

College and Career Readiness: What Do We Mean?

A Proposed Framework

REVISED DRAFT VERSION 1.2: April 12, 2012

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*Brad Stam, ConnectEd and Svetlana Darche, WestEd
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*Brad Stam, ConnectEd
January 2012*

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INTRODUCTION

A nationwide consensus is developing that all U.S. students should graduate from high school “ready for college and career.” Though many have thought and written about the issue of college and career readiness, presently there is no clear, agreed-upon definition of what it means to be college and career ready. Although not intended to be a definitive statement of what college and career readiness means, this document takes a step toward a consensus definition.

We will set a clear goal: Every student should graduate from high school ready for college and a career, regardless of their income, race, ethnic or language background, or disability status.

President Barack Obama,
Blueprint for Reform

ConnectEd seeks to develop an operational definition of college and career readiness to help clarify specific outcomes for students participating in programs implementing the Linked Learning approach in California and across the nation. To do so, with the assistance of WestEd, we began by examining a variety of views informing the debate on what constitutes college and career readiness and the most commonly used definitions or indicators of preparation for success beyond high school from the past two decades. Sources included research summaries, policy and advocacy documents, and existing frameworks that address students’ long-term success in postsecondary education and future careers. The underlying premise of this document is that these varied perspectives reflect both diverse student educational needs and the diverse missions and priorities of different organizations. The aim is to arrive at a holistic and long-term view of student success, recognizing that ensuring this success would require solutions at multiple levels.

Though not intended to be exhaustive, this review includes current perspectives on college and career readiness based on the work of leading economists, educators, researchers, and policy organizations, such as Nobel Laureate James Heckman, the Education Policy Improvement Center (EPIC), the Partnership for 21st Century Skills, the Georgetown Center on Education and the Workforce, the Association for Career Technical Education, and many others. Existing frameworks we drew upon included:

- The California Career Technical Education (CTE) Model Curriculum Standards, Foundation Standards
- The Common Core State Standards
- Partnership for 21st Century Skills
- Association of American Colleges and Universities
- The Conference Board
- Skills highlighted in the work of Anthony Carnevale, Director, Georgetown University Center on Education and the Workforce

- The National Association of State Directors of Career Technical Education Essential Skill Statements
- The Secretary’s Commission on Achieving Necessary Skills (SCANS)
- Assessment and Teaching of 21st Century Skills (ATC21S)
- Equipped for the Future Work Readiness Skills
- National Career Development Guidelines
- Education Policy Improvement Center’s Four Dimensions of College and Career Readiness

Based on this review, we propose a framework — the **College and Career Readiness Framework** (Framework) — aimed at moving toward a consensus definition of readiness that can guide instruction and assessment in Linked Learning programs. We see this as an **equity strategy**; by getting clear about what all students should know and be able to do in order to succeed after high school, we empower students, families, teachers, and those who support them to more effectively align practice, structures, and systems to achieve that goal and close the equity gap.

The Framework focuses on four categories:

- **Knowledge**
- **Skills**
- **Productive Dispositions and Behaviors**
- **Educational, Career, and Civic Engagement**

We believe that these four categories are interrelated—in education and in life. And they are intended to capture convergence among the various perspectives on college and career readiness reviewed here. But we have separated them in the Framework to allow policymakers and educators to consider how best these categories can be combined to address the varied ways that students can be supported to achieve the societal goal of an educated, engaged, and productive adulthood for all young people.

We conclude by briefly discussing the **implications of this Framework for instruction, teacher preparation and development, and assessment** — the drivers of change in practice.

Appendices include an annotated version of the Framework, with descriptors and assessment options and a crosswalk of the knowledge, skills, dispositions and behaviors, and engagement areas in each of the existing frameworks we drew upon.

PERSPECTIVES ON THE PREPARATION OF YOUNG PEOPLE FOR THE FUTURE

College and career readiness for all students is a prominent focus of current debates about education reform and how to improve student achievement and long-term success. This renewed attention provides a propitious moment for those working to forge a clearer and more seamless integration of college and career preparation, particularly in view of economic globalization and increasingly rapid change in every sphere of life. But this idea is not a new one. Resnick and Wirt, for example, noted in 1996 that the United States faced “a moment of extraordinary opportunity in which business, labor, and educational leaders can set a new common course in which preparation for work and preparation for civic and personal life need no longer be in competition” (Resnick & Wirt, 1996, p. 10). Given the rise of new technologies, the globalization of industry, and persistent achievement gaps and unemployment rates, we can no longer afford to maintain traditional education dichotomies — between college and work, between academics and technical skills, and between cognitive skills and character. These divisions have proven unproductive; students need all of these. We must move with urgency toward a synthesis that will benefit both individuals and society.

