs of students, and be used to improve upon relevant instructional programming (Lombardi, Conley, Seburn, & Downs, 2013). By assessing navigation knowledge and skills, educators can establish a baseline that allows for meeting students where they are and more accurately addressing their needs.

Conclusion 3: Educators identify students' education and career planning as a collaborative process requiring counselors, teachers, parents, principals, and superintendents.

When asked whose role it is to teach students about education and career planning, teachers across grades 3–12 identified counselors, parents, and themselves as having a role in this process, with teachers identifying counselors as taking a primary role. The highest percentage of teachers across grades 3–12 (ranging from 68% to 76%) agreed or strongly agreed that it is the job of school counselors (Figure 36). As grade level increased, the percentage of teachers indicating that education and career planning is a counselor role slightly increased as well, with more than three-fourths of high school teachers indicating this. Teachers did recognize their own role in helping students with education and career planning, with half of them across grades agreeing that they are responsible for teaching students about the education and career planning process. About half of the teachers also identified parents as a group that should play a role in the process. Less than one-fifth (ranging from 10% to 15%) of teachers thought students should figure out the education and career planning process for themselves.

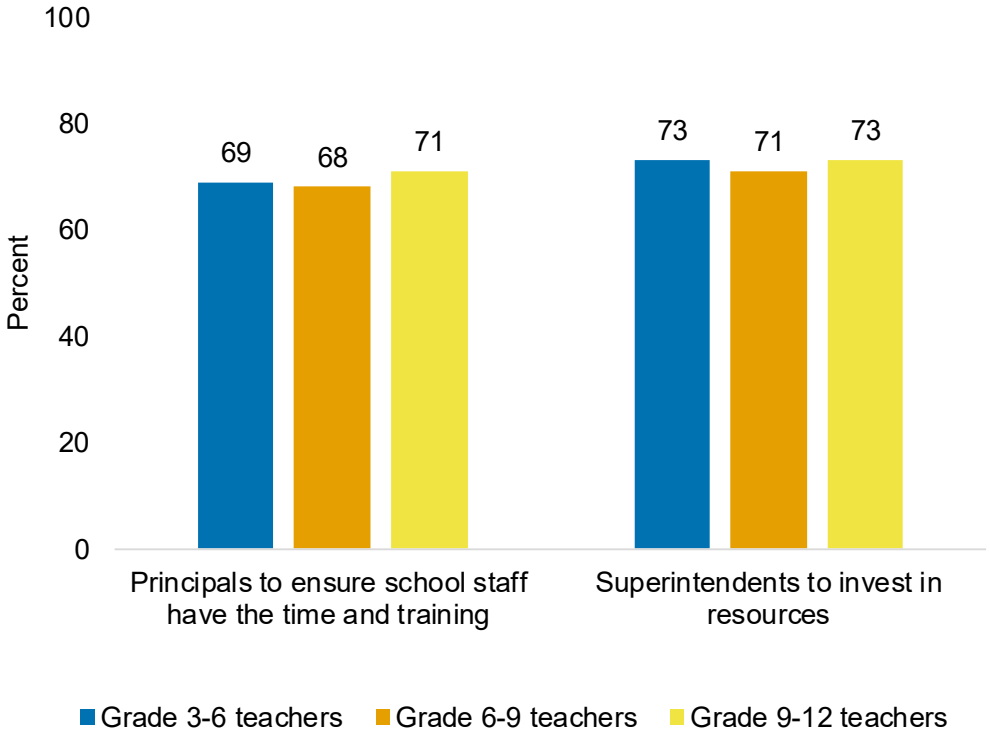
About two-thirds (64%) of postsecondary instructors agreed that it is the job of students to figure out their own education and career planning. At the same time, postsecondary instructors emphasized the importance of collaborative efforts among counselors, parents, and instructors in this process. Nearly three-quarters (73%) of the instructors thought college counselors and advisors should help students with education and career planning, 65% indicated the instructors themselves should help, and 63% that parents should.

Figure 36. Percentages of 3–12 and postsecondary educators who agreed or strongly agreed that students, parents, teachers/instructors, and counselors should help in teaching the education and career planning process



Additionally, grades 3–12 teachers indicated that supports from principals and superintendents are critical (Figure 37). More than two-thirds of these teachers agreed that principals should ensure that school staff have the time and training needed to help students learn about education and career planning (ranging from 68% to 71%), and that superintendents should invest in resources that will help students learn about the process (ranging from 71% to 73%). These percentages were similar to the percentages reported by postsecondary instructors (ranging from 71% to 74%) for college administrators' roles in supporting college students' education and career planning.

Figure 37. Percentages of teachers who agreed or strongly agreed that principals and superintendents should support students' learning about the education and career planning process



During elementary and secondary education, students would benefit most when there are collaborative college and career planning efforts among counselors, teachers, parents, and other school personnel, including principals and superintendents (Trusty, Niles, & Carney, 2005). Although teachers identify school counselors as critical to teaching students about education and career planning, teachers themselves can also play an important role in this process by integrating the teaching of navigation knowledge and skills into the regular curriculum (Curry, Belser, & Binns, 2013) and sharing their knowledge of students' academic and non-academic behavior with others (e.g., parents) to enhance the collaborative effort needed for effective education and career planning (Trusty, Niles, & Carney, 2005). Parents can have a strong and positive influence in this process if they have the necessary information (Wimberly & Noeth, 2004). School staff can develop partnerships with parents to ensure that they are actively engaged in the process (Epstein & Van Voorhis, 2010) and have the educational planning knowledge

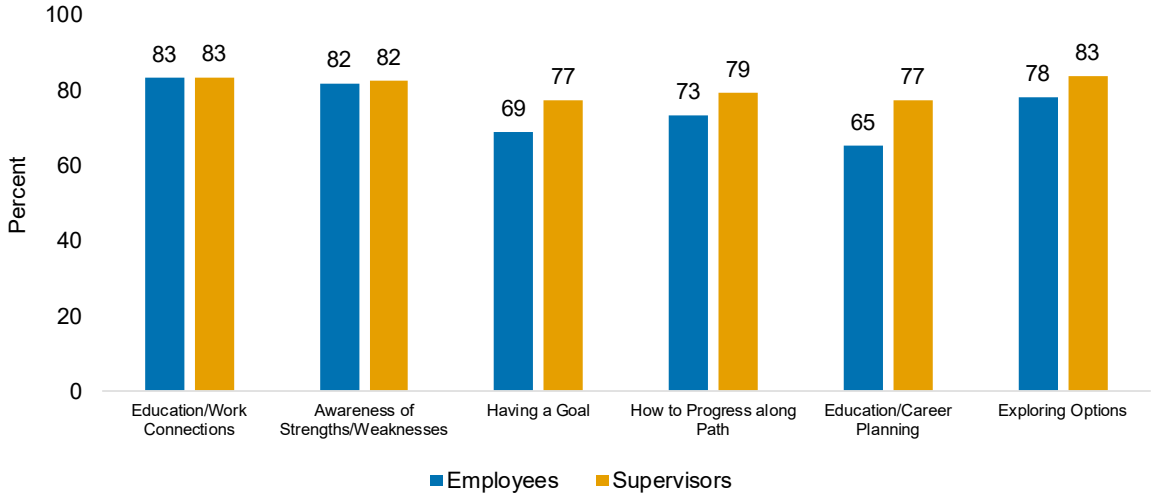
and timely information to help their children (Wimberly & Noeth, 2004). Principals and superintendents are also critical to the support and resources that school staff may need in this collaborative effort. For example, by providing teachers with training in college and career planning, they build up the skills to continually support the diverse needs of their students (Witko, Bernes, Magnusson, & Bardick, 2009).

During postsecondary education, college students become more responsible for managing their career paths and engaging in self-directed, values-driven career planning activities (Briscoe & Hall, 2006). Through active participation in these activities, college students are able to clarify their professional values and refine their skills, facilitating successful transition to work (Waddell & Bauer, 2012). At the same time, the involvement of others (e.g., counselors, parents, and instructors) is critical to students' navigation. For example, career counselors play a significant supportive role by helping college students understand workplace realities and resources for coping with the college-to-work transition (Wendlandt & Rochlen, 2008). Maintaining a strong relationship with a counselor can motivate students to take actions (e.g., job search) in their education and career planning and to overcome challenges in the process (Wood, 2004). Additionally, parents play a role: young adults who perceive their parents as supportive are more confident in their ability to engage in career planning activities successfully (Turner & Lapan, 2002). Positive interaction between students and faculty is also associated with greater academic achievement and enhanced career choice and development (Kim & Sax, 2009).

Conclusion 4: Employees and supervisors consider navigation skills and knowledge important for workforce success.

Overall, more than two-thirds (ranging from 65% to 83%) of employees and supervisors indicated that navigation factors are very important or important for workforce success (Figure 38). Examining navigation knowledge and skills separately, most employees and supervisors rated Education/Work Connections, Awareness of Strengths and Weaknesses, and Exploring Options as very important or important for success in the workforce. More than three-quarters of supervisors (ranging from 77% to 79%) considered Having a Goal, How to Progress along Path, and Education/Career Planning as very important or important, while two-thirds or more of the employees (ranging from 65% to 73%) rated these three navigation factors as very important or important.

