

Postsecondary Preparedness Initiative: Background

Over a decade ago, the National Assessment Governing Board examined academic preparedness for postsecondary opportunities, using NAEP's grade 12 Reading and Mathematics assessments. Beginning with the 2013 NAEP results, the Governing Board reported that 37 percent of 12th graders were academically prepared to take entry-level, credit-bearing college coursework without remediation, providing the nation with a [national metric of college preparedness](#). However, the Governing Board's efforts to explore an analogous metric linking NAEP to career readiness in specific job training programs were not supported by research. Since then, the Board has remained interested in expanding NAEP's ability to report on postsecondary preparedness of high school graduates more broadly.

The Governing Board's [Strategic Vision](#) includes a priority to, "*Develop new approaches to measure the complex skills required for transition to postsecondary education and career.*" In August 2017, the Governing Board established the Ad Hoc Committee on Measures of Postsecondary Preparedness to review existing research, collect expert testimony, and prepare [recommendations for the Governing Board's consideration](#) in November 2018. At that point, the Governing Board voted to explore what postsecondary preparedness data to present to the public and how.

The Board defines "postsecondary preparedness" as the *skills that all youth need, regardless of the pathways they take immediately after high school*. While the nation increasingly values "college and career ready" standards, there is no comprehensive measure to represent readiness for any postsecondary path. Instead, states typically either rely on academic measures doubling as indicators of career readiness or develop bifurcated indicators for college *or* career readiness. Expectations for high school graduates are shifting, creating a need for indicators to capture postsecondary preparedness more broadly.

Many states are pursuing means for understanding whether youth are prepared for postsecondary pathways. However, there is great divergence among these states in their approaches, definitions, and in what measures they include. The Governing Board and the National Center for Education Statistics, which administers the NAEP program, share a national focus. The Board's postsecondary preparedness initiative attempts not only to highlight similarities and differences among states but also to clarify a broader understanding of postsecondary preparedness.

Postsecondary Preparedness Conceptual Framework: An Overview

To determine what indicators should be presented to the public, and to serve as a free-standing reference to the field of secondary and postsecondary education generally, the Governing Board is developing a conceptual framework to describe the universal skills that represent postsecondary preparedness.

This conceptual framework will:

- *Include external input* in the development of the conceptual framework.
- *Be comprehensive* in the skills, knowledge, and abilities in the framework, including constructs that may extend beyond NAEP's statutory purview.
- *Provide the education field with a resource*, offering a comprehensive picture of what postsecondary preparedness includes, even if it is not expressly taught in secondary school or measured in assessments.
- *Inform revisions to NAEP*, as new assessment items and contextual variables are developed, aspects of the postsecondary preparedness conceptual framework may be incorporated into those revisions and subsequently used in reporting.
- *Form the foundation for content* to be shared with the public through an online dashboard.

Postsecondary Preparedness Dashboard: An Overview

The Ad Hoc Committee on Measures of Postsecondary Preparedness recommended not only the draft conceptual framework just described but also a prototype of a Postsecondary Preparedness Dashboard to display indicators from a variety of extant data sources (including, but not limited, to NAEP) to report, to the extent possible, the academic knowledge, literacies, cross-cutting cognitive skills, and intra- and inter-personal skills that are essential for all high school graduates to be prepared for postsecondary endeavors.

The conceptual framework is intended to drive the content for the web-based dashboard and tool. Development of the dashboard is helmed by the National Center for Education Statistics on a parallel track to the development of the conceptual framework. At this stage, the dashboard is a prototype to determine if implementing such a tool is feasible and potentially valuable.

As the conceptual framework should serve as a valuable resource to the field, the dashboard—an information source on postsecondary preparedness—should add unique value to the field. Note that given the broad scope of postsecondary preparedness, there may be skills that the conceptual framework prioritizes which cannot be measured through extant data or pursued through the online dashboard. As with any new initiative, each step forward inspires questions about value and utility

Session Overview

In plenary session, the Board will hear first the progress on the Conceptual Framework and the dashboard prototype made by both the Reporting and Dissemination Committee and NCES over the last year. The Chair of the Reporting and Dissemination Committee, Rebecca Gagnon, will present the work on the Conceptual Framework, and Eunice Greer from NCES and Robert Finnegan from ETS will present on the dashboard.

Then Board members will disburse to convene in small groups to discuss both the framework and dashboard prototype. Board members will provide feedback on how they envision themselves and the constituent group they represent using the dashboard and will consider the scope of questions that can be addressed by available data sources, e.g., NAEP, PISA, PIAAC, the longitudinal studies at NCES, and transcript data.

Board members will facilitate the small group conversations, and Board staff will take notes. Staff from the Governing Board and NCES will be available to answer any questions that may arise in the course of the discussion.

On Saturday morning, Board members will reconvene and discuss their reactions, feedback, and thoughts on the framework and dashboard. This will help formulate a path forward.

Questions to guide the small group discussions include:

- (1) How do the Conceptual Framework and dashboard prototype align with the stated intentions of the Ad Hoc Committee?
 - a. Is the evidence to support the inclusion of each skill sufficient?
 - b. Are there any glaring omissions?
- (2) What are the utility and value of framework as both a stand-alone resource for the education community and as a guide for dashboard?
- (3) Is this dashboard feasible to launch? Not all indicators can be supported by data; what amount and quality of data should deem this initiative feasible?
- (4) What are the potential utility and value of the dashboard?
 - a. Reactions on look, organization, and proposed navigation?
- (5) If and how should this postsecondary preparedness effort interact with extant dashboards and with state initiatives?
- (6) How can the work be improved?



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Postsecondary Preparedness Conceptual Framework

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Postsecondary Preparedness Conceptual Framework: DRAFT

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Postsecondary Preparedness Conceptual Framework: DRAFT

Introduction

We all want young people to be well prepared for responsible adulthood, including becoming engaged and contributing members of communities, the economy, and civic life. Young Americans should know and be able to do the things that are necessary to craft meaningful lives, attain work that earns a living wage, and engage in continuous learning and accomplishment throughout their careers. Content knowledge is necessary, but so too are skills such as communication and collaboration, and attitudes like a commitment to producing high quality work.

As the pace of change increases, and the world becomes more complex, it is clear that such preparation must extend past high school. Jobs that require only a high school diploma often offer less income, fewer benefits, and fewer opportunities for advancement than jobs requiring some postsecondary education (Berube, 2019). One of the critical aims of the education system, therefore, is to equip high school graduates with the knowledge, skills, and dispositions that will be needed along any postsecondary path or life course. This state of readiness is called *postsecondary preparedness*.

The need for both defining and measuring postsecondary preparedness is clear. Federal and state legislative requirements mandate that state school accountability systems include academic content standards which prepare students to succeed in college and careers. Further, the Every Student Succeeds Act and the Strengthening Career and Technical Education for the 21st Century Act (Perkins V) require states to include college and career readiness indicators in their accountability systems.