The definition of “preparation for the future” has shifted over time, ranging over many dimensions, from academic preparedness to employment training to preparation for civic participation and lifelong learning. Despite this variation, many of these perspectives are necessarily interrelated, and all reflect the same vision: students’ successful transition to the various roles and responsibilities of adulthood.¹

This section provides a brief overview of various current perspectives on what constitutes preparation for college and career. As noted earlier, this review is not intended to be

Preparing All Students for Both College and Career

The failure of our educational system to prepare an educated and skilled citizenry is well documented. In 2010, the share of young people in the United States ages 16–24 who were employed in July was 48.9 percent, the lowest July rate on record since data were first collected in 1948 (U.S. Census, 2010). The Georgetown University Center on Education and the Workforce projects a shortfall of at least 3 million postsecondary degrees, associate’s degrees or higher, by 2018, with an additional need for 4.7 million new workers with postsecondary certificates (Carnevale, Smith, & Strohl, 2010). At the same time, baby boomers are beginning to retire, taking their expertise with them and making way for the younger generation to pick up the mantle and contribute to the economy.

¹ Carnevale argues that education plays a broader role than just preparing students for the workforce because “the inescapable reality is that ours is a society based on work. Those who are not equipped with the knowledge and skills necessary to get and keep good jobs are denied full social inclusion and tend to drop out of the mainstream culture, polity, and economy.” He notes that if educators also do not help young people to become successful workers, they will fail to fulfill “their cultural and political missions to create good neighbors and good citizens” (Carnevale 2007).

exhaustive, but to highlight the views and major common themes current in the national conversation about college and career readiness. Our aim is to begin constructing a comprehensive definition of readiness — one that affords students the opportunity to successfully transition to adulthood.

Academic Content and Skills

Nearly every existing framework highlights the importance of academic knowledge and skills as foundational to students’ future success. The National Assessment Governing Board (NAGB), which oversees administration of the National Assessment of Educational Progress (NAEP), focuses on academic preparation for college and the workplace, as follows:

For college, academic preparedness refers to the reading and mathematics knowledge and skills necessary to qualify for placement into entry-level college credit courses that meet general education requirements without the need for remedial coursework.

For the workplace, academic preparedness refers to the reading and mathematics knowledge and skills needed to qualify for job training; it does not necessarily mean that the qualifications to be hired for a job have been met (NAGB, n.d.).

NAGB seeks to encourage research that will illuminate college and workforce preparedness and currently is conducting a variety of research projects to determine what NAEP scores would be necessary for entry into various kinds of postsecondary institutions and workforce training in five occupations. NAGB emphasizes “reading and mathematics academic skills” and does not intend its preparedness reporting to be “the single, authoritative definition of preparedness.” NAGB’s focus on academics is deliberate:

Several national conversations include capabilities beyond academics when addressing preparedness and readiness. NAEP measures academic aspects of student achievement, and it is important to clearly communicate this focus of NAEP preparedness research to avoid misrepresentation and overstatement (NAGB, 2009, p. iii).

The Common Core State Standards (CCSS) for English language arts and mathematics, developed by the National Governors Association and Council of Chief State School Officers (CCSSO) and adopted by California in 2010, also emphasize academic content and skills. These standards are intended to define the knowledge and skills students should acquire during their K–12 education to enable them to graduate from high school ready “to succeed in entry-level, credit-bearing academic college courses and in workforce training programs” (CDE, 2010).

Other perspectives on academic preparedness include a movement called “deeper learning,” championed by the Hewlett Foundation. This approach calls for an emphasis on applying

knowledge in addition to mastering core content, and promotes skills such as critical thinking and problem solving, collaboration, communication and “learning how to learn” (Alliance for Excellent Education, 2011; Chow, 2010). Researcher David Conley of the Educational Policy Improvement Center (EPIC) has used the term “cognitive strategies” to represent the key cognitive skills needed in addition to academic content. These include problem formulation, research, interpretation, communication, and precision and accuracy. In their College Readiness Indicator Systems (CRIS) being developed with support from the Bill & Melinda Gates Foundation, the John W. Gardner Center for Youth and Their Communities at Stanford University and the Annenberg Institute for School Reform at Brown University also connect cognitive strategies with content knowledge as a basis for academic preparedness.

While nearly all college and career frameworks list academic knowledge and skills as necessary to preparation for both postsecondary education and careers, many believe that academic knowledge and skills are not sufficient to ensure preparation for career success. For example, a comparison between the CCSS and the Essential Knowledge and Skill Statements, the career technical education (CTE) standards set by the National Association of State Directors of CTE Consortium (NASDCTEc, 2008) found that many skill statements align with the CCSS. NASDCTEc found, however, that the CCSS did not “fully address the critical ‘career’ component of a student’s overall experience” (NASDCTEc, n.d.). Perspectives regarding the wide range of content and skills needed for college and career readiness and success are presented below.