Figure 38. Percentages of employees and supervisors rating navigation knowledge and skills very important or important for workforce success

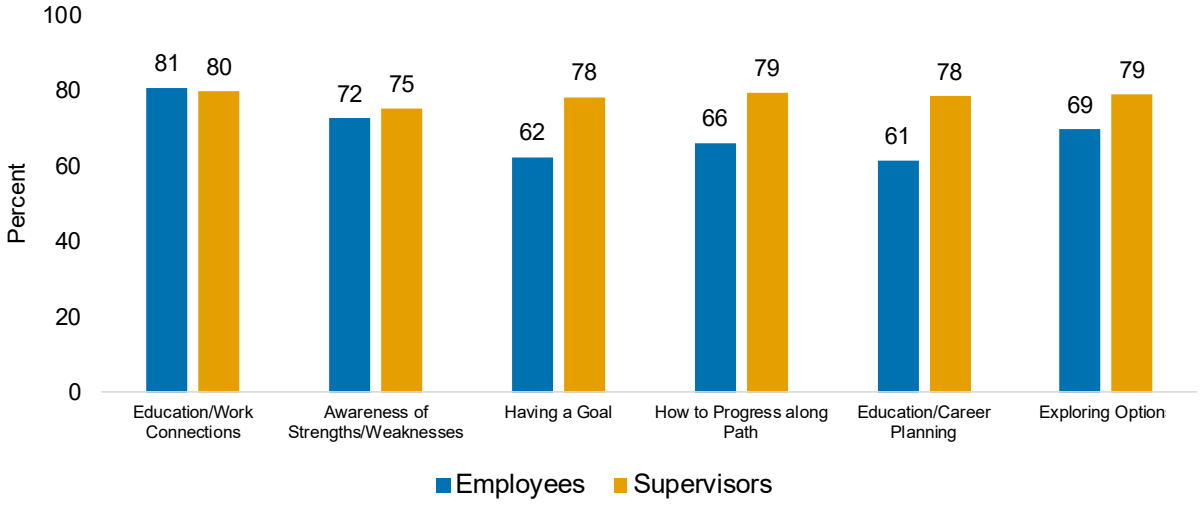


The importance of navigation knowledge and skills reported by supervisors and employees shows that they recognize the influence of these factors on workforce success. For example, individuals who can apply their training to their jobs have higher career involvement and job satisfaction (Ballout, 2007). Reflecting on one's competencies and being aware of capabilities is more likely to lead to realistic expectations in the workforce and higher extrinsic career success (Kuijpers, Schyns, & Scheerens, 2006). Employees engaged in occupational goal setting during young adulthood also report greater well-being in terms of personal growth and life satisfaction (Hill, Jackson, Roberts, Lapsley, & Brandenberger, 2011). Proactive career planning helps workers set new career goals, achieve person–job fit, and become more employable (Kooij, 2015). Additionally, work life aspirations and the ability to cope with career development tasks and transitions predict proactive career behaviors such as skill development and career networking (Taber & Blankemeyer, 2015). Supervisors and employees consider these navigation knowledge and skills essential for workforce success.

Conclusion 5: Employees and supervisors consider it important for navigation knowledge and skills to be trained on and evaluated in the workforce.

Three-quarters or more of supervisors (ranging from 75% to 80%) considered it very important or important for there to be training in all six navigation areas (Figure 39). A similar percentage of employees reported that Education/Work Connections and Awareness of Strengths/Weaknesses are very important or important to train. About two-thirds of employees (ranging from 61% to 69%) considered it very important or important for there to be training on navigation skills including Having a Goal, How to Progress along Path, Education/Career Planning, and Exploring Options. The percentages of employees and supervisors reporting that it is important to evaluate these navigation knowledge and skills in the workforce were similar to the findings reported for the importance of training.

Figure 39. Percentages of employees/supervisors who rated the training of navigation knowledge and skills as very important or important



Navigation knowledge and skills can be developed and improved over time, and employees and supervisors think it important for them to be trained and evaluated in the workforce. Training can build up employees' job-relevant and employability skills. For instance, after career management training, employees increased their self-knowledge, career goal commitment, and career plan quality, which was subsequently related to positive career self-management behaviors and later career satisfaction (Raabe, Frese, & Beehr, 2007). Additionally, workers who participated in career coaching interventions demonstrated increased career planning and career optimism, which were further related to positive changes in subjective career success (Spurk, Kauffeld, Barthauer, & Heinemann, 2015).

In addition to training, it is important to evaluate navigation knowledge and skills. Evaluations allow supervisors to see how their employees' navigation skills grow over time and to determine how future professional development can be tailored to better meet employees' needs (Pop, 2014). For example, evaluating the degree to which employees' aspirations match organizational needs can help supervisors understand any gaps in alignment and identify the resources that would further support employees' goals (Antoniu, 2010).

Chapter 5: Workforce

This chapter highlights findings from the Workforce portion of the ACT National Curriculum Survey 2020. Respondents to the Workforce survey were supervisors and employees representing a diversity of jobs and professions from across the nation. Job segments represented included agricultural, manufacturing, finance, sales, business management, information technology, science, education, legal, health care, public safety, leisure and hospitality, arts and entertainment, construction, mining, and government.

The bulk of the survey—reflected in all but the last of the seven findings presented below—included 82 skill statements for respondents to rate in terms of frequency of use and importance. The survey asked employees to consider each skill in terms of whether it was needed by an entry-level employee starting in their job, and supervisors to consider it in terms of a specific job that they supervised and whether an entry-level person would need the skill.

The survey also included a list of eleven skills, in which employees and supervisors were asked, if an employee lacked the skill, whether that lack would be an obstacle to job success. The results for this section of the survey are given in Finding 7.

In the larger section of the survey, employees and supervisors rated skills on two five-point scales. Regarding frequency of use, the scale ranged from “Never” to “Every work day.” Regarding importance, the scale ranged from zero (not important) to four. In the smaller section of the survey, employees and supervisors rated skills on a four-point scale ranging from “Not all likely” to “Very likely.” To calculate the ratings presented in the findings below, in each section of the survey the percentages of respondents choosing either of the top two points on the relevant scale were added together.

Workforce Findings

Conclusion 1: The responses of employees and supervisors support the criticality of 21st-century skills for workplace success.

Twenty-first-century frameworks have emphasized skills such as learning to learn, communication, collaboration, critical thinking/problem solving, adaptability/flexibility, information technology communication (ITC), and behavioral skills (Carnevale & Smith, 2013; National Network of Business and Industry Associations, 2015; Organization for Economic Cooperation and Development, 2008; Bishop, 2019). The 82 skill statements making up the bulk of the survey were grouped into six categories: communication, technology tools, applied mathematics, reading, writing, and task effectiveness. Figure 40 (employees) and Figure 41 (supervisors) present ratings of frequency of use and importance for the six categories.

Figure 40. Employees' Average Percentage Ratings of Skill Categories on Frequency of Use and Importance