There are different ways to define this critical concept, as illustrated by the development of a variety of postsecondary preparedness frameworks in recent years (Balestreri, Sambolt, Duhon, Smerdon, & Harris, 2014; Conley, 2012; Partnership for 21st Century Skills [P21], 2018). Existing frameworks range from focusing on skills that can be taught and measured within the K–12 education system to assembling lengthy lists of skills and competencies. For example, Conley (2012) focused on four key areas that schools can influence, whereas AIR’s College and Career Readiness Success Organizer (Balestreri et al., 2014) comprises skills and traits (some of which are influenced by family and community outside of school walls), along with other measures, supports, and resources. State education systems likewise differ in how they define and measure preparedness (Klein, 2019).

Such variation is not problematic in itself—indeed, it fits well with the ideal of local control of schools. Any definition, however, requires identifying appropriate indicators of success against which that definition can be validated (WestEd, 2010). And so, the variety of definitions has resulted in the desire for indicators and outcomes, which are challenging to measure (Waldman, 2016). To make progress toward greater postsecondary preparedness, we must identify reliable markers and valid measures to guide the journey. This framework intends to identify which skills should and could be measured.

Strategic Vision

The National Assessment Governing Board’s (hereafter referred to as Governing Board) Strategic Vision includes a priority to, “*Develop new approaches to measure the complex skills*

required for transition to postsecondary education and career.” In August 2017, the Governing Board established the Ad Hoc Committee on Measures of Postsecondary Preparedness to review existing research, collect expert testimony, and prepare recommendations for the Governing Board’s consideration in November 2018. At that point, the Governing Board voted to explore what postsecondary preparedness data to present to the public and how. This initiative includes developing a comprehensive framework of postsecondary skills that undergirds an online dashboard of measurable indicators.

The Governing Board, which includes representatives from myriad education stakeholder groups, is responsible for setting policy related to the National Assessment of Educational Progress (NAEP). As the foremost nationally representative assessment of student learning recognized as the gold standard in measurement, the NAEP program is not affected by short-term or local changes in educational policies and, thus, can unite variations in, or provide commonality, across state definitions of postsecondary preparedness.

The need for a unifying framework grounded in an understanding of educational measurement is clear. While the extant literature proposes, and continues to identify, skills important for postsecondary success, a need exists for identifying high quality metrics to reliably measure these skills. The extent to which the Governing Board can unify the evaluation of measurable indicators and contribute to capturing non-academic metrics could help guide what data states collect. Given these features of the NAEP program, as well as the Governing Board’s policy-setting role, the Governing Board is well positioned to propose a conceptual framework to structure and measure postsecondary preparedness.

This framework provides a comprehensive, but not exhaustive, list of skills related to postsecondary success. The framework is not intended to include only skills that are systematically measurable or that are currently taught in a traditional K–12 setting. Rather, the framework highlights essential skills, habits, and knowledge and stands alone as a union of the varied postsecondary preparedness definitions established by states.

It is beyond the scope of this framework to identify specific variables and indicators for the included skills. Additionally, the National Center for Education Statistics, which administers NAEP, is already expert in tapping district, state, national, and international data that can inform postsecondary preparedness indicators. Rather, this framework sets out to identify which skills *should* and *could* be measured.

The skills outlined in this framework were derived from the work of the Governing Board’s Ad Hoc Committee on Postsecondary Preparedness, with input from experts in higher education and industry, futurists, representatives from state education departments, and young adults currently in the postsecondary transition period.

Framework Overview

The broad conceptualization for this framework defines postsecondary preparedness as the knowledge, skills, and habits of mind that will be needed along any postsecondary path or life course, that educators can help to develop in all students, and that can be supported through programs and policies at the school, district, or state level.

This framework is unique from other college and career readiness frameworks in that it articulates what should be ultimately operationalized as valid and reliable indicators which inform student preparedness for any pathway immediately after high school.

The “any pathway” perspective is in keeping with the emerging consensus that the binary “college or career” goal model – in which all students are expected *either* to attend college *or* to embark on a career immediately after high school – is unnecessarily limiting (Lake, Heyward, Coyne, 2018; Newton, 2017). This framework recognizes that students’ postsecondary experiences are diverse, often marked by unanticipated twists and turns, and may lead to unexpected or unpredictable (yet desirable) destinations. It also recognizes that preparation for the world of the future is itself unpredictable. As automation of jobs changes the postsecondary landscape (Frey & Osborne, 2013), the future skills of the workforce become less pathway-specific and more focused on the ability to learn new skills and adapt skill sets (Gribben, Becker, & Dickinson, 2018).

The framework is organized into the following five categories that represent key overarching skills all students will need to be prepared for their postsecondary lives: (a) foundational academic skills, (b) literacies, (c) cross-cutting cognitive skills, (d) intrapersonal skills, and (e) interpersonal skills. Although the framework describes the overarching categories of skills separately, these skills are interdependent. Success manifests at the intersection of several skills. For example, increased civic engagement is desirable, but an argument can be made that informed civic engagement is more desirable. To be informed, an individual should be able to read, interpret, take others’ perspectives, and critique.

This way of thinking about postsecondary preparedness can be likened to a rope, which needs every strand in order to be strong and functional. That is, each category comprises several specific skills that complement and reinforce one another; each represents a distinct strand, yet they interact with and depend on one another. No single skill is more important than another. The skills needed to succeed in school and the workplace across the nation are increasingly a combination of related skills: an interwoven braid of knowledge, intellectual and social skills, emotional capabilities and mindsets. These blended skill sets are the tools for learning and performing new tasks in novel situations.

The weaving and uses of this “rope” will be varied. Specific postsecondary pathways will vary in terms of when and how particular skills are developed, refreshed, and applied, and some skill sets will carry more weight on certain pathways compared to others. Likewise, the interaction of these skills will differ for each person and will contribute uniquely to the person’s advancement in the future. Although some skills may not be included in a typical school curriculum, the skills may be shaped by students’ K-12 educational experiences and affect success later in their lives.

This framework is not an exhaustive list of every skill that would be useful or beneficial in postsecondary life, but rather, those that are essential on any path after high school. The framework provides descriptions of each skill category and its component skills, how each skill contributes to postsecondary preparedness, and how these skills may be shaped throughout the life course.