21st Century Content and Skills

In 1990, growing concern about student preparation for the workplace in light of increasing global competition and the growth of technology resulted in the formation of the Secretary’s Commission on Achieving Necessary Skills (SCANS). The fundamental purpose of SCANS was to promote “a high-performance economy characterized by high-skill, high-wage employment” (DOL, n.d.). Noting that globalization and the explosion in technology “have barely been reflected in how we prepare young people for work,” SCANS urged schools and employers to do a better job with preparedness: “Unless they do, neither our schools, our students, nor our businesses can prosper” (SCANS, 1991, p. viii).

Murnane and Levy (1996) outlined skills for the 21st-century workforce in *The New Basic Skills*. These include the ability to read and do math at the ninth-grade level or higher and four new “soft skills.” The latter include the ability to solve semistructured problems for which hypotheses must be formed and tested; the ability to work in groups with persons of various backgrounds; the ability to communicate effectively orally and in writing; and the ability to use personal computers to carry out simple tasks like word processing.

In 2002, the Partnership for 21st Century Skills (P21) was formed through the efforts of the U.S. Department of Education, the National Education Association, and several corporations, most of which, such as Microsoft, Cisco, and Apple, were in the information technology industry. P21

urged students to attain a broad range of skills, including core academic competencies and many “learning and innovation skills,” including critical thinking and problem solving, creativity and innovation, communication, and collaboration, to enable them to compete in an increasingly global economy.

In 2003, Autor, Levy, and Murnane warned about the exportation of jobs performed more economically through computerization and argued for the importance of skills such as “flexibility, creativity, generalized problem-solving capabilities, and complex communications” that would enable workers to perform “complementary” and “non-routine tasks.”

The NASDCTEc Essential Knowledge and Skill Statements include a similar list of skills among their essential topics: communications, problem solving and critical thinking, information technology applications, safety, health and environmental, leadership and teamwork, ethics and legal responsibilities, and employability and career development.

Assessment and Teaching of 21st Century Skills (ATC21S), an international project supported by Microsoft, Intel, and Cisco, recently prepared a series of white papers discussing the multitude of skills needed for the future workplace, including the knowledge, skills, and “attitudes, values, and ethics” needed in each of 10 areas, recognizing that the full array of individual capacities that lead to success in the workplace. The project emphasizes that, although many of these skills have always been important, the 21st century workplace now requires that *all* workers have these skills (Scardamalia, Bransford, Kozma, and Quellmalz, 2010). According to Rotherham and Willingham, “What’s actually new is the extent to which changes in our economy and the world mean that collective and individual success depends on having such skills. ... If we are to have a more equitable and effective public education system, skills that have been the province of the few must become universal” (Rotherham & Willingham, 2008).

Further, workers must be able to work creatively with knowledge itself, as described in the ATC21S White Papers: “Creative work with knowledge — with conceptual artifacts (Bereiter, 2002) — must advance along with work with material artifacts. Knowledge work binds hard and soft skills together” (Scardamalia et al., 2010, p. 211).

Proponents of 21st century skills include a variety of cross-disciplinary themes and traditional academic subjects within the content domain. P21, for example, includes “21st century themes” such as “**global awareness, financial, economic, business and entrepreneurial literacy, civic literacy, and health and environmental literacy**” (P21 website). ATC21S refers to “citizenship — local and global” (Binkley, Erstad, Herman, Raizen, Ripley, & Rumble, 2010). With expanded globalization and interdependence (UN, n.d.) global awareness — and global citizenship — have become increasingly important. These themes are considered critical to students’ understanding of the world they are entering, and they “promote understanding of academic content at much higher levels by weaving 21st-century interdisciplinary themes into core subjects” (P21, 2009).

Technical Content and Skills

Career technical educators have been consistent champions of the SCANS “employability” and “21st century” skills primarily in the context of CTE courses and pathways. In addition, they have focused on career-related content and technical skills increasingly integrated with academic content and skills within the 16 federally identified industry sectors or “career clusters.”

Technical skill attainment is measured by students’ receipt of industry-validated credentials or related measures allowed by the *Carl D. Perkins Career and Technical Education Improvement Act of 2006*. California measures technical skill attainment by grades attained in CTE courses aligned with industry-recognized standards, including the California CTE Model Curriculum Standards (CDE, 2008, p. 211).

Through its States’ Career Cluster Initiative, NASDCTEc has developed Essential Knowledge and Skill Statements organized into 10 Essential Topics. These cover a broad range of skills, including academic, technical, and employability skills, that should be demonstrated in the context of any given cluster and pathway. Technical skills are elaborated in detail for pathways in each of the 16 career clusters, ranging from the fields of Agriculture, Food, and Natural Resources to Transportation, Distribution, and Logistics.