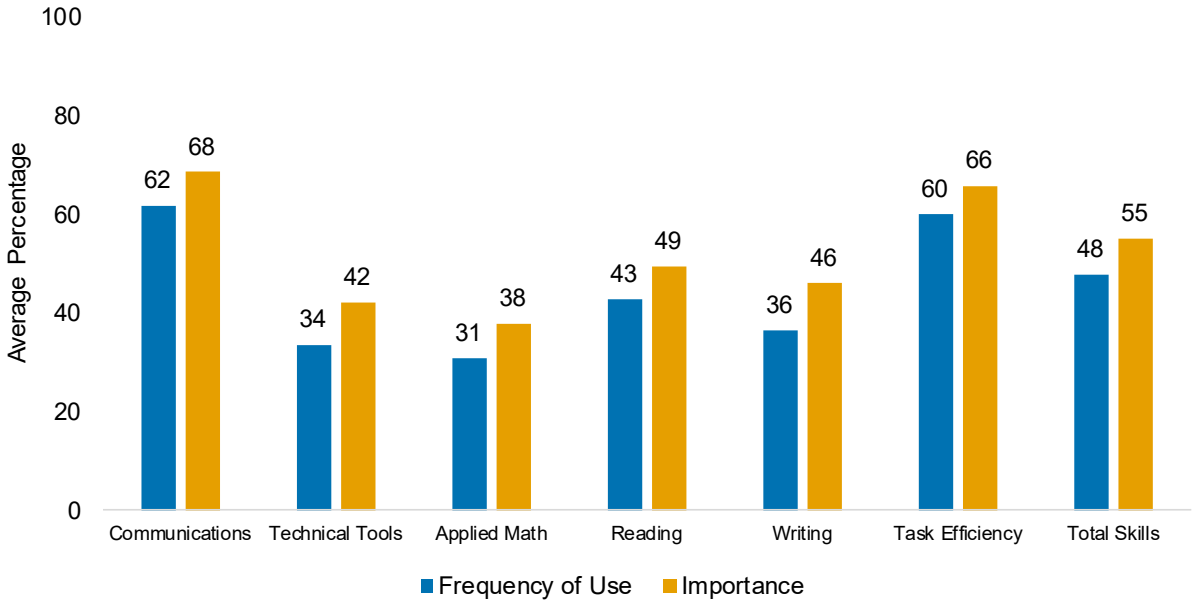
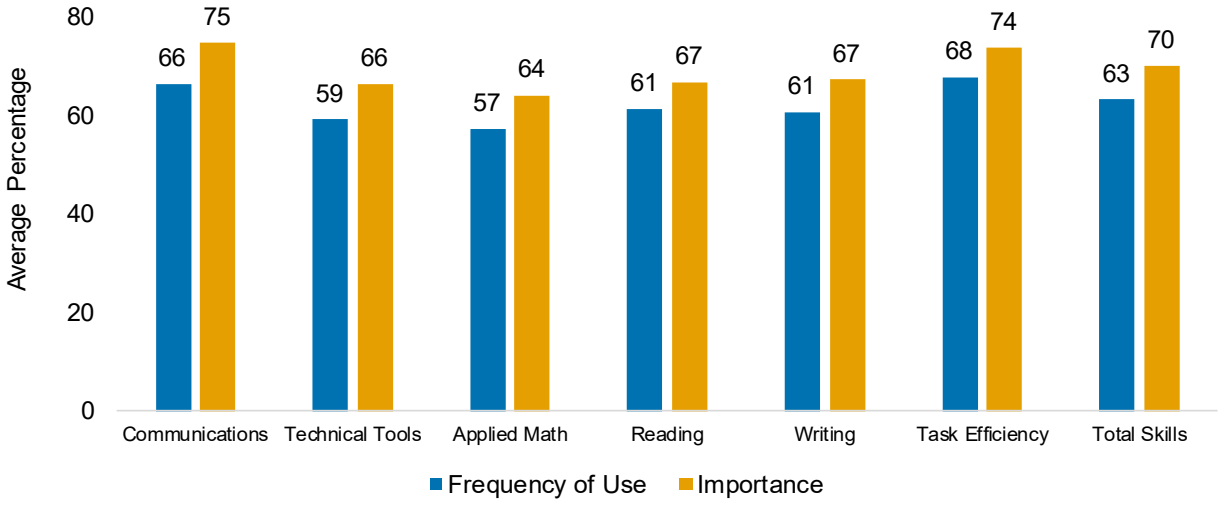


Figure 41. Supervisors' Average Percentage Ratings of Skill Categories on Frequency of Use and Importance



These findings reinforce the importance of 21st-century skills and align with significant components of ACT's Holistic Framework (Camara, O'Connor, Mattern, & Hanson, 2015), which identifies the essential learning and behavioral skills required for college and career readiness. Employees and supervisors both rated skills aligned to communication and task effectiveness more highly than the other categories. Jobs in the 21st-century economy necessitate higher levels of interpersonal and problem-solving skills because work involves more human and personal interaction to meet consumer needs.

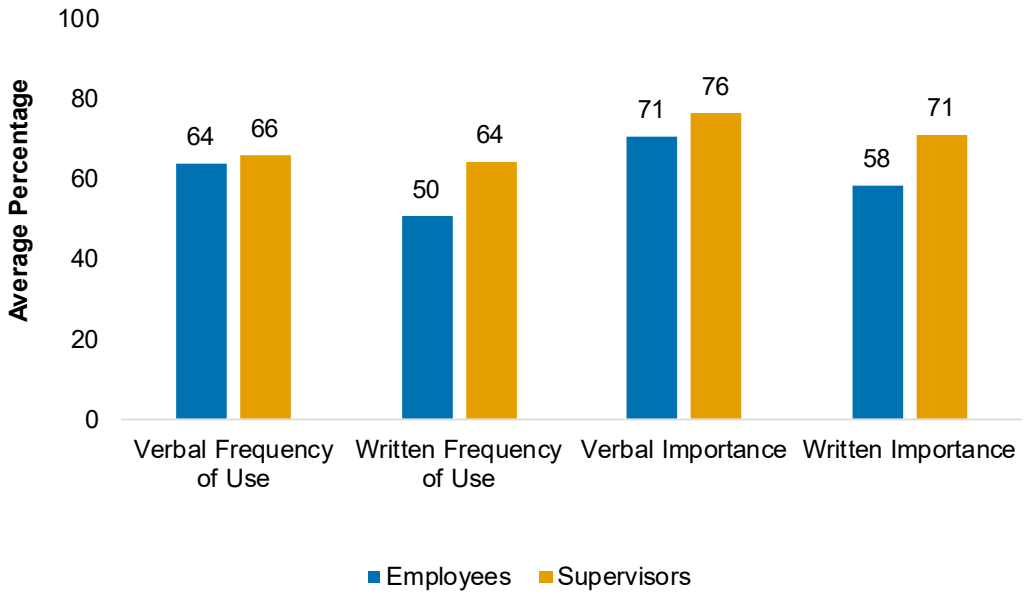
Consumers today are no longer seeking products and services that are mass produced using low-cost standardized processes; rather, they are seeking customized, interactive products and services that are tailored to specific needs (Carnevale & Smith, 2013). The 21st-century requirements have led businesses of all sorts to seek workers who can empathize with customers while critically evaluating whether the business is on track. Business and industry require workers who can collaborate with others to ensure that projects are developed to meet consumer demand and are finished on time. Essential skills in these tasks include customer empathy or understanding, adaptability, critical thinking, problem solving, and lifelong learning.

Lifelong learning is now a "fact of life if workers are going to keep up with the blur of changes in modern workplaces" (Carnevale & Smith, 2013, p. 5). To be a lifelong learner and to keep up with the changing workplace, workers require solid foundational skills that can be applied to workforce problems. In that regard, Figure 26 shows supervisors recognizing that the 21st-century skills of communication and task effectiveness must be accompanied by skills in technology tools, applied mathematics, reading, and writing. The percentages of supervisors who rated all six skill categories as important or highly important for job success ranged from 64% for applied mathematics to 75% for communication.

Conclusion 2: Although employees and supervisors rate verbal communication skills as used more frequently than written communication skills, they rate both as highly important.

Both employees and supervisors identified communication skills as critical to job success. Figure 42 provides average ratings for statements describing verbal and written communication skills.

Figure 42. Employees' and Supervisors' Average Percentage Ratings of Verbal and Written Communication Skill Categories on Frequency of Use and Importance



Generally, both employees and supervisors reported that verbal communication (speaking and listening skills) were more frequently used than written communication (reading and writing) but rated both forms of communication more highly on importance than on frequency. Sixty-four percent and 50% of employee respondents, respectively, reported that verbal and written communication skills are used with the greatest frequency (i.e., on 75% or more of all work days); 71% and 58% of employees, respectively, rated the two skill categories as a 3 or a 4 on the importance scale. Supervisors' ratings were even higher: 67% and 64%, respectively, for frequency of use of verbal and written communication skills, and 76% and 71%, respectively, for the importance of the two sets of skills.

The responses to skill statements covering communication indicated that being able to appropriately express oneself verbally, actively listen and understand others, carefully read and interpret information, and express oneself clearly in writing are essential skills needed for job success.

Conclusion 3: Workforce respondents identify responsibility, adaptability, and problem solving as critical skills for workplace success.

Employees and supervisors identified a willingness to accept and handle responsibilities as an important workplace requirement. The survey included three statements directly related to responsibility.

- Taking individual responsibility for completing work assignments
- Taking individual responsibility for mistakes
- Completing work tasks with minimal direction or direct support

The average percentage of employees and supervisors who rated these skill statements highly was over 70% for frequency of use and importance. A large majority of both groups of respondents indicated that being able to carry out responsibilities with minimal direction, taking responsibility for completing tasks, and being responsible for mistakes are frequently used on the job and are important skills for job success.

Adaptability in the workplace refers to the willingness to accept changes and to potentially suggest changes when things are not going as planned. In today's team-oriented jobs, where requirements are constantly changing, adaptability is viewed as an important 21st-century skill (Carnevale & Smith, 2013). The survey included four statements directly related to adaptability in terms of accepting changes, revising plans, taking corrective actions, and suggesting changes to processes.

- Adapting to changes in task requirements
- Revising plans, goals, or priorities to account for new information
- Responding with corrective action when an initial plan for completing a task fails
- Suggesting improvements in work processes

Employees average percentage ratings for these statements for frequency of use and importace ranged from 47% to 72%. Supervisors average percentage ratings for these statements for frequency of use and importance ranged from 65% to 75%. In particular, supervisors indicated that the willingness to accept changes and adaptability were important to job success.