Postsecondary Preparedness Skills

The constructs and concepts considered important for postsecondary preparedness involve (a) foundational academic skills, (b) literacy skills, (c) cross-cutting cognitive skills, (d) intrapersonal skills, and (e) interpersonal skills.¹

Foundational Academic Skills

Foundational academic knowledge in content areas such as mathematics, English language arts (ELA), and science, and the application of this fundamental knowledge to authentic situations are key cognitive skills needed to understand and interact with others and the world around us (Patelis, 2016). Basic academic skills are essential to the performance of most tasks, and it is widely accepted that both early academic competencies and the attainment of higher levels of academic skill are associated with a range of positive outcomes in educational, career, and health contexts (Pellegrino & Hilton, 2012). Economic research shows that improving basic academic skill proficiency also positively impacts important social outcomes, such as wage growth (McIntosh & Vignoles, 2001) and social development (Hanushek & Woessmann, 2008).

Research suggests that educational practitioners and policymakers can improve workforce readiness by designing instruction that supports the development of basic academic skills (Hilton, 2019). According to the National Technical Assistance Center on Transition (NTACT), “Students need to be fluent readers with proficient comprehension skills, have a mastery of written language, and be able to apply math content knowledge to a variety of scenarios to be academically successful” in college or training after high school (Fowler, Holzberg, MaGee, Lombardi, & Test, 2018, p. 14). Employers increasingly seek employees with skills in English and written communications, and in mathematics such as data analysis and mathematical problem solving (Association for Career and Technical Education [ACTE], 2010).

The Common Core State Standards (CCSS) Initiative identified the academic knowledge and skills in ELA and mathematics that students should know and be able to do at each grade level, with the goal of all students graduating high school prepared to take credit-bearing introductory college courses or enter the workforce (Common Core State Standards Initiative, 2010). The Next Generation Science Standards (NGSS) identify expectations for all students regarding science education, “preparing them to be informed citizens in a democracy and knowledgeable consumers” (“NGSS Lead States”, 2019, p. 1).

Based on literature related to postsecondary preparedness, high school seniors should be prepared in the following foundational academic areas:

- Reading and Writing – read a broad range of high-quality texts and use writing to clearly communicate understanding and express opinions and ideas.
- Mathematics – understand key mathematics concepts, demonstrate speed and accuracy in making mathematical calculations, and correctly apply mathematical knowledge.

¹ We considered additional skills that are not included in the framework. The Appendix contains a list of excluded skills with a rationale for not including those skills.

- Science – understand core scientific concepts and interdisciplinary ideas and apply them through the practice of scientific inquiry.

Each of the above represents a discrete content area, however, knowledge and skills in one area support and enhance knowledge and skills in other key academic areas. The following sections start with the importance of each content area and how students use knowledge and skills across the content areas to prepare themselves for life after high school.

Reading and Writing

Literacy refers to the basic ability to understand and use text-based material. Students graduating high school encounter a wide variety of written material. Literacy is the ability to use these text-based sources to perform life tasks and achieve goals (White & McCloskey, in press). A person without basic literacy skills would be unable to find information in a pamphlet or guide (Kutner, Greenberg and Baer, 2006).

The NAEP Reading Framework defines reading as “an active and complex process that involves: understanding written text, developing and interpreting meaning, and using meaning as appropriate to type of text, purpose, and situation” (National Assessment Governing Board, 2017a, p. 2). The Progress in International Reading Literacy Study (PIRLS) framework defines reading as “the ability to understand and use those written language forms required by society and/or valued by the individual. Readers can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment” (Mullis & Martin, 2019, p. 6). Both definitions stress the importance of reading skills in a broad range of contexts within and outside the formal education. In 2011–2012, the Programme for the International Assessment of Adult Competencies (PIAAC) became the most current indicator of adult skills in text-based literacy in technology-rich environments, expanding the measurement of these literacies to include digital mediums such as chat rooms and text messages (NAAL, 2019).

The CCSS integrate reading and writing as ELA (National Governors Association, 2010) and identify anchor standards that include, but are not limited to, foundational reading skills, reading both literature and informational texts, and writing. Foundational skills include decoding words, reading them with fluency, and understanding what those words are expressing. Reading in this sense is a basic, academic-oriented skill. Attaining these basic skills is essential for accessing any information that is presented in a written format. Informational text, written with the primary purpose of communicating information about the natural or social world, is encountered daily (Duke, 2004).

In contrast, literary texts tell a story that may or may not be based on real people or events. Reading literary texts can teach about diverse cultures (Atwell, 2010), enhance reasoning skills, and improve the capacity for understanding diverse human experiences (Worth, 2008). Thus, literary reading skills have implications for studying the social sciences and for engaging with an increasingly diverse world.

To assess writing skills, NAEP considers the communicative purposes for writing, audience, and form (National Assessment Governing Board, 2017b). Writing may be performed to persuade someone, explain something, or convey a real or imagined experience. Writers should be aware of their audience, which may include either familiar or unfamiliar people. Forms used in writing may vary widely (e.g., essay, letter, editorial), and should consider the purpose and audience.

The CCSS also describes the increasingly sophisticated writing skills that K–12 students should demonstrate, ranging from vocabulary and grammar to how ideas are developed and organized.

Effective writing skills have implications for postsecondary experiences. Many postsecondary educational institutions require a written essay or personal statement as part of the application process (Franek, n.d.) and many jobs, even those not directly related to writing, may require applicants to respond to an open-ended question about why they should be hired or to submit some sort of writing sample (Lester, n.d.). As individuals advance along their postsecondary pathways, written communication skills are essential for tasks such as writing reports and communicating with peers, teachers/trainers, and supervisors.

Individuals with higher levels of reading are more likely to hold fulltime employment (Kutner, et. al., 2007), and higher literacy levels correlate with higher wages (Liming and Wolf, 2008). Low levels of reading are associated with poor health conditions (Marcus, 2006), and with limited access to and understanding of health-related information for both self and family members (Berkman, et. al., 2004). There may also be implications for civic life, such as lower voting rates among citizens with lower levels of literacy (Summers and Langford, 2015).

Mathematics

Numeracy is the “ability to access, use, interpret, and communicate mathematical information and ideas, ... to engage in and manage the mathematical demands of a range of situations in adult life” (PIAAC Numeracy Expert Group, 2009, p. 21). It is frequently used synonymously with the term quantitative literacy, which has been defined as “the knowledge and skills required to perform quantitative tasks” (National Assessment of Adult Literacy [NAAL], 2019). Although there is overlap between numeracy and the elementary academic mathematics standards, numeracy requires sufficient understanding to apply numerical ideas in both familiar and new contexts (Hughes-Hallett, 2001).

Since the late 1970s, educators and policy makers have attempted to define the essential academic skills in mathematics that all students should know and be able to apply (National Council of Supervisors of Mathematics, 1977; National Council of Teachers of Mathematics, 1980). In 1989, the National Council of Teachers of Mathematics (NCTM) first published *Curriculum and Evaluation Standards for School Mathematics*, which identified five mathematics content standards: (a) number and operations, (b) algebra, (c) geometry, (d) measurement, and (e) data analysis and probability. The *Mathematics Framework for the 2017 National Assessment of Educational Progress* and the CCSS for mathematics (National Governors Association, 2010) include and, in some cases, further specify these same content domains.