Labor market demand has traditionally driven the development of students’ technical skills. In recent years, economists have underscored the continuing importance of technical skills for “middle-skill” jobs — those requiring more than a high school diploma but less than a four-year college degree, including employer-based training and CTE offered through community colleges and private training institutions. In *America’s Forgotten Middle-Skill Jobs: Education and Training Requirements in the Next Decade and Beyond*, Holzer and Lerman conclude that Bureau of Labor Statistics projections indicate “robust” future demand for mid-level skills, “with jobs requiring postsecondary education or at least moderate-term training growing substantially over the next decade.” They argue that “Demands for skilled labor in construction, health care, computer use, transportation, and elsewhere are projected to grow at above-average rates. Replacement needs for retiring workers will also be strong, generating even more job openings in the middle than the top of the skills spectrum” (Holzer & Lerman, 2007, p. 29).

In addition, several scholars and researchers have highlighted the value of technical skills as a means to cognitive development (Rose, 2006; Wilson, 1998). For example, Rose calls for a “turning of the epistemological tables by articulating the substantial cognitive potential of the world of work — as Dewey and Whitehead did long ago.” He argues that some of the cognitive skills that can be fostered by good CTE include:

- Acuity in perception and observation;
- Ability to attend and remember;
- Planning and prioritizing tasks;
- Increased ability to solve both routine and non-routine problems;
- Analytical reasoning skills;

- Ability to use and communicate with a variety of symbols, including mathematical symbols;
- Applying mathematics to support planning, troubleshooting, and problem-solving;
- Using writing to aid learning and task completion;
- Using a variety of reading strategies; and
- Reflecting on one's own actions and modifying them to improve task performance and avoid injury or error (Rose, 2006).

Unlike most academic skills, technical skills involve the use of tools. According to Resnick (1987), using tools allows those of limited education to participate in “cognitively complex activity systems,” while also “enhancing the capacity of highly educated people well beyond what they could do independently.” **In other words, while technical skill development has been seen as a means to career preparation, offered primarily to CTE students, it is also a means to cognitive development that can benefit all students.**

Transferable Skills and Productive Dispositions and Behaviors

While technical skills are important, researchers such as Carnevale underscore the importance of general competencies over specific occupational skills: “While specific skills have greater short-term economic value, more general skills have greater long-term value. General competency leavens all subsequent learning and practical experience” (Carnevale, 2008).

The Organisation for Economic Co-operation and Development (OECD), an international research and policy organization that administers the Programme for International Student Assessment (PISA), has confirmed the importance of generic transferable skills for students entering employment at all levels:

In sectors facing rapid technological change, the ability to learn is crucial and generic skills are highly valued by employers (Smits, 2007; Ghost, 2002). Labour markets change rapidly and often unpredictably, so skills like literacy that assist the acquisition of new skills are particularly valuable in the long run (Kézdi, 2006). In low-technology industries and at lower skill levels, generic competencies may be less valued by employers, but workers need to be able to switch jobs, since they are precisely the ones at risk of job loss due to diminishing job opportunities (Smits, 2007) (OEDC, 2009, p. 41).

Broad agreement exists that among the generic transferable skills critical for success in both education and careers are a group of noncognitive, or social-emotional, skills. This cluster of abilities and skills has acquired various labels over time, but in this document we refer to them as “productive behaviors and dispositions.” While these are often subsumed within 21st century skills, many existing frameworks identify them separately.

Conley, for example, identifies “Key Learning Skills and Strategies” as a critical category of skills and behaviors, separate from content knowledge and cognitive strategies. These include self-awareness, time management, goal setting, study skills, persistence, collaborative learning, student ownership of learning, and retention of factual information (Conley, 2011). Similarly, the CRIS framework being developed by the John W. Gardner Center and the Annenberg Institute for School Reform highlights “academic tenacity” as a critical dimension of success. CRIS defines academic tenacity as “the underlying beliefs and attitudes (such as motivation and aspiration) and accompanying academic behaviors that drive student achievement” (CRIS, 2011).

The National Research Council has underscored the distinct importance of these sets of skills in the workplace and in civic life. According to NRC, 21st century skills include both “interpersonal” skills (complex communication, social skills, teamwork, cultural sensitivity, dealing with diversity), and “intrapersonal” skills (self-management, time management, self-development, self-regulation, adaptability, executive functioning), in addition to the “cognitive” skills of non-routine problem solving, critical thinking, systems thinking (NRC, 2011).²

Sagar, an expert in measurement and the analysis of jobs, speaking at a National Research Council workshop on future skill demands, noted the need to “develop the skills required to enter the workforce, including adequate levels of oral and written communication, interpersonal skills, and conscientiousness.” He warned that “because many people lack these skills and opportunities to develop them, they have trouble obtaining work and may become dependent on welfare,” adding that society clearly “needs to address this second skill demand problem” (NRC, 2008, p. 87).