Problem solving in the workplace refers to applying relevant information and skills to a task to achieve a desired outcome. Problem solving can be done either in isolation or as a part of a team. It includes clearly identifying the problem and its associated characteristics, analyzing potential courses of action, and then selecting the action most likely to lead to the desired outcome. The survey included seven statements related to problem solving.

- Applying relevant existing knowledge and skills to novel tasks
- Identifying when a given approach to solving a problem isn't working
- Effectively researching solutions to problems using internet resources
- Identifying the characteristics of a problem
- Anticipating possible obstacles to successful completion of a task
- Putting together information from multiple sources to solve a problem

Employees and supervisors rated problem solving as frequently used and important. Employees average percentage ratings for these statements for frequency of use and importance ranged from 46% to 67%. Supervisors average percentage ratings for these statements for frequency of use and importance ranged from 63% to 76%. Individuals who possess strong problem solving skills appear to bring greater value to the workplace.

Conclusion 4: Workforce respondents identify professionalism in interpersonal interactions and communications as absolutely essential.

Interacting in a professional manner in the workplace is seen as indispensable. The survey contained two statements related to professional and respectful communications, and both employees and supervisors identified these statements as critical.

- Using professional language when communicating with coworkers, supervisors, and customers
- Displaying appropriate respect when communicating with coworkers and supervisors

Employees and supervisors both responded to these two statements in strongly positive terms: of the 82 skill statements in the main section of the survey, the statements were consistently at or near the top of all ratings. The high scores indicate that professionalism is a workplace expectation that must be met.

Conclusion 5: Workforce respondents believe timeliness is critical for workplace success.

The survey findings demonstrated that employers and supervisors agreed that being accountable based on project timelines (e.g., meeting deadlines, prioritizing around timing needs) is important to workplace success. The survey contained three statements related to time management.

- Providing responses in a timely manner
- Effectively prioritizing competing tasks with similar deadlines
- Effectively allocating time to complete tasks by their deadlines

The strong responses by both groups demonstrate that workplace success is highly dependent on a worker being able to manage his or her time to prioritize and complete tasks to meet the needs of the organization. Employees average percentage ratings for these statements for frequency of use and importance ranged from 61% to 84%. Supervisors average percentage ratings for these statements for frequency of use and importance ranged from 72% to 83%.

Conclusion 6: Workforce respondents identify email and phone (voice) as the most frequently used technology tools.

To achieve greater understanding of the use and importance of technology tools in the workplace, ACT asked employees and supervisors to rate nine different technology tools. ACT selected the tools from a very large set of possible choices, because they are being accepted in many office settings. Figure 43 (employees) and Figure 44 (supervisors) present the average response percentages for frequency of use and importance for the nine technology tools.[12]

[12]Employees and supervisors completed the survey during the second half of 2019, prior to the emergence of the Corona virus and the subsequent pandemic. Due to workforce changes stemming from the pandemic, ACT anticipates that employees and supervisors would now rate Videoconferencing as more frequently used and more important.

Figure 43. Employees' Percentage Ratings of Technology Tools on Frequency of Use and Importance

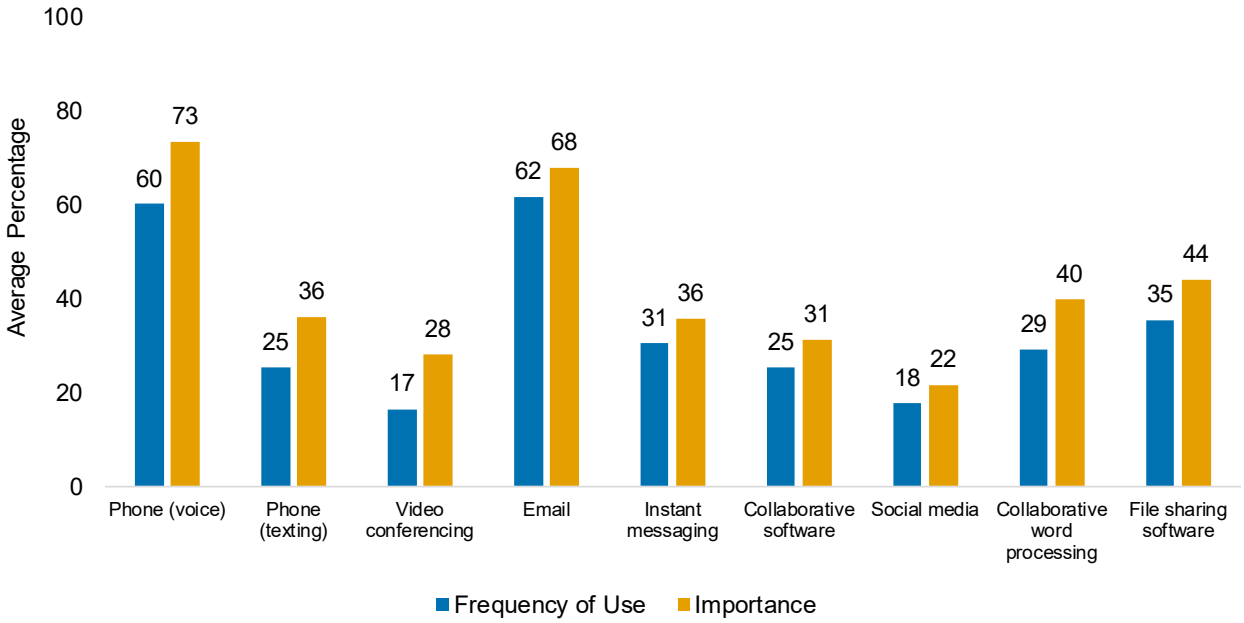
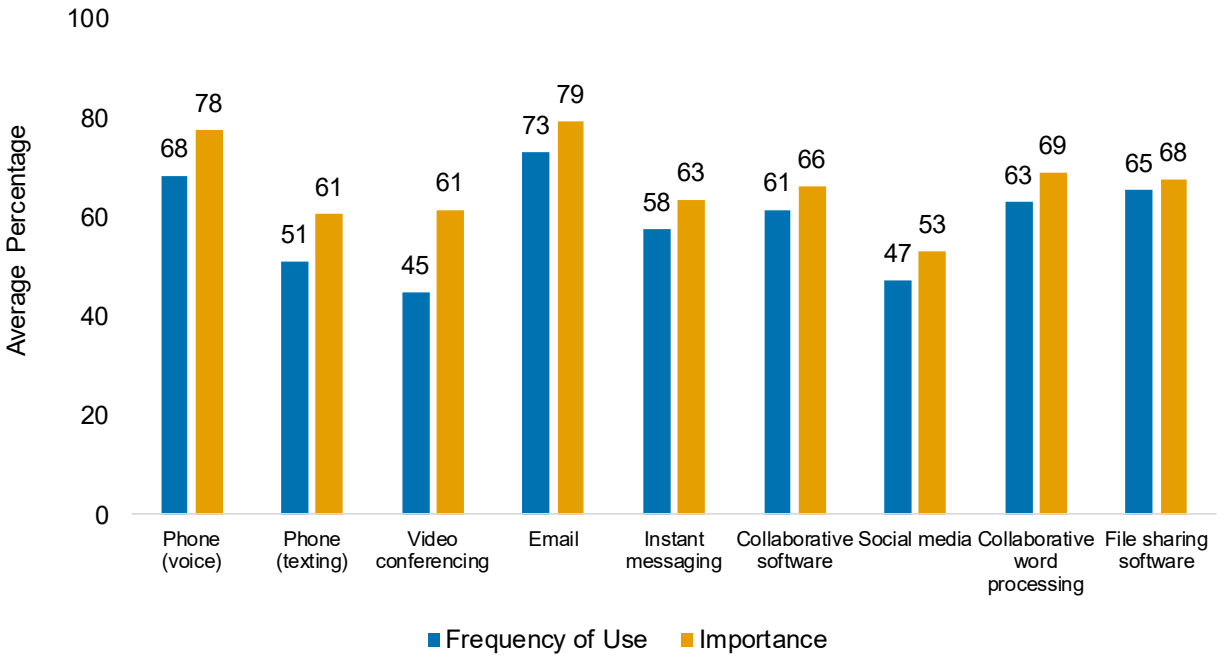


Figure 44. Supervisors' Percentage Ratings of Technology Tools on Frequency of Use and Importance



For both groups of respondents, each tool was rated more highly on importance than on frequency of use, but email and phone (voice) were by far both used the most and identified as most important by each group. Interestingly, from the employees' responses, only the use of the telephone and email had an average percentage rating of 50% or

higher; at the same time, from the supervisors' perspectives, all of the technology tools in terms of importance merited a 50% or higher rating. This difference indicates that supervisors expect employees to have greater technology competence than employees.

Conclusion 7: Supervisors stated that workers need a wide range of skills and lacking any of the main skills presents an obstacle to success.

Both supervisors and employees were provided with eleven skill statements and asked to rate them in terms of whether lacking a specific skill would be an obstacle to job success (Table 6).