Beyond mathematics content knowledge, current mathematics standards also provide guidance for doing mathematics. The 2019 Trends in Mathematics and Science Study (TIMSS) framework identified three cognitive domains important for doing mathematics: (a) knowing, (b) applying, and (c) reasoning (Mullis & Martin, 2017). Similarly, the National Council of Teachers of Mathematics (NCTM) identified five mathematics process standards: (a) problem solving, (b) reasoning and proof, (c) communication, (d) connections, and (e) representations (NCTM, 2000), and these have been mapped to the eight CCSS mathematical practices (Koestler, Felton-Koestler, Bieda, & Otten, 2013).

Numeracy relates to many aspects of adult life, such as financial transactions, managing time and resources, measuring things, analyzing numerical data, and making numeric estimations (Fownes, Thompson, & Evetts, 2002). Increased numeracy has been associated with increased

financial literacy and more positive health-related behaviors (Peters, Hibbard, Slovic, & Dieckmann, 2007). Adults with limited numeracy skills may encounter difficulty securing and maintaining fulltime employment, and their options for employment may be limited to lower paying jobs with little growth potential (Bynner & Parsons, 1997; Lane & Conlon, 2016).

Several math content areas apply to common aspects of postsecondary life. For example, most adults will need to understand exponential growth and interest to make sensible financial decisions, and algebra informs this understanding (Harackiewicz, Hyde, & Hulleman, , 2007). Calculating area (geometry) is useful when setting up and redecorating an apartment or home; understanding ratios and proportional relationships help in preparing meals (Molenda-Lesniak, Moya, & Shumow, 2019).

Mathematical practices such as *Make sense of problems and persevere in solving them* require students to identify potential solutions and think through steps to achieving them, a practice that can be used to solve problems in almost any context. Similarly, the mathematical practice requiring students to *Construct viable arguments and critique the reasoning of others* is applicable to critical thinking, in which an individual considers the argument of another, evaluates its foundations and logic, and asks questions to clarify or improve others' positions.

Science

Science has become increasingly important and is often grouped with other related subjects to form their own category of Science, Technology, Engineering, and Mathematics (STEM). Comparisons across recent standards reveal considerable overlap in defining science education for K–12 students. Common across the NGSS, TIMSS, and NAEP is the importance of physical science, life science, and earth and space science (NGSS Lead States, 2013; Centurino & Jones, 2019; NAGB, 2015). The NGSS and NAEP recognize the importance of engineering and technology, as well as cross-cutting concepts. The 2015 NAEP Science Framework defined four important science practices: identifying science principles, using science principles, using scientific inquiry, and using technological design.

To guide curriculum development, instruction, and assessment, Achieve—an independent, nonpartisan, nonprofit education reform organization—coordinated the NGSS Project (NGSS Lead States, 2013). The NGSS are three-dimensional and include (a) science practices, (b) disciplinary core ideas, and (c) crosscutting concepts. There are four main domains: physical science; life science; earth and space science; and engineering, technology, and applications of science. Within these domains are foundational content; and disciplinary core ideas (DCI), such as energy, ecosystems, hereditary characteristics, and engineering design.

Science teachers find students are better able to learn when they can see connections to the world around them and understand how things work (3M Young Scientist Challenge, 2013). This is not surprising because using evidence to support a claim is a hallmark of scientific practice. Adams (2017) demonstrates scientific argumentation transfers across disciplines.

Other Literacies

Skills used in applied settings, such as school or the workplace, draw on foundational academic knowledge and skills but require the individual to apply and use those skills in a specific context. These applied skills are literacies. Literacy Advance defined literacy as:

“...the ability to read, write, speak and listen, and use numeracy and technology, at a level that enables people to express and understand ideas and opinions, to make decisions and solve problems, to achieve their goals, and to participate fully in their community and in wider society. Achieving literacy is a lifelong learning process” (“Literacy Advance of Houston”, 2019).

The Organisation for Economic Co-operation & Development (OECD) succinctly describes the breadth of literacies as having adequate skills for today’s demands (Literacy Advance of Houston, 2019). Possessing literacies enables “individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society” (United Nations Educational Scientific and Cultural Organization, 2004, p. 13). To achieve goals and participate in community life, high school seniors on the cusp of adulthood should acquire the following four core literacies:

- Information and digital media literacy – ability to evaluate the accuracy and reliability of print and online information.
- Statistical literacy – ability to evaluate the accuracy and reliability of data.
- Civic literacy – participating in a democratic society.
- Financial literacy – understanding money and working toward financial independence.

Information and Digital Media Literacy

The exponential growth and instant availability of information on the Internet point to a need to critically evaluate content. Information literacy comprises information seeking, identifying research questions, answering research questions, and evaluating and using information (McPherson & Dubé, 2016). The Association of College and Research Libraries (ACRL) extends information literacy to include the use of information in creating new knowledge (ACRL, 2016). The Work Group on Information Competence (1995) developed a more focused definition: the ability to find, evaluate, use, and communicate information in all its various formats. iSkills, developed by the Educational Testing Service to assess information literacy, measures seven information communication skills in a technology rich environment: (a) define, (b) access, (c) evaluate, (d) manage, (e) integrate, (f) create, and (g) communicate (Flood, 2015).

It is important to identify and evaluate the best sources of information. Research indicates a need for digital media literacy to offer students a pathway to consider how media messages influence user perspectives (Fortuna, 2019; Johnson, Levine, Smith, & Haywood, 2010). Researchers have identified gaps in students’ ability to judge the quality of scientific claims (Brickman et al., 2012; Klucsevsek, K., 2017; Thiebach, M., Mayweg-paus, E., & Jucks, R., 2015). However, need for digital media literacy is not limited to science. Mertens and Hobbs (2015) studied the positive impact of high levels of digital media literacy on civic behavior. Media savvy students—those with higher levels of digital media knowledge—were more motivated to seek information, had more knowledge of digital sources, possessed stronger skills in analyzing the news, and held more positive attitudes toward civic engagement.

Statistical Literacy

Employers predict an increased demand for employees in all occupations who can (a) effectively use data, (b) understand how to visualize and manipulate data, and (c) draw conclusions from data (Brynjolfsson & McAfee, 2011). Access to new technology has further increased the importance of statistical literacy. Big data, artificial intelligence, and machine

learning play an increasing role in daily life. While these technologies will replace some existing human tasks, they are expected to create new occupations and skill requirements, all needing statistical literacy (Wilson, Daugherty, & Morini-Bianzino, 2017).