Research and scholarship on noncognitive skills have suggested that, for many students, these skills may be better predictors of long-term success than academic skills (Lerman, 2008; Deke & Haimson, 2006; Sedlacek, 2008; Kyllonen, 2009). According to economist Robert Lerman, a study by Heckman, Stixrud, and Urzua (2006) of the schooling and job market experience of a national sample of young workers as they age from 14 through 30 found that, “except for college graduates, noncognitive skills (as measured by indices of locus of control and self-esteem) exert at least as high and probably a higher impact on job market outcomes than do cognitive skills (word knowledge, paragraph comprehension, arithmetic reasoning, mathematical knowledge, and coding speed, as measured by the Armed Forces Vocational Aptitude Battery). Using another major data set, the National Education Longitudinal Study (NELS), Deke and Haimson (2006) develop evidence reinforcing the importance of nonacademic competencies, such as work habits, leadership skills, teamwork and other sports-related skills, and attitudes about whether luck or effort determines success in life. They found that for two-

² NRC conference participants pointed out, however, that all skills required cognition: “It is impossible to perform skills such as collaboration, complex communication, or self-regulation without using cognition” (NRC, 2011, p. 109).

thirds of all high school students, a nonacademic skill is most predictive of earnings (Lerman, 2008, pp. 26–27).

Research on social-emotional learning also has shown benefits for students. The literature highlights the importance of self-awareness, self-management, social awareness, relationship skills, and responsible decision making and indicates that programs designed to strengthen these competencies enhance academic attainment, attitudes, and behaviors (Durlak et al., 2011).

Navigating Education, Career, and Civic Life Beyond High School

To be able to exercise their various sets of skills, schools must provide students with the opportunities and knowledge about how to engage with and navigate the institutions and communities they will enter after high school. In other words, they need access to “social capital.” Stanton-Salazar defines social capital as resources and social support embedded in an individual’s network or associations and accessible through direct or indirect ties with “institutional agents.” Institutional agents are “high-status, non-kin, agents who occupy relatively high positions in the multiple dimensional stratification system, and who are well positioned to provide key forms of social and institutional support to youth,” including both resources and empowerment (Stanton-Salazar, 2010, p. 2). Social capital in the domains of postsecondary education, career, and civic life gives students access to information and relationships that can make the difference between success and failure in their encounters with college, employment, and civic institutions. This is particularly true for young people who are the first in their families to go to college, choose a career, or engage in political activity.

Recent research on postsecondary educational success has demonstrated the need for students to have direct access to, and familiarity with, resources, new processes, and new environments if they are to succeed in education beyond high school. Conley has found that students sometimes fail in college due not only to a lack of academic skills, but also to a lack of contextual knowledge (also called “college knowledge”) about the college experience itself (Conley, 2009). This includes understanding admission requirements and college types and missions; knowing how to obtain financial aid; understanding college culture; addressing social/identity issues in making the transition; and understanding how to interact with professors and study groups. The CRIS framework also highlights the importance of college knowledge, combining this with academic preparedness and academic tenacity as keys to college success. College knowledge includes “the knowledge base and contextual skills that enable students to successfully access college and move along through the system once they arrive” (CRIS, 2011).

Promoting the development of career management skills is the central focus of the career development field. In California, the California Career Resource Network (CalCRN) encourages adherence to the National Career Development Guidelines and promotes the use of numerous tools and resources to encourage students’ career awareness and exploration. CalCRN and other

career development organizations have articulated specific career management skills. These include awareness of one's own skills and interests; research, resume-writing, interviewing, and other job-seeking strategies; presentation skills; and flexibility and various interpersonal skills. Career management also involves making meaningful connections with potential employers, both during initial informational interviews and throughout one's career. Besides supporting long-term career success, participation in well-designed, academically integrated career development programs has been shown to improve student engagement and academic attainment (Hooley et al., 2011).

Similarly, CTE, youth development organizations, and many champions of work-based learning have cited career exploration, familiarity with the workplace and workplace culture, and building social networks as key goals of work-based learning and work experience (Bailey, Hughes, & Moore, 2004; Darche, Nayar, & Bracco, 2009; Symonds, Schwartz, & Ferguson, 2011).

Labor economists also have argued that students must be able to identify their interests and manage their own careers to adapt to fast-changing workplace environments (OECD, 2009; NRC, 2008). At the National Research Council workshop on Research on Future Skill Demands, Peter Cappelli, professor of management at the University of Pennsylvania Wharton School, argued that “employees today must manage their own careers, in contrast to the ‘organization man’ of the 1950s...Employees must learn to market themselves, and one who tries to simply fit in will have little chance of promotion” (NRC, 2008, p. 89).