Table 6. Employees' and Supervisors' Average Percentage Ratings Identifying Skills Whose Absence would be an Obstacle to Workplace Success

Skill	Employees	Supervisors
Communicating Verbally	66	76
Dependably Fulfilling Work Obligations	64	77
Adapting Well to Change	61	76
Learning New Knowledge and Skills	58	73
Thinking through Problems in a Systematic, Logical Way	55	73
Using Technology	55	73
Solving Problems as Part of a Team	52	75
Communicating in Writing	51	71
Locating and Critically Analyzing Information	50	72
Applying Job-specific Technical Knowledge	49	71
Applying Foundational Academic Knowledge	40	61

Whereas employees' responses tended to vary a great deal, supervisors' responses were consistently high. In essence, supervisors were saying it is necessary for workers to possess a wide range of essential skills, while the employees were saying that a worker might be lacking in three or more of these skills and still be successful. The contrast was so pronounced that only two of the employees' average percentages were higher than the lowest of the supervisors' average percentages.

Nevertheless, both groups rated communicating verbally and dependably fulfilling work obligations as the skills that would most likely be obstacles to success. (This finding paralleled those that revealed communication and task effectiveness as two of the most frequently used and important skills in the other portion of the survey.) And both groups also rated applying job-specific technical knowledge and applying foundational academic knowledge as the two skills least likely to be an obstacle, despite the fact that both skills are necessary for learning new knowledge and skills, which was rated more highly.

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Appendices: Content Topics "Taught" Percentages

Table A.1
How Frequently Topics Are Taught
ELA

MS%				HS%				PS%				
Not at all	1	2	3	Not at all	1	2	3	Not at all	1	2	3	Topics and Skills
												INSTRUCTIONAL ACTIVITIES
24.13	26.37	20.65	28.86	26.63	26.38	22.11	24.87					Foundational reading skills (phonological awareness, phonics and word recognition, fluency)
26.12	26.37	21.14	26.37	36.93	22.61	16.58	23.87					Foundational writing skills (handwriting, keyboarding)
0.25	3.73	18.41	77.61	1.01	6.53	22.36	70.10					Literal comprehension of texts
0.25	1.74	15.17	82.84	0.25	1.51	16.08	82.16					Inferential comprehension of texts
0.50	2.74	19.90	76.87	0.25	2.26	15.58	81.91					Analysis and evaluation of texts
1.00	8.71	55.22	35.07	2.26	8.04	54.02	35.68					Comparison of 2 or more texts
0.25	4.98	24.88	69.90	1.51	4.52	32.41	61.56					Comprehension strategies and metacognition
1.24	10.20	43.03	45.52	2.01	16.33	41.46	40.20					Composition of texts intended to convey experiences and emotions (e.g., story, novel, poem,
1.00	7.96	53.98	37.06	1.26	13.32	53.77	31.66					Composition of texts intended to inform or explain (e.g., report, biography, article)
1.99	15.17	53.98	28.86	1.76	14.32	52.51	31.41					Composition of texts intended to persuade or present an argument (e.g., review, political
0.75	8.21	35.82	55.22	1.51	7.04	40.70	50.75					Composing skills and strategies
0.75	6.47	27.86	64.93	0.75	11.06	33.42	54.77					Vocabulary
1.00	13.43	37.81	47.76	0.50	13.32	36.43	49.75					Usage and mechanics
1.49	16.42	38.56	43.53	1.51	16.33	37.69	44.47					Sentence structure
1.24	19.65	45.77	33.33	1.01	11.06	48.24	39.70					Style and tone
												RESEARCH AND INFORMATION LITERACY
5.22	34.33	41.79	18.66	8.29	30.40	42.46	18.84	5.80	18.43	40.61	35.15	Develop focused inquiry questions around a research topic
3.48	22.64	46.77	27.11	4.52	20.35	47.24	27.89	2.22	19.80	46.76	31.23	Use effective search strategies to find information from various sources
1.99	14.18	42.79	41.04	2.51	16.83	38.94	41.71	3.24	15.02	43.00	38.74	Use appropriate methods or tools to obtain information
3.73	27.36	44.78	24.13	2.76	19.35	42.46	35.43	2.22	14.68	46.76	36.35	Evaluate the credibility of individual sources
2.99	19.65	46.77	30.60	2.26	16.83	44.72	36.18	3.58	17.41	42.32	36.69	Evaluate the relevance of information obtained
2.24	9.20	33.58	54.98	1.51	11.31	38.44	48.74	3.24	16.55	42.66	37.54	Summarize information obtained from sources
6.97	30.10	40.80	22.14	5.03	22.36	40.70	31.91	3.92	15.19	42.49	38.40	Analyze multiple sources to identify conflicting information
4.23	21.14	48.51	26.12	3.27	19.60	47.99	29.15	4.10	16.21	35.15	44.54	Develop a thesis or claim related to a research topic
6.47	28.61	44.78	20.15	4.77	23.62	50.00	21.61	3.58	19.11	45.22	32.08	Refine claims and counterclaims related to a research topic
3.23	19.65	37.06	40.05	3.77	15.83	38.69	41.71	3.41	16.21	40.96	39.42	Identify evidence in sources that directly supports or challenges claims
6.47	27.11	44.78	21.64	3.27	23.37	44.47	28.89	4.10	18.09	45.90	31.91	Identify other perspectives or counterclaims related to a thesis about a research topic
4.23	24.63	40.30	30.85	3.27	20.10	44.97	31.66	3.24	17.92	41.64	37.20	Integrate evidence from sources into a research project (e.g., essay, oral presentation)
10.45	30.85	32.34	26.37	4.27	19.60	41.46	34.67	3.24	16.04	43.00	37.71	Cite information sources using a citation style appropriate for the discipline (APA, MLA, etc.)
8.96	34.08	36.32	20.65	8.29	29.90	40.95	20.85	6.31	19.62	37.03	37.03	Work collaboratively with other students on a research project

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors

1 = Rarely (1-2 times per course)
2 = Occationally (1-2 times per month)
3 = Frequently (multiple times per week)
. = This item was not asked at this grade level.

Table A.2
How Frequently Topics Are Taught
Literacy in Social Studies

MS%				HS%				PS%				
Not at all	1	2	3	Not at all	1	2	3	Not at all	1	2	3	Topics and Skills
												RESEARCH AND INFORMATION LITERACY
7.41	20.99	41.23	30.37	4.69	22.47	43.46	29.38	7.30	16.42	34.31	41.97	Develop focused inquiry questions around a research topic
2.72	15.80	45.43	36.05	0.99	17.28	48.89	32.84	5.84	16.42	47.45	30.29	Use effective search strategies to find information from various sources
2.47	9.88	41.23	46.42	1.48	12.10	43.46	42.96	4.01	12.77	47.45	35.77	Use appropriate methods or tools to obtain information
4.69	17.78	41.98	35.56	2.96	14.57	39.75	42.72	5.47	11.31	44.53	38.69	Evaluate the credibility of individual sources
3.46	16.79	41.23	38.52	1.23	12.84	39.75	46.17	5.11	11.68	39.42	43.80	Evaluate the relevance of information obtained
2.47	8.40	36.30	52.84	1.23	7.16	33.09	58.52	4.74	13.50	44.16	37.59	Summarize information obtained from sources
5.43	21.23	41.98	31.36	3.95	16.79	41.73	37.53	5.84	18.98	37.59	37.59	Analyze multiple sources to identify conflicting information
7.90	25.43	43.46	23.21	4.44	28.64	35.56	31.36	9.49	16.06	32.85	41.61	Develop a thesis or claim related to a research topic
11.11	31.36	36.79	20.74	6.67	31.36	40.74	21.23	10.95	14.60	49.27	25.18	Refine claims and counterclaims related to a research topic
7.16	18.77	40.74	33.33	5.43	15.80	42.47	36.30	7.66	13.50	48.18	30.66	Identify evidence in sources that directly supports or challenges claims
10.12	26.91	40.00	22.96	6.67	26.42	39.51	27.41	10.22	17.88	32.48	39.42	Identify other perspectives or counterclaims related to a thesis about a research topic
6.42	21.98	45.93	25.68	3.70	22.22	45.93	28.15	8.76	14.23	34.67	42.34	Integrate evidence from sources into a research project (e.g., essay, oral presentation)
13.09	26.91	33.83	26.17	8.40	26.67	41.98	22.96	8.39	13.87	47.45	30.29	Cite information sources using a citation style appropriate for the discipline (APA, MLA, etc.)
7.41	19.75	38.52	34.32	4.69	28.40	40.74	26.17	14.96	19.71	33.58	31.75	Work collaboratively with other students on a research project

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors
1 = Rarely (1-2 times per course)
2= Occationally (1-2 times per month)
3 = Frequently (multiple times per week)