Statistical literacy is the ability to read and interpret data, and to use statistics as evidence in arguments (Schild, n.d.). Individuals need access to, and use of, data to make decisions, followed by a need for statistical reasoning skills which underlie all data-based decision-making. Being statistically literate gives people the tools to ask good questions and evaluate evidence to use to make better judgments and decisions (Schild, n.d.). While some basic numerical and statistical processes can be automated, citizens must understand concepts underlying statistical reasoning and terminology to interpret data, evaluate sources, and make decisions (Gal, 2002). Peter and Kellam (2013) describe a continuum of statistical skills, ranging from understanding basic statistical terms (e.g., percentage, average) to more advanced statistical methods and analyses. Wherever a person falls on the continuum, they should be able to locate relevant, quality statistics and think critically about data. Fox and Hendler (2011) add data visualization skills to the concept of statistical literacy to understand relationships in data.

Civic Literacy

Aware, informed, and engaged citizens are key to solving critical problems in communities across the nation (Rita Allen Foundation, 2019). “Working to make a difference in the civic life of one’s community” is civic engagement (Ehrlich, 2000, vi). In *Democracy in America* (1835), Alexis de Tocqueville opined the key to making democracy work is a willingness to participate in civic associations. Active and engaged citizens can identify and address social challenges as well as join others to shape society for the better (Fidan, 2015). Participation in formal and informal political processes help address community needs and seek to improve individual, group, and local quality of life. Bobek, Zaff, Li, and Lerner (2009) conceptualized four constructs of civic engagement: (a) civic action; (b) civic commitment; (c) civic skills; and (d) civic cohesion. These constructs generally encompass volunteering; a willingness to make positive contributions to society; involvement in civil society; and a sense of reciprocity, trust, and bonding to others.

Civic *literacy* is the ability to effectively participate in civic life by being informed of and understanding basic governmental processes (Hylton, 2018; Partnership for 21st Century Skills, 2009). Differentiating engagement from literacy highlights the importance of understanding rather than simply acting. The low levels of civic engagement and literacy over the past few decades (CIRCLE, 2019; Hylton, 2018; Shapiro and Brown, 2018) has led to increased attention on civic learning, primarily among youth and young adults. For example, the state of Florida passed a statute in 2017 requiring students entering a Florida state university to demonstrate competency in civic literacy (FLDOE, n.d.). In 2009, Justice Sandra Day O’Connor founded iCivics to offer practical, dynamic, and standards-aligned resources, including engaging games based on real-life problems, to reimagine civics education (iCivics, n.d.).

Civic engagement cannot emerge without civic literacy and vice versa. For example, exercising the right to vote is the quintessential interaction of civic engagement and literacy. Voting is the cornerstone of democracy and offers individuals the chance to influence their government. When individuals do not vote, democracy is less representative, which ultimately affects quality of life when elected officials pay less attention to important issues facing communities with low voter turnout.

There are other benefits to encouraging effective civic engagement. Voter participation is associated with better self-reported health (Kim, Kim, & You, 2015). Volunteers have better mental health (Jenkinson et al., 2013; Musick & Wilson, 2003) as well as lower risk for cardiovascular disease (Burr, Han, & Tavares, 2016) and cognitive impairment (Infurna, Okun, & Grimm, 2016). The goal of civic engagement, however, is not simply to increase engagement, but to increase how effectively citizens engage with their community and the democratic process.

Financial Literacy

The President’s Advisory Council on Financial Literacy defines personal financial literacy as “the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being” (President’s Advisory Council on Financial Literacy, 2008, p. 4). The Programme for International Student Assessment (PISA) defines financial literacy as “knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life” (PISA, 2015, p. 24). From a practical perspective, financial literacy is the knowledge and skills to make appropriate decisions about personal finance, including investing, insurance, real estate, budgeting, planning for retirement, and taxes (Investopedia, 2019).

According to the Financial Industry Regulatory Authority (FINRA), people who are financially literate tend to have emergency savings, handle credit cards responsibly, and save for retirement. Research shows that most individuals do not understand the concept of compound interest and lack money management and financial planning skills. Individuals with limited knowledge and understanding of finances may find themselves in severe debt (Mbazigwe, 2013). In a test of financial literacy, Valentine and Khayum (2005) found that high school students were not well prepared to manage their finances after graduation. The PISA assesses financial literacy of 15-year-olds around the world; students in the United States showed average knowledge compared to those in other countries (PISA, 2015). Adults do not fare much better (Farber, 2016; Pelletier, 2016), although the latest data from the National Financial Capability Study indicate slow improvement (Lin, Bumcrot, Ulicny, Lusardi, Mottola, Keiffer, & Walsh, 2016). According to the 2016 Consumer Financial Literacy Survey (Harris Poll, 2016), adults surveyed reported low levels of consumer knowledge and confidence in saving for the future. Some students and their parents demonstrate limited knowledge of access to financial aid for postsecondary education (Taylor, 2019). Nearly 900,000 Pell Grant-eligible high school graduates did not complete the Free Application for Federal Student Aid (FAFSA), leaving \$2.9 billion of grant funds unclaimed, indicating greater access to financial knowledge and literacy would benefit some low-income high school students (Sen-Gupta, 2015). The numerous websites designed to improve one’s financial literacy, such as Investopedia, Practical Money Skills, and Financial Literacy 101, are further testament to the need for students to gain a better understanding of personal finance issues.

Cross-Cutting Cognitive Skills

Skills and abilities that are useful across multiple domains are often referred to as cross-cutting skills. These are general cognitive skills that enable an individual to perform and succeed in a wide variety of contexts. The following reflect the crosscutting cognitive skills that are essential for postsecondary success:

- Problem solving – finding the solution to unique and/or complex problems.
- Judgment and decision-making – thinking about and making decisions.
- Creativity – generating novel ideas or products.
- Critical thinking – applying, analyzing, synthesizing, and/or evaluating information.

Problem Solving

Philosopher Karl Popper famously observed that *All Life Is Problem Solving* (Popper, 1999). A problem does not always have a negative connotation; it may simply be a question or proposition that needs to be considered. Problems may be personal (should I see a doctor?) interpersonal (how can I help my friend?), or practical (which phone should I buy?). Problems may be simple and well-defined with a clear solution or they may be complex and involve many possible courses of action with no guaranteed outcome (Fischer, Greiff, & Funke, 2012; Schraw, Dunkle, & Bendixen, 1995).

In an academic context, problems are frequently referred to as routine and nonroutine. Educators strive to help their students attain deep learning which they can then apply to nonroutine problems (Mayer, 1998). Demonstrating proficiency on academic content often requires students to apply their knowledge to identify appropriate solutions to novel problems (e.g., National Research Council, 2002).