Skills enabling students to participate meaningfully in civic life also are critical to success in adulthood. In *The Mission of the High School: A New Consensus of the Purposes of Public Education?* Barton and Coley argue that civic engagement has dropped significantly in the last four decades. For example, UCLA surveys of matriculating freshman each year since the mid-1960s show that every key indicator of political engagement has fallen at least by half. Only 26 percent think keeping up with politics is important, down from 56 percent in 1966, and only 14 percent say they discuss politics, down from 30 percent. The authors warn of a “serious threat to the health of our democracy” (Barton & Coley, 2011, p. 38).

Civic learning, defined as “that which enables students to respond to social, environmental and economic challenges at local, national and global levels,” is also one of five key learning outcomes or “areas of learning” in the Lumina Foundation Degree Profile. The Degree Profile — or qualifications framework — illustrates what students should be expected to know and be able to do once they earn their degrees — at any level. This Degree Profile highlights five learning areas and proposes specific learning outcomes at the associate's, bachelor's, and master's degree levels. The five learning areas include Specialized Knowledge, Broad Integrative Knowledge, Intellectual Skills, Applied Learning, and Civic Learning (Lumina Foundation website, n.d.).

A Meeting of the Minds

As described above, academic preparation for college and career has been defined by the CCSS and NAEP as the knowledge and skills students should have to graduate from high school prepared to succeed, without remediation, in entry-level, credit-bearing academic college courses and in workforce training programs. The opportunity to acquire additional knowledge and skills, however, is needed for success.

Based on our review we have distilled a core list of the knowledge, skills, dispositions and behaviors, and engagement strategies cited as critical for student success in postsecondary education, careers, and civic life. The sources for these lists are presented in Appendix B and the references.

From our analysis, three critical domains of preparation emerged: the academic, 21st century, and career and technical domains, each encompassing both knowledge and skills.

“Knowledge” encompasses core academic content knowledge, cross-cutting “21st century themes” and career and technical knowledge. While knowledge is inherently valuable, it also provides the context for skill development.

Knowledge and skills are intertwined — and, in fact, cannot be taught separately. ATC21S does not list content knowledge as a separate prerequisite for readiness, but rather includes knowledge as a component of each of the 10 skill areas (Binkley et al., 2010, pp. 13–33). Content or “domain knowledge” is considered a context for learning and assessing 21st century skills, not a focus in itself (Scardamalia et al., 2010). This applies to both academic and career-related knowledge. According to Carnevale, for example, **21st century skills, such as critical thinking and problem solving, are best learned through career-related examples and in real-world settings.** Psychometricians have demonstrated that students do best when working on problems directly related to their subject matter (Carnevale, personal communication, June 20, 2011). At a National Research Council workshop on Research on Future Skill Demands, Susan Trainman of the Business Roundtable expressed a similar view, noting that the standards movement placed great emphasis on content and less emphasis on soft skills. She called for teaching both content and skills simultaneously (NRC, 2008, p. 80).

At the same time, clustering content knowledge and skills separately is a useful way of categorizing the material for standards and curriculum development (Martin Ripley, ATC21S, personal communication, May 25, 2011). This approach also enables us to transcend the traditional divisions among domains — and their respective constituencies — and focus rather on the knowledge and skills that benefit all students.

Decoupling knowledge and skills also facilitates interdisciplinary teaching practices, as discussed below, allowing for more intentional use of content from one domain as context for teaching skills in another, or skills from one domain to teach content in another.

Productive dispositions and behaviors are also needed in all domains. Our review has revealed that, while these are sometimes combined with skills such as critical thinking or included within “soft skills,” “employability” skills, or “life and career” skills, productive dispositions and behaviors merit separate attention. They usually are not addressed explicitly in curriculum, as critical thinking might be, and often are learned outside of classrooms (Resnick, 1987; Wilson-Ahlstrom, Yohalem, DuBois, & Ji, 2011). But they are considered extremely important. Indeed, research indicates that instruction must mix “context specificity and generality,” as well as include the development of “self-regulatory and performance control strategies” (Raizen, 1989, p. 55). Within the category of productive dispositions and behaviors, self-concepts such as self-esteem and self-efficacy are different from self-management, which includes the ability to set goals and manage one’s time (NRC, 2011; Conley, 2011). Similarly self-management is different from effective organizational behaviors, as reflected in the National Research Council differentiation of interpersonal from intrapersonal skills (NRC, 2011).

The navigation skills associated with education, career, and civic engagement are also distinct from other nonacademic or behavioral competencies. They encompass the practical skills needed to navigate college campuses, workplaces, and civic institutions and to manage one’s future educational and career development and engagement with democratic processes. While they include both knowledge (i.e., about college or career management) and skills (i.e., filling out a financial aid application), these are rarely taught systematically and require their own spotlight, as provided by David Conley (2011) in *Four Keys to College and Career Readiness: Key Transition Skills and Strategies*.

This brief review demonstrates increasing convergence of views that a “both/and” approach is needed to identify the knowledge and skills essential for college and career readiness.