Table A.3 How Frequently Topics Are Taught Science												
MS%				HS%				PS%				
Not at all	1	2	3	Not at all	1	2	3	Not at all	1	2	3	Topics and Skills
1.24	6.68	57.92	34.16	0.24	7.09	56.72	35.94	3.78	9.44	35.69	51.09	Laboratory activities, investigations, or experiments that require following given procedures
7.92	34.16	45.79	12.13	4.89	38.63	44.99	11.49	2.68	19.48	47.12	30.72	Laboratory activities, investigations, or experiments that require students to create their own procedures about a question or topic selected by the teacher (guided inquiry)
19.80	39.85	32.18	8.17	19.07	46.94	25.92	8.07	4.77	15.21	43.14	36.88	Laboratory activities, investigations, or experiments that require students to create their own procedures about a question or topic selected by the students (open inquiry)
9.65	36.14	39.60	14.60	23.72	41.08	27.63	7.58	6.96	12.52	44.23	36.28	Activities focused on engineering and design (e.g. engineering project, prototype design)
5.20	20.30	49.50	25.00	2.20	19.07	50.37	28.36	1.89	13.62	42.35	42.15	Analyzing or examining existing data sets from other experiments or sources
6.93	22.52	46.29	24.26	3.91	24.21	51.83	20.05	3.08	15.81	47.91	33.20	Computer simulations of science investigations or labs
0.50	9.41	34.90	55.20	1.96	6.60	30.81	60.64	0.50	8.55	38.77	52.19	Listening to the teacher explain, demonstrate, or model a science concept or procedure
0.25	2.72	17.33	79.70	0.24	5.87	25.67	68.22	2.49	13.02	34.99	49.50	Participating in whole-class discussions about science
0.00	0.99	16.09	82.92	0.00	0.98	14.18	84.84	0.70	16.70	44.93	37.67	Working in small groups
0.00	2.97	20.05	76.98	0.49	2.93	16.38	80.20	1.49	9.15	43.44	45.92	Working individually
0.74	5.69	34.16	59.41	1.96	11.00	44.50	42.54	0.60	9.54	44.63	45.23	Reading texts related to science topics
0.50	5.45	43.32	50.74	1.22	9.78	48.90	40.10	1.09	15.61	45.53	37.77	Watching a video about a science topic
0.74	21.04	44.06	34.16	3.67	25.92	48.90	21.52	1.59	13.52	48.01	36.88	Activities that explicitly link across STEM (science, technology, engineering, and mathematics)

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors
1 = Rarely (1-2 times per course)
2 = Occationally (1-2 times per month)
3 = Frequently (multiple times per week)

Table A.4
How Frequently Topics Are Taught
Thinking Skills

MS%			HS%			PS%			
Not Taught	1	2	Not Taught	1	2	Not Taught	1	2	Topics and Skills
11.52	36.35	52.13	9.57	32.92	57.50	.	.	.	Applying relevant existing knowledge and skills to novel tasks
19.72	41.40	38.88	19.39	34.40	46.20	.	.	.	Adapting to changes in task requirements
17.93	39.43	42.64	16.00	35.21	48.80	.	.	.	Identifying when a given approach to solving a problem isn't working
17.87	35.06	47.07	15.13	33.91	50.96	.	.	.	Revising plans, goals, or priorities to account for new information
22.12	30.44	47.44	20.51	30.14	49.35	.	.	.	Effectively researching solutions to problems using internet resources
15.53	35.00	49.48	14.21	33.05	52.75	.	.	.	Identifying the characteristics of a problem
20.21	32.66	47.13	17.36	32.61	50.03	.	.	.	Identifying the strengths and weaknesses of alternative solutions to a problem
22.24	34.38	43.38	20.82	32.55	46.63	.	.	.	Predicting the consequences of decisions
12.20	33.03	54.78	13.84	33.48	52.69	.	.	.	Working effectively in a team of individuals with varying skill sets to accomplish a goal
21.01	39.86	39.13	19.27	37.43	43.30	.	.	.	Responding with corrective action when an initial plan for completing a task fails
23.78	35.86	40.36	20.88	35.70	43.42	.	.	.	Effectively prioritizing competing tasks with similar deadlines
17.68	36.60	45.72	16.62	34.90	48.49	.	.	.	Effectively allocating time to complete tasks by their deadlines
23.72	38.14	38.14	22.24	37.31	40.46	.	.	.	Anticipating possible obstacles to successful completion of a task
17.93	31.85	50.22	14.89	28.10	57.01	.	.	.	Putting together information from multiple sources to solve a problem

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors
1 = Taught (as review)
2 = TAUGHT (as Standard Course Content)
. = This item was not asked at this grade level.

Appendices: Content Topics "Importance" Percentages

Table B.1
How Important Topics Are in a Course
ELA

MS%					HS%					PS%					
Not Important	1	2	3	High 4	Not Important	1	2	3	HIgh 4	Not Important	Low 1	2	3	High 4	Topics and Skills
															INSTRUCTIONAL ACTIVITIES
4.23	10.70	14.18	15.92	54.98	6.03	13.07	17.34	16.33	47.24	.	.	.	.	.	Foundational reading skills (phonological awareness, phonics and word recognition, fluency)
5.72	20.90	19.90	22.39	31.09	8.54	20.85	20.10	19.85	30.65	.	.	.	.	.	Foundational writing skills (handwriting, keyboarding)
0.00	1.00	4.48	19.15	75.37	0.00	1.51	3.77	22.36	72.36	1.88	6.14	13.48	38.05	40.44	Inferential comprehension of texts
0.50	1.00	5.22	18.91	74.38	0.00	0.75	3.77	19.35	76.13	2.39	5.46	11.43	32.25	48.46	Analysis and evaluation of texts
0.50	3.73	15.67	34.33	45.77	1.01	3.27	12.31	35.18	48.24	2.39	7.34	14.85	34.47	40.96	Comparison of 2 or more texts
0.25	0.75	5.47	20.90	72.64	0.50	1.51	7.79	23.37	66.83	.	.	.	.	.	Comprehension strategies and metacognition
0.75	3.98	16.42	32.09	46.77	1.01	9.05	13.32	32.16	44.47	4.10	8.53	14.68	27.13	45.56	Composition of texts intended to convey experiences and emotions (e.g., story, novel, poem,
0.50	2.49	7.46	37.31	52.24	0.50	3.77	10.55	36.43	48.74	1.71	5.63	11.60	38.23	42.83	Composition of texts intended to inform or explain (e.g., report, biography, article)
0.25	1.74	11.19	35.82	51.00	0.50	3.52	12.31	33.17	50.50	2.39	5.97	12.46	32.76	46.42	Composition of texts intended to persuade or present an argument (e.g., review, political
0.25	1.74	8.46	25.37	64.18	0.00	2.01	9.05	32.91	56.03	.	.	.	.	.	Composing skills and strategies
0.00	1.49	6.72	23.63	68.16	0.25	2.76	11.06	27.39	58.54	1.88	4.27	12.80	36.18	44.88	Vocabulary
0.00	1.99	17.91	32.59	47.51	0.00	3.27	14.32	29.90	52.51	2.39	4.27	13.31	31.57	48.46	Usage and mechanics
0.25	3.73	18.66	32.59	44.78	0.25	2.26	13.57	32.16	51.76	2.73	4.95	8.02	25.09	59.22	Sentence structure
0.25	5.97	25.37	32.09	36.32	0.50	3.02	19.60	35.68	41.21	.	.	.	.	.	Style and tone
															RESEARCH AND INFORMATION LITERACY
0.50	4.73	13.43	34.33	47.01	2.01	4.02	13.07	35.18	45.73	3.07	6.14	11.43	38.74	40.61	Use effective search strategies to find information from various sources
0.75	3.48	12.19	38.06	45.52	1.01	4.77	7.79	32.91	53.52	3.07	7.17	11.95	32.76	45.05	Use appropriate methods or tools to obtain information
1.00	4.48	12.94	33.58	48.01	1.26	3.27	6.53	30.15	58.79	2.73	6.31	10.41	34.13	46.42	Evaluate the credibility of individual sources
1.00	3.23	10.95	35.82	49.00	1.01	2.51	8.29	32.66	55.53	3.24	5.63	14.16	29.18	47.78	Evaluate the relevance of information obtained
0.25	2.99	9.70	28.36	58.71	0.75	3.27	7.04	34.17	54.77	2.73	5.97	12.63	31.40	47.27	Summarize information obtained from sources
1.24	7.46	17.16	34.08	40.05	2.01	4.27	12.56	31.66	49.50	2.73	4.78	13.48	31.57	47.44	Analyze multiple sources to identify conflicting information
1.24	3.48	9.45	29.35	56.47	1.26	4.02	7.29	25.63	61.81	4.44	7.17	8.53	23.04	56.83	Develop a thesis or claim related to a research topic
0.75	4.98	14.18	39.05	41.04	2.26	3.77	13.32	34.92	45.73	2.90	8.70	12.63	38.74	37.03	Refine claims and counterclaims related to a research topic
0.75	3.73	8.71	30.60	56.22	1.51	2.51	11.06	28.14	56.78	2.90	7.00	13.48	31.57	45.05	Identify evidence in sources that directly supports or challenges claims
1.49	4.98	16.42	36.57	40.55	1.51	4.27	11.31	35.18	47.74	3.41	6.31	13.48	35.67	41.13	Identify other perspectives or counterclaims related to a thesis about a research topic
0.50	3.73	13.93	34.58	47.26	1.76	2.26	9.55	29.90	56.53	2.56	9.04	12.12	29.69	46.59	Integrate evidence from sources into a research project (e.g., essay, oral presentation)
2.74	13.43	16.42	29.10	38.31	2.26	7.29	11.81	25.13	53.52	3.41	6.66	13.31	34.13	42.49	Cite information sources using a citation style appropriate for the discipline (APA, MLA, etc.)
2.74	10.20	22.89	28.86	35.32	3.77	9.55	20.85	28.89	36.93	5.46	10.24	14.51	28.67	41.13	Work collaboratively with other students on a research project

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors
. = This item was not asked at this grade level.