Employers identify problem solving as one of the top skills they look for on candidates' resumes and consider problem solving to be essential for career readiness (Gray & Koncz, 2017). Workplace problem solving includes a range of skills, from resolving interpersonal conflicts that arise in increasingly collaborative work environments to anticipating and identifying complex problems and potential courses of action (Carnevale and Smith, 2013).

Problem-solving skills have broad implications for postsecondary life. Deficiencies in problem solving skills may lead to engaging in negative coping behaviors (Williams & Kleinfelter, 1989) or contribute to the development of depression (Nezu, 1989).

Judgment and Decision-making

Life consists of a series of decisions. Judgment refers to making a sound rationale or evaluation based on information. Decision-making is the willingness to act on a judgment, making a decision or taking a course of action. Judgment entails “considering the relative costs and benefits of potential actions to choose the most appropriate one” (National Center for O*NET Development, 2019, p.1). Judgment skills may be used to enhance problem solving skills (U.S. Department of Labor, n.d).

Young adults will choose among several possible postsecondary pathways, and good judgment and decision-making skills are key to this process. Academic advisors are trained to evaluate students' decision-making and provide tools to ensure students make the most appropriate choice (Gordon, 2007). Sound judgment is increasingly valued if students seek entry into advanced degree programs. For example, requirements for admission into medical and dental schools may include performance on situational judgment tests (SJTs), which present hypothetical scenarios and ask respondents to select among several possible decisions (Lievens, Buyse, & Sackett, 2005).

Managers recognize the importance of evaluating judgment skills during the hiring process (Larson Marketing & Communications, 2017). Similarly, “ethical judgment and decision-making”

has been rated among the top learning outcomes identified by employers as very important (Hart Research Associates, 2015, p. 4). Judgment and decision-making skills will be necessary as more jobs require independent decision-making (Heerwagen, Kelly, & Kampschroer, 2016). Judgment is arguably one of the skills that cannot be replaced by automation (Johnson, 2018). Relationship building has been tied to improved decision-making, and problem solving and collaboration are several methods that may be used to make decisions (Pauleen, 2004).

Creativity

Creativity is the ability to produce original work that is useful for some purpose (Sternberg & Lubart, 1998). Boden (2003) builds upon this definition of creativity as the ability to come up with ideas or artifacts that are novel and valuable. Similarly, Mumford (2003) describes creativity as producing something that is new and useful. Creativity has been conceptualized in a variety of ways, from a personality trait (Barron & Harrington, 1981), to an occasionally experienced state that is at least in part attributable to circumstances (Harnad, 2007). Creativity may be nurtured by providing opportunities to generate new thoughts and ideas (Renzulli, 2017). Creativity tends to decline over time (Gopnik & Griffiths, 2017), unless individuals continue to engage in creativity-enhancing activities (Smith, 2012).

Creativity is a skill often identified as important in the rapidly changing world of work, as it is a capability that machines do not possess. Brynjolfsson and McAfee (2011) suggest the combination of current economic trends, specifically job growth trends and wage stagnation at the median range, provide opportunities for creative entrepreneurs. U.S. CEOs are also looking for employees with creativity (Ryan, Sapin, Rao, & Ampil, 2018). Similarly, top universities place great value on applicants' creative sensibilities (Vendler, 2019).

Creativity has benefits at the individual and group levels. Engaging in creative artistic expression is linked with positive health effects (Stuckey & Nobel, 2010), and creativity is consistently and positively correlated with academic achievement (Gajda, Karwowski, & Beghetto, 2017). Organizations can benefit from the increased productivity, sense of empowerment, and motivation that members experience when individual creativity is encouraged and supported (Jones, 2014).

Critical Thinking

Critical thinking has been defined as “purposeful, reflective judgment which manifests itself in reasoned consideration of evidence, context, methods, standards, and conceptualizations in deciding what to believe or what to do” (Facione, 2015, p. 23). In addition to making evaluative judgments, critical thinking is distinct from other cognitive skills because it includes active problem solving (McPeck, 2016).

Critical thinking may be inspired at a young age through activities such as guided philosophical dialogue (Daniel & Auriac, 2011) or by building opportunities into simple, everyday activities for children to engage in reasoning (Aizikovitsh-Udi & Cheng, 2015). Educators are encouraged to further support development of critical thinking by offering students regular opportunities for practicing critical thinking skills in an environment that appreciates and promotes intellectual values (Kuhn, 1999).

Possessing critical thinking skills may mitigate the number of negative life events a person experiences by promoting effective decision-making (Butler, 2017). Postsecondary education institutions see the value of critical thinking for success in college and have expressed concerns

over the number of students who graduate high school without gaining proficiency in this skill (McCarthy, 2017). Similarly, job recruiters across the major industries have identified critical thinking skills among the less common, but more desired skills for business school graduates to possess (Levy & Cannon, 2016). In a future world of work characterized by expanding technology and artificial intelligence, humans' unique capacity for critical thinking will set them apart from machine learning algorithms (Barnett, Lawless, Kim, & Vista, 2017; Pistrui, 2018).

Learning Agility

Experts predict that workplace culture and processes will shift as well as career paths, including how people learn the necessary job skills needed to perform jobs of the future (Gribben, Becker, & Dickinson, 2018). Adapting to new business processes and unfamiliar assignments requires flexibility and learning agility. Individuals who respond with ease to new experiences and change are more effective than others, leading employers to seek employees who demonstrate learning agility (Kopoulos, n.d.).

Learning agility is the ability to incorporate new information quickly and includes multiple dimensions: flexibility, speed, experimenting, performance risk taking, interpersonal risk taking, collaborating, information gathering, feedback seeking, and reflecting (Hoff & Burke, 2017). Learning agility involves multiple skills, including adaptability (Mueller-Hanson, White, Dorsey, & Pulakos, 2005), communication, listening skills, tolerance for ambiguity (Eichinger & Lombardo, 2004), and the willingness to learn and seek out new experiences (Pico, 2018). DeMeuse, Dai, and Hallenbeck (2010) indicate that learning agility is related to previous experience, self-awareness, and the ability to handle complexity. High learning-agile people are focused, organized, driven, and methodical when completing tasks (Mitchinson & Morris, 2014).

Intrapersonal Skills

Young adults will need to manage and regulate themselves, including awareness of their strengths and abilities for achieving their goals, and an understanding of how to stay on a goal-oriented path even when faced with obstacles. Intrapersonal skills cover intellectual openness, work ethic, and conscientiousness. The following key intrapersonal skills are helpful for achieving goals in school, the workplace, or personal life:

- Perseverance – persisting in working toward a goal despite obstacles.
- Self-efficacy – believing in one's ability to achieve goals.
- Adaptability – adjusting to different or changing conditions.

Perseverance

Perseverance is a component of *grit*, a construct that is argued to play a key role in the achievement of long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007). Perseverance has relevance to all postsecondary pathways, as theory and research support its positive association with career success (e.g., Lamine, Mian, & Fayolle, 2014), college success (Ipek & Yonca, 2017) and success more generally (Howe, 1999).