Academics must be integrated with other knowledge and skills, such as the 21st century skills of being able to work with and create knowledge and “learning to learn.” Various productive dispositions and behaviors also are important. CTE can not only prepare students for immediate employment, but also teach them such important skills as teamwork, communication, and critical thinking, along with content skills in mathematics, writing, and other subjects. Students should be exposed to and be familiar with a variety of postsecondary settings and processes, spanning college, workplace, and community settings, and the self-knowledge and navigational skills to enter and succeed in all three — immediately after high school and throughout their adult lives.

This developing consensus is exemplified in a recent document published jointly by NASDCTEc, the Association for Career Technical Education (ACTE), and P21 entitled *Up to the Challenge: The Role of Career and Technical Education and 21st Century Skills in College and Career Readiness*. The report, which addresses “the growing skills deficit in the United States,” calls for breaking down “the silos between academic, CTE and 21st century education initiatives, programs and teachers” and arriving at a “unified vision of college and career readiness.”

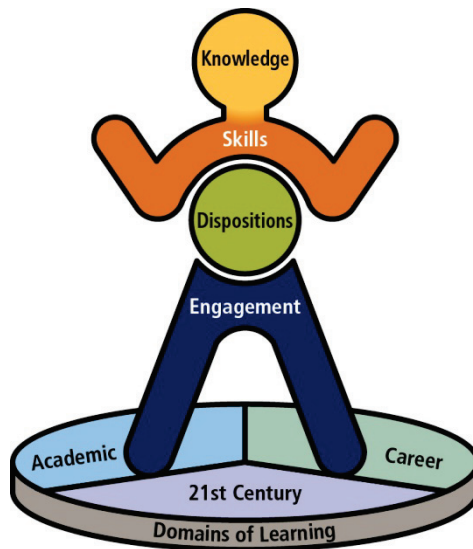
We propose such a unified vision below — including the full array of knowledge, skills, and behaviors and dispositions that give all students the ability to succeed beyond high school.

A FRAMEWORK FOR DEFINING COLLEGE AND CAREER READINESS

The Framework and a graphic illustration of its most salient features are presented below. It reflects the following principles:

- A variety of knowledge, skills, dispositions and behaviors, and educational, career, and civic engagement abilities are needed for all students to be ready for their endeavors beyond high school.
- Organizing our thinking into these four categories, rather than into the domains of “academic,” “21st century,” and “career and technical” knowledge and skills, allows us to transcend the traditional domain-driven divisions among disciplines and constituencies, and particularly to transcend our traditional categorization of students; rather we suggest that all students have access to knowledge and skills in all domains.
- Distinguishing among knowledge, skills, and dispositions and behaviors, as well as educational, career, and civic engagement enables practitioners to intentionally explore options for developing interdisciplinary curricula and instructional approaches. Knowledge and skills must be taught together, but can be integrated across domains in ways that meet varying curricular objectives and student needs.
- “21st century” knowledge and skills are highlighted, even though they are often already embedded in high-quality academic and CTE programs. We do this to spotlight their importance and to acknowledge a growing constituency that has championed development of cross-disciplinary knowledge and skills such as global awareness, and critical thinking and creativity, irrespective of the courses within which they are taught.
- Productive dispositions and behaviors are also best learned through experiences in various courses. In addition, they are learned through work-based experiences and in many extra-curricular settings, such as afterschool programs, athletics, and clubs. They serve as facilitators — and often engines — of learning. For this reason, while they may be difficult to measure, they deserve their own spotlight.
- Educational, career, and civic engagement is included as a separate category in acknowledgement that all students, including those who are first in their families to go to college, first to work in the United States, or first to vote, should learn how to navigate the world beyond high school. Indeed, in this rapidly changing world, all young people should learn strategies to effectively manage their own educational and career development over time and to participate fully in civic life.

College and Career Readiness Framework



I. Knowledge

- A. Core subject-area content
- B. 21st century knowledge: global, civic, environmental, financial, health, and media literacy
- C. Career-related and technical knowledge: knowledge about a broad industry sector and associated technical content and college majors

II. Skills

- A. Academic skills in core disciplines
- B. 21st Century skills
 - 1. Metacognition and knowing how to learn
 - 2. Creativity and innovation
 - 3. Critical thinking and problem solving
 - 4. Systems thinking
 - 5. Communication: listening, speaking, writing, and nonverbal communication
 - 6. Collaboration and working with diversity
 - 7. Information management and digital media applications
- C. Technical skills: technical skill in at least one career area of interest

III. Productive Dispositions and Behaviors

- A. Productive self-concept: self-knowledge, self-esteem, self-efficacy
- B. Self-management: goal setting, time management, study skills, precision and accuracy, persistence, initiative/self-direction, resourcefulness, and task completion
- C. Effective organizational and social behavior: leadership, flexibility/adaptability, responsibility, and ethics