Table B.2
How Important Topics Are for Success in a Course
Literacy in Social Studies

MS%					HS%					PS%					
Not Important	1	2	3	High 4	Not Important	1	2	3	HIgh 4	Not Important	Low 1	2	3	High 4	Topics and Skills
															AS PREREQUISITE
.	.	.	.	.	.	.	.	.	.	0.73	4.01	16.79	42.70	35.77	Inferential comprehension of texts
.	.	.	.	.	.	.	.	.	.	1.82	2.92	17.15	31.02	47.08	Analysis and evaluation of texts
.	.	.	.	.	.	.	.	.	.	6.57	8.76	18.98	31.75	33.94	Comparison of 2 or more texts
.	.	.	.	.	.	.	.	.	.	10.58	13.14	22.99	21.53	31.75	Composition of texts intended to convey experiences and emotions (e.g., story, novel, poem, drama, memoir)
.	.	.	.	.	.	.	.	.	.	1.09	8.03	11.31	35.04	44.53	Composition of texts intended to inform or explain (e.g., report, biography, article)
.	.	.	.	.	.	.	.	.	.	5.47	5.84	16.06	33.58	39.05	Composition of texts intended to persuade or present an argument (e.g., review, political speech, debate, critique)
.	.	.	.	.	.	.	.	.	.	0.36	5.84	17.15	34.31	42.34	Vocabulary
.	.	.	.	.	.	.	.	.	.	1.46	4.74	14.60	33.58	45.62	Usage and mechanics
.	.	.	.	.	.	.	.	.	.	1.46	4.38	11.31	33.58	49.27	Sentence structure
.	.	.	.	.	.	.	.	.	.	1.09	4.01	13.87	32.48	48.54	Content knowledge
.	.	.	.	.	.	.	.	.	.	0.73	3.65	19.34	31.02	45.26	Understanding of key concepts (e.g., democratic principles, human-environment interaction)
.	.	.	.	.	.	.	.	.	.	1.46	6.93	12.41	41.97	37.23	Interpersonal communication
.	.	.	.	.	.	.	.	.	.	1.09	4.01	15.33	31.75	47.81	Information literacy
.	.	.	.	.	.	.	.	.	.	1.82	2.92	13.50	35.40	46.35	Discussion skills
.	.	.	.	.	.	.	.	.	.	3.65	5.84	20.44	34.67	35.40	Presentation skills
.	.	.	.	.	.	.	.	.	.	1.09	6.20	14.96	32.85	44.89	Research skills
.	.	.	.	.	.	.	.	.	.	32.12	4.01	8.39	14.60	40.88	Other (Please specify.)
															RESEARCH AND INFORMATION LITERACY
2.96	6.67	19.26	28.64	42.47	2.22	5.93	18.02	37.53	36.30	4.74	9.12	16.06	34.67	35.40	Use effective search strategies to find information from various sources
2.96	6.17	16.79	32.84	41.23	1.23	6.91	17.04	36.05	38.77	2.55	5.84	16.06	35.04	40.51	Use appropriate methods or tools to obtain information
4.69	8.64	14.32	30.86	41.48	2.22	5.68	15.31	28.15	48.64	4.38	4.38	12.04	37.23	41.97	Evaluate the credibility of individual sources
2.96	8.64	15.80	32.10	40.49	2.72	5.93	15.56	32.35	43.46	4.38	2.92	10.95	31.75	50.00	Evaluate the relevance of information obtained
2.96	5.68	17.28	29.63	44.44	1.98	4.69	15.06	34.81	43.46	4.01	5.84	9.85	31.75	48.54	Summarize information obtained from sources
4.44	10.37	18.77	30.37	36.05	2.47	4.94	16.54	36.05	40.00	4.38	6.20	12.41	29.93	47.08	Analyze multiple sources to identify conflicting information
5.93	11.85	19.26	32.84	30.12	3.70	9.14	22.96	28.40	35.80	6.93	4.01	10.22	24.45	54.38	Develop a thesis or claim related to a research topic
6.42	12.10	22.47	32.35	26.67	3.46	12.35	26.67	31.85	25.68	8.76	8.76	14.23	38.32	29.93	Refine claims and counterclaims related to a research topic
4.44	10.12	19.51	30.12	35.80	3.70	7.90	19.75	32.35	36.30	6.20	4.38	17.15	28.47	43.80	Identify evidence in sources that directly supports or challenges claims
6.17	12.35	20.99	36.54	23.95	4.69	11.60	21.23	34.57	27.90	8.03	6.93	13.87	34.31	36.86	Identify other perspectives or counterclaims related to a thesis about a research topic
4.20	8.40	19.51	34.57	33.33	2.72	10.12	19.26	31.85	36.05	6.20	4.01	13.14	27.37	49.27	Integrate evidence from sources into a research project (e.g., essay, oral presentation)
8.15	15.56	18.77	29.38	28.15	5.19	17.28	20.74	29.38	27.41	5.11	5.84	12.04	28.47	48.54	Cite information sources using a citation style appropriate for the discipline (APA, MLA, etc.)
6.17	11.11	16.05	29.63	37.04	5.68	14.07	19.51	28.89	31.85	12.77	9.12	14.60	24.09	39.42	Work collaboratively with other students on a research project

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors
. = This item was not asked at this grade level.

Table B.3
How Important Topics Are for Success in a Course
Science

MS%					HS%					PS%					
Not Important	1	2	3	High 4	Not Important	1	2	3	HIgh 4	Not Important	Low 1	2	3	High 4	Topics and Skills
0.25	2.23	11.63	30.20	55.69	0.49	2.20	11.49	34.96	50.86	1.89	2.58	6.06	21.27	68.19	Laboratory activities, investigations, or experiments that require following given procedures
0.74	5.20	13.37	35.89	44.80	1.47	3.67	14.18	35.21	45.48	1.29	5.47	12.03	42.35	38.87	Laboratory activities, investigations, or experiments that require students to create their own procedures about a question or topic selected by the teacher (guided inquiry)
1.98	8.17	14.11	34.90	40.84	2.69	8.07	20.05	33.01	36.19	1.29	4.87	13.72	33.20	46.92	Laboratory activities, investigations, or experiments that require students to create their own procedures about a question or topic selected by the students (open inquiry)
1.98	7.67	17.57	36.39	36.39	4.16	15.89	25.67	31.30	22.98	3.38	6.36	15.41	39.36	35.49	Activities focused on engineering and design (e.g. engineering project, prototype design)
0.00	5.69	13.61	38.12	42.57	0.49	4.65	14.18	36.43	44.25	1.09	3.88	12.03	33.60	49.40	Analyzing or examining existing data sets from other experiments or sources
0.74	10.15	23.51	34.16	31.44	1.96	11.74	25.67	33.50	27.14	1.59	5.07	15.81	37.38	40.16	Computer simulations of science investigations or labs
0.25	8.91	25.74	30.94	34.16	0.49	8.07	29.83	31.54	30.07	0.40	2.88	12.52	33.70	50.50	Listening to the teacher explain, demonstrate, or model a science concept or procedure
0.74	2.48	6.44	29.46	60.89	0.00	1.96	11.98	29.83	56.23	1.39	3.68	8.85	26.54	59.54	Participating in whole-class discussions about science
0.00	2.23	4.46	31.93	61.39	0.00	1.47	6.85	29.83	61.86	0.50	4.97	13.12	41.65	39.76	Working in small groups
0.25	3.96	13.12	36.88	45.79	0.49	3.42	13.45	35.21	47.43	0.70	3.68	13.12	34.00	48.51	Working individually
0.50	3.71	12.62	30.69	52.48	0.49	6.36	17.60	34.96	40.59	1.09	4.47	12.33	39.66	42.45	Reading texts related to science topics
0.00	5.69	22.77	36.63	34.90	1.47	9.54	30.56	32.03	26.41	1.09	6.26	16.40	35.39	40.85	Watching a video about a science topic
0.50	3.47	13.12	35.89	47.03	0.49	6.11	17.60	36.43	39.36	0.80	3.68	14.12	37.57	43.84	Activities that explicitly link across STEM (science, technology, engineering, and mathematics)

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors
. = This item was not asked at this grade level.