Some research on the topic focuses on the personal costs that can be incurred when an individual perseveres in a task that is not in their best interest (e.g., Lucas, Gratch, Cheng, & Marsella, 2015). This implies that perseverance may need to be tempered in some scenarios or is most helpful when combined with specific attitudes or other personal characteristics.

Perseverance may be shaped by circumstances, targeted support, and interventions (DiMenichi & Richmond, 2014; SRI Education, 2018).

Self-Efficacy

Self-efficacy refers to one's perception of whether he or she can act effectively in a given situation (Bandura, 1982). Much research focuses on self-efficacy in specific contexts, such as academic, physical, or creative (Bong & Skaalvik, 2003; Perkins, Multhaup, Perkins, & Barton, 2008; Farmer & Tierney, 2017). Greater sense of self-efficacy has been found to be associated with greater life satisfaction (Azizli, Atkinson, Baughman, & Giammarco, 2015) and a greater likelihood of meeting life's changing demands (Benight & Cieslak, 2011). Self-efficacy develops through interpreting outcomes of personal experiences, outcomes of others' experiences, verbal and non-verbal messages received from others in social situations, and the physical and emotional states that one experiences (Pajares, 2005). Research indicates self-efficacy can be purposefully influenced through interventions (e.g., Mann, Smith, & Kristjansson, 2014; McNatt & Judge, 2008; Wittkowski, Dowling, & Smith, 2016).

Adaptability

Adaptability involves adjusting thinking, behavior, and emotions in response to uncertainty. Being adaptable facilitates thinking and acting effectively under pressure and supports appropriate adjustment of timelines and expectations when needed (National Institutes of Health, 2015). These characteristics are key to career success (O'Connell, McNeely, & Hall, 2008) and integral to the evolving career path an individual will take over the course of a working lifetime. As companies demand upskilling or reskilling, the adaptable employee is at an advantage. Bughin et al. (2018) stated "[we] are going to have to continue to adapt, get new skills ... learn how to learn and become very flexible and adaptable" (p. 2). Martin et al. (2013) found adaptability predicted students' positive academic and nonacademic outcomes. Adaptable students were more ambitious in their future plans, participated in class more, and enjoyed school. Students demonstrating adaptability were less likely to fail (Martin et al., 2015).

Interpersonal Skills

Youth entering the postsecondary world will need to understand and relate to others as they enter new educational and/or work contexts in an increasingly diverse world. Interpersonal skills, or social skills, require complex communication, teamwork, and collaboration. The following key interpersonal skills help individuals interact effectively with others:

- Communication – exchanging information.
- Collaboration – working with others to solve problems or generate products.
- Perspective taking – seeing another person's point of view.

Communication

Communication is, at its core, an exchange of information, whether linguistic or non-linguistic, and is widely considered a key competency in both postsecondary education and workplace contexts (Brink & Costigan, 2015). Effective communication, defined as the ability to synthesize and transmit ideas, is among the critical skills needed by members at all levels of organizations (American Management Association, 2012). Communication plays a major role in relationship building which benefits employees by developing trust, boosting morale, and improving decision-making (Pauleen, 2004).

Listening

Listening is the most important oral communication skill for successful job performance across a range of workforce samples (Brink & Costigan, 2015). Four categories of listening have been identified based on the amount of consideration given to the speaker by the listener, with active listening entailing the listener's full attention (Pearce, Johnson, & Barker, 2003). An active listener makes empathetic comments on what is being communicated, asks relevant questions, and summarizes what is being communicated to verify understanding (McNaughton, Hamlin, McCarthy, Head-Reeves, Schreiner, 2007). Active listening helps create a positive organizational culture and supports collaboration, which, in turn, spurs creativity and innovation (Nowogrodski, 2015).

Speaking

Speaking and listening are complementary skills (Macaulay, 2014). Skilled speakers are strategic about the information conveyed and taken away from interactions (Coplin, 2003).

Conversation among team members, whether virtual or face-to-face, will feature in future jobs (Gribben, Becker, & Dickinson, 2018). Executives and hiring managers seek employees with strong oral communication skills but find that such candidates are hard to find (Gewertz, 2018). Speaking with colleagues contributes to an organization's shared understandings, which may be critical for quick decision-making (Heidema, 2017). Those with strong speaking skills build a sense of community (Bouhnik & Marcus, 2006; Macaulay, 2014). Similarly, the ability to converse with college professors is key for building rapport that can lead to future references and recommendations (Holmes, 2014).

Collaboration

Collaboration is defined as the ability to engage effectively with two or more people to solve a problem through shared understanding and effort, and pooled knowledge and skills (Luckin, Baines, Cukurova, Holmes, & Mann, 2017). Within education, collaboration is increasingly important as a skill due to increases in project- and inquiry-based learning and to a need for students to apply their knowledge and skills outside the classroom (Child & Shaw, 2016). Collaborative problem solving was recently added to the skills measured by PISA, also a reflection of its significance as a desired skill.

Collaboration has been valued as a skill for centuries, though collaboration in the 21st century requires a more sophisticated set of skills (Dede, 2009). Jobs of the future will be characterized by increasing amounts of teamwork, thus being able to collaborate to solve problems will be a highly desired skill (Thompson, 2016). Collaboration will be key as increasingly complex problems will not be solved by one specific field of expertise, but with others from different disciplines (Davies, Fidler, & Gorbis, 2011). Managers will depend on employees to have the collaborative problem solving skills necessary for successful conflict negotiation (Bernstein & Ablon, 2011).

Perspective Taking

Perspective taking is the ability to take another person's point of view. It is an active and goal-directed process that involves trying to understand the thoughts and feelings of another, as well as the motivations behind them (Parker, Atkins, & Axtell, 2008). Cultural globalization requires sensitivity to work effectively alongside someone from a different cultural background who may

approach working together differently and hold different values (Sherman, 2018). For example, people from an individual-oriented culture may approach tasks differently than someone from a group-oriented culture (Heggertveit-Aoudia, 2012), which may influence behaviors such as how people participate in groups, the amount of time they spend socializing, and whether they provide feedback or otherwise publicly express opinions (Knight, 2015). Increased cultural sensitivity and perspective could help mitigate such differences.

Situational awareness and personal awareness are two key components of perspective-taking. Situational awareness is an understanding of the current state of the environment and refers to the ability to identify relevant parameters to inform future event predictions (Endsley, 1995). Personal awareness refers to understanding what the other person brings into that context (Goulston & Ullmen, 2013). Other building blocks of perspective taking include being aware of others, regulating one's emotions and empathy, being able to successfully read other people, and correctly interpreting what others are trying to communicate (Campbell, 2016). Perspective taking is positively linked to moral development, prosocial behavior, and student leadership (Dugan, Bohle, Woelker, & Cooney, 2014; Farrant, Devine, Maybery, & Fletcher, 2011). Teams with more perspective taking produced significantly more creative solutions, were more cooperative, and engaged in effective communication (Falk & Johnson, 1977).