Table B.4
How Important Skills Are for Success in a Course Across Content Areas
Thinking Skills

MS%					HS%					PS%					
Not Important	Low 1	2	3	High 4	Not Important	Low 1	2	3	HIgh 4	Not Important	Low 1	2	3	High 4	Topics and Skills
3.39	5.18	13.37	31.30	46.77	1.54	4.32	13.84	32.61	47.68	1.87	4.93	11.06	32.50	49.64	Applying relevant existing knowledge and skills to novel tasks
3.64	6.90	17.74	34.57	37.15	2.35	5.37	18.22	34.59	39.47	0.66	4.37	14.12	43.46	37.39	Adapting to changes in task requirements
3.02	5.55	15.40	34.63	41.40	1.61	4.69	15.19	33.91	44.60	0.73	3.71	15.64	36.59	43.32	Identifying when a given approach to solving a problem isn't working
2.83	5.36	17.13	32.78	41.90	2.29	4.88	15.94	32.92	43.98	0.83	5.41	13.04	41.35	39.37	Revising plans, goals, or priorities to account for new information
3.51	6.90	19.78	30.87	38.94	3.77	6.05	17.73	32.30	40.15	2.08	4.86	16.41	35.93	40.72	Effectively researching solutions to problems using internet resources
2.46	5.98	18.85	33.33	39.37	1.61	5.56	15.81	34.96	42.06	1.28	5.17	14.15	40.27	39.13	Identifying the characteristics of a problem
2.46	7.09	18.24	32.72	39.49	1.98	6.05	17.05	34.22	40.70	1.18	4.20	14.26	35.38	44.99	Identifying the strengths and weaknesses of alternative solutions to a problem
2.83	5.79	16.14	29.94	45.29	1.98	5.87	15.63	33.11	43.42	1.63	4.47	12.83	34.86	46.20	Predicting the consequences of decisions
1.60	3.76	12.94	31.36	50.34	2.16	5.44	14.27	33.05	45.09	1.63	5.27	16.65	42.32	34.13	Working effectively in a team of individuals with varying skill sets to accomplish a goal
2.53	5.05	16.76	34.57	41.10	2.53	5.81	16.12	35.39	40.15	0.76	4.72	15.99	37.25	41.28	Responding with corrective action when an initial plan for completing a task fails
2.71	4.99	16.64	33.39	42.27	2.16	5.00	14.89	34.10	43.85	1.21	4.93	15.33	39.51	39.02	Effectively prioritizing competing tasks with similar deadlines
1.79	4.99	13.99	32.10	47.13	1.85	4.57	12.42	32.06	49.10	1.56	4.27	14.33	36.00	43.84	Effectively allocating time to complete tasks by their deadlines
2.65	5.91	17.68	33.83	39.93	2.41	6.18	16.43	34.96	40.02	0.94	5.45	15.09	39.20	39.33	Anticipating possible obstacles to successful completion of a task
2.59	5.61	15.28	29.64	46.89	1.91	3.89	12.91	31.62	49.66	1.39	3.88	11.27	36.18	47.28	Putting together information from multiple sources to solve a problem

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors
. = This item was not asked at this grade level.

Table B.5
How Important Skills Are to be Taught and Assessed Across Content Areas
Social Emotional Skills

MS%				HS%				PS%				
Not Important	Somewhat Important	Important	Very Important	Not Important	Somewhat Important	Important	Very Important	Not Important	Somewhat Important	Important	Very Important	Topics and Skills
												IMPORTANT TO BE ASSESSED
22.74	30.87	28.90	17.50	20.82	27.55	31.62	20.01	4.96	15.82	36.28	42.94	Acting honestly (e.g., acting sincerely and genuinely, treating others fairly)
17.19	28.59	33.03	21.20	16.86	26.13	36.26	20.75	3.47	19.74	45.13	31.67	Getting along with others (e.g., cooperating with other students, working effectively in groups)
22.74	31.05	27.91	18.30	19.33	27.67	32.74	20.26	3.36	17.31	40.17	39.16	Keeping an open mind (e.g., curiosity about a variety of ideas and experiences, being creative)
22.61	29.21	27.97	20.21	20.63	26.50	32.92	19.95	5.41	16.09	42.00	36.49	Maintaining composure (e.g., remaining calm, keeping emotions under control)
24.03	30.44	27.66	17.87	24.21	28.97	30.14	16.68	6.63	17.45	37.74	38.19	Socializing with others (e.g., establishing friendships, maintaining a social support network)
16.76	24.52	30.99	27.73	13.71	19.83	35.39	31.07	2.74	14.64	45.30	37.32	Sustaining effort (e.g., staying focused, persisting through challenges, completing work)
22.18	30.38	29.51	17.93	19.39	27.86	33.54	19.21	4.99	14.95	38.81	41.24	Leadership (e.g., assertiveness, enthusiasm)
												IMPORTANT TO BE TAUGHT
1.97	6.47	27.36	64.20	1.36	6.92	29.77	61.95	2.74	7.53	29.62	60.11	Acting honestly (e.g., acting sincerely and genuinely, treating others fairly)
2.09	4.99	27.66	65.25	1.17	6.86	32.98	58.99	1.39	11.03	48.18	39.40	Getting along with others (e.g., cooperating with other students, working effectively in groups)
1.73	8.69	31.55	58.04	1.05	7.91	31.13	59.91	0.90	9.40	37.39	52.31	Keeping an open mind (e.g., curiosity about a variety of ideas and experiences, being creative)
1.79	7.52	32.96	57.73	0.99	9.02	35.70	54.29	2.53	10.75	41.35	45.37	Maintaining composure (e.g., remaining calm, keeping emotions under control)
2.65	12.69	35.37	49.29	2.41	16.68	35.21	45.71	3.12	13.18	37.98	45.72	Socializing with others (e.g., establishing friendships, maintaining a social support network)
1.73	4.81	24.52	68.95	0.86	4.63	24.40	70.11	1.11	9.43	42.77	46.69	Sustaining effort (e.g., staying focused, persisting through challenges, completing work)
2.90	9.67	37.89	49.54	1.54	12.42	38.79	47.25	2.01	9.64	36.42	51.93	Leadership (e.g., assertiveness, enthusiasm)

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors

Table B.6
How Important Skills Are to be Taught and Assessed Across Content Areas
Education and Career Navigation

MS%				HS%				PS%				
Not Important	Somewhat Important	Important	Very Important	Not Important	Somewhat Important	Important	Very Important	Not Important	Somewhat Important	Important	Very Important	Topics and Skills
												IMPORTANT TO BE ASSESSED
21.81	29.82	27.79	20.58	20.01	25.88	31.13	22.98	5.97	16.48	35.73	41.83	Awareness of the connection between academic learning and future work
19.47	25.39	32.22	22.92	18.41	23.53	32.49	25.57	4.06	17.90	44.29	33.75	Awareness of one's own academic strengths and weaknesses
22.74	26.43	31.61	19.22	21.49	26.81	30.82	20.88	5.20	17.07	42.04	35.69	Having a clear, identified direction (e.g., major, career)
23.91	27.48	27.11	21.50	23.35	23.84	29.59	23.22	4.89	15.40	42.35	37.36	Understanding what is needed to progress in one's educational path
25.14	26.00	28.47	20.39	25.63	25.39	27.36	21.62	4.82	16.68	38.09	40.41	Recognizing that education/career planning is necessary throughout the postsecondary experience
27.79	27.54	27.17	17.50	27.42	25.94	26.99	19.64	5.48	14.71	41.03	38.78	Openness to exploring different career options and opportunities
												IMPORTANT TO BE TAUGHT
1.36	7.95	33.70	56.99	0.86	7.72	33.54	57.88	2.46	7.11	31.25	59.17	Awareness of the connection between academic learning and future work
0.99	7.15	37.40	54.47	1.05	7.23	36.32	55.40	1.04	10.61	49.50	38.85	Awareness of one's own academic strengths and weaknesses
3.08	15.71	36.17	45.04	2.84	16.37	37.62	43.17	2.74	13.94	39.58	43.74	Having a clear, identified direction (e.g., major, career)
1.29	6.10	34.50	58.10	0.86	7.60	30.70	60.84	1.91	10.13	41.76	46.20	Understanding what is needed to progress in one's educational path
2.40	11.40	34.20	52.00	3.89	12.72	35.39	47.99	1.77	11.03	40.24	46.96	Recognizing that education/career planning is necessary throughout the postsecondary experience
1.60	14.91	33.76	49.72	2.10	11.67	38.05	48.18	1.53	9.23	40.72	48.53	Openness to exploring different career options and opportunities

Note:
MS = Middle school/junior high school teachers
HS = High school teachers
PS = Postsecondary instructors

ACT

500 ACT Drive
PO Box 168
Iowa City, Iowa 52243-0168
Telephone: 319.337.1000

A copy of this report can be found at

act.org/research