Skills Indicators

As this conceptual framework is intended to provide the conceptual foundation for a data-driven dashboard, it is useful to begin to outline the measurability of the skill categories. The following section briefly discusses potential data sources, some specific, some more general with the intention of starting a conversation around what are the measurable indicators of the skills outlined in the framework.

Foundational Academic Skills

Foundational academic skills can be measured by various high-quality standardized and readily available assessments, most notably NAEP. NAEP administers reading and mathematics assessments to Grade 4, 8, and 12 students every other year and science less frequently (e.g., 2009, 2015). Indicators could include reporting categories or subject-matter domains measured on the various standardized assessments. One drawback to using NAEP indicators is that the Grade 12 assessment is voluntary. While NAEP grade 4 and 8 data in reading and mathematics are available at the state level, grade 12 data are not available for every state. However, reporting on both NAEP and state accountability assessment performance could provide valid indicators of academic readiness. Additional indicators could also include SAT or ACT performance, high school GPA, AP courses taken/scores, and Program for International Assessment of Adult Competencies (PIAAC) performance. International assessments measure reading (PIRLS) and mathematics and science (TIMSS).

Literacies

The United Nations Educational, Scientific and Cultural Organization (UNESCO) statistical office, UNESCO Institute for Statistics (UIS), reviewed the quality of 44 global digital literacy assessments and found that few met their standards requirements (Laanpere, 2019). Although the UIS focuses on defining a measure that will encompass a global definition of digital literacy, future research might be useful for students in the United States. ETS developed iSkills (now defunct), an interactive problem-based assessment to measure information and communications technology skills. Many measures of digital literacy administer self-report

instruments to gauge media or digital literacy. The ability to integrate and evaluate information could be measured by assessments aligned to the Reading Informational academic standards found in the Common Core State Standards and in many state content standards.

Several international assessments include literacy and financial literacy. PISA measures “reading literacy” and financial knowledge. PIAAC assesses literacy, numeracy, and financial literacy. Indicators for civic and financial literacy could come from knowledge tests and self-report measures. Civics indicators could include societal statistics, such as, voter registration and voter participation rates, as well as community service hours. The NAEP Civics assessment was most recently administered to grade 8 students in 2018. Additionally, researchers develop their own self-report measures to assess civic disposition and behaviors. Financial indicators could include societal statistics such as credit card analytics, and FAFSA completion rates. The National Financial Educators Council (NFEC) offers financial literacy assessments and PISA assessed 15-year olds’ financial knowledge in 2015.

Cross-Cutting Cognitive Skills, Intrapersonal Skills, and Interpersonal Skills

Although available standardized measures of cross-cutting cognitive, intrapersonal, and interpersonal skills are limited, there are several potential ways that this information could be captured. Cognitively complex items and performance tasks from academic assessments could serve as indicators of several cross-cutting skills. To measure intrapersonal skills such as self-efficacy, existing scales could be added to student surveys that are already administered in conjunction with academic assessments.

Ratings could be collected from educators on not only the strength of students’ cross-cutting cognitive skills, but also the extent to which they exhibit intrapersonal skills such as perseverance and adaptability and interpersonal skills such as communication and collaboration. In addition, statistics such as rates of participation in educational programs and activities designed to address intrapersonal skills such as self-efficacy and interpersonal skills such as collaboration and perspective are another potential data source.

Conclusion

This framework is intended to guide the collection and development of indicators of postsecondary skills. The transition after high school is not limited to a binary path of going to college or entering the workforce. Regardless of the path forward, attaining certain skills can help ease that progression to the next step. This framework is not confined to specific regions or stakeholders; it transcends the variation among states, jurisdictions, and districts in defining what constitutes preparedness. The next phase is to build an easily accessible dashboard with key indicators that will allow users to explore trends in postsecondary preparedness. As this framework underpins the upcoming dashboard’s structure, conversations can occur about some of the non-readily measurable skills pertinent for postsecondary success and can move the field toward more accurate and reliable measures².

² The Education Strategy Group mapped state career readiness measures in ESSA Plans providing a compendium of indicators for high school seniors. See http://edstrategy.org/wp-content/uploads/2017/12/Mapping_Career_Readiness_ESSA_Appendix_2017-2.pdf

Appendix: Skills Excluded from the Framework

In researching important skills applicable across postsecondary pathways, we identified some skills that, ultimately, we did not include. These are listed below with a rationale for why they are not included in the framework.

- Emotional intelligence/Social-emotional learning – Emotional intelligence is a frequently researched capability that is often targeted through social and emotional learning processes. The important aspects of these are incorporated in the intrapersonal skills and interpersonal skills included in the framework and thus not included separately.
- Character education/Ethics – Being ethical is important to being a valued member of society and is a component of good citizenship, so it is incorporated within civic literacy.
- Health literacy – Health literacy is the extent to which individuals are able to understand health-related information in order to make health-related decisions. We acknowledge the importance of maintaining healthy habits and taking care of oneself but consider health literacy to be an applied literacy that lies outside the scope of this framework.
- Transitional skills – Transitional skills are associated with choosing a path after high school and with the many associated future transitions such as job or career changes and additional education or training. Some college and career readiness frameworks include these skills, others do not. In this framework, we include decision-making, which is a hallmark of making the high school to postsecondary transition.
- STEM – There is much research on Science, Technology, Engineering, and Mathematics. This framework is designed to be relevant across college and career, college majors and occupations. Thus, the framework includes science and mathematics and touches on technology in information and digital media literacy. However, the framework does not include engineering, because it is a more occupation-specific skill.
- Innovation – Innovation is closely tied to creativity, collaboration, problem solving, and critical thinking. These related skills are included in the framework.
- Digital tools – The pace of change in technology and digital tools has been growing at an increasing rate. To guard against becoming outdated, the framework includes information and digital media literacy skills, but not skills tied specifically to digital tools.
- Computational thinking – Computational thinking, not synonymous with coding or programming skills, integrates mathematics, computer science, and knowledge in one or more subject areas to solve complex problems. This skill is more specialized than the focus of this framework.
- Cultural sensitivity – With increasing globalization, cultural sensitivity is important. The framework incorporates this skill in perspective taking.
- Time management – Time management is a narrowly-focused intrapersonal skill. The framework includes intrapersonal skills with broad applications and interrelationships with other skills, specifically perseverance, self-efficacy, and adaptability. Time management is incorporated, in part, in the more general intrapersonal skills included in the framework.

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