IV. Educational, Career, and Civic Engagement

- A. Engaging in and navigating the world of higher education
- B. Engaging in and navigating the world of work
- C. Engaging in and navigating civic life

IMPLICATIONS FOR CURRICULUM AND INSTRUCTION, ASSESSMENT, AND TEACHER PREPARATION

Implementation of the framework that we have proposed will require new curriculum and instructional strategies, new assessments, and new teacher preparation and professional development. ConnectEd promotes Linked Learning as a transformational approach that moves beyond past dichotomies in education to ensure that all students are ready for both postsecondary education and successful entry into careers.³

The Need for New, Integrated Curriculum and Instruction

The Framework promotes integration of curricula within and across domains, enabling rich and meaningful student learning and preparation for postsecondary education and careers. Curriculum integration means bringing together various fields of content knowledge and skills around a common theme to reveal connections and facilitate learning. Linked Learning promotes career pathways that include rigorous academics, rigorous CTE, work-based experiences and student support services to ensure that students succeed. Pathways are intentionally designed to offer integrated learning experiences — connecting academic learning with technical skills and real-world applications in the context of students' career interests — to make learning relevant, engaging, and meaningful, thereby motivating student achievement. Integration is not intended to detract from the richness or rigor of any of the individual disciplines. Instead, the disciplines complement one another to enhance student learning (CDE, 2010c, p. 28).

For students to access and master the content and skills we propose as well as develop behaviors, dispositions and navigational competencies, our approach to curriculum and instruction must be intentional and thoughtfully crafted, to avoid becoming “just another fad”, as Rothingham (2008) has warned. The Framework proposes a set of outcomes that, together with existing and new standards and assessments, can be used as an overarching set of guidelines to ensure that curriculum and instruction are sufficiently rich and rigorous to promote access to postsecondary education and living-wage careers for all students.

Intentional and careful crafting of integrated curriculum has borne fruit for students of The Center for Advanced Research and Technology (CART) in Clovis, California. CART combines rigorous CTE courses with academic courses. Eleventh- and twelfth-grade students attend CART for half of the school day, taking courses in the career areas of professional sciences, advanced communications, global issues, and engineering and product development. They work actively in teams to research real-world problems and discover original solutions. Academic instructors and business partners guide their project work. Students have access to the latest technology and

³ More information about Linked Learning can be found at www.connectedcalifornia.org and www.linkedlearning.org.

are expected to include their community in integrated projects. The Clovis and Fresno school districts jointly operate CART, and even though students are bused to the site from their home schools, there is often a waiting list (CDE, 2010c). Preliminary evaluation findings from the past seven years are promising and notably positive. CART students matriculated to postsecondary institutions, including community colleges and universities, at a higher rate than a matched sample of similar students from area high schools. This held true for college-going within one year of graduation and at any time after graduating from CART (CART, 2011).

The Need for New Assessments That Use Multiple Measures

In addition to high-quality curriculum and instruction, assessments are needed that can measure the full array of knowledge and skills in the proposed Framework, together with appropriate accountability mechanisms. As is widely understood in the field of education, “you get what you measure.” As we emerge from an era of focus on high stakes multiple-choice tests under the federal *No Child Left Behind Act*, efforts are underway, both in the U.S. and internationally, to explore more robust approaches to measuring college and career readiness. In developing such assessment tools, matters of cost, feasibility, and logistics must be considered. Further, as with any transformative reform, new assessments should not simply be added on, but rather embedded in new ways of teaching and learning.

Two consortia of states have been selected to develop assessments to measure student attainment of the CCSS: the Partnership for Assessment of Readiness for College and Careers (PARCC) and the SMARTER Balanced Assessment Consortium (SBAC). Both consortia will use a mix of methods and online technology to assess student knowledge and skills more efficiently and effectively than the current standardized testing regime.

Other organizations are developing tools that measure skills beyond the CCSS. For example, the Assessment and Teaching of 21st Century Skills (ATC21S) project is developing web-based assessments to measure digital literacy skills, communication, and collaborative problem-solving. The National Academy Foundation is developing tools that measure attainment of college- and career-readiness skills through teacher- and employer-scored assessments. Employer observation of student performance allows for an accurate appraisal of students’ skills with respect to workplace requirements.

The Envision Schools are developing a College Success Assessment System embedded in curriculum. Students develop portfolios to demonstrate their mastery of academic content and 21st century skills. The students work toward three goals: mastery knowledge, application of knowledge, and metacognition. The portfolio, presented at the end of 12th grade, includes a written introduction to the contents; examples of mastery-level student work (assessed and certified by teachers before the presentation); reflective summaries of work completed in five core content areas; an artifact of and written reflection on the workplace learning project; and 21st century skills assessment. Students must defend their portfolios, and teachers are given

professional development to guide students in this process (NRC, 2011, p. 50). Other school networks and districts are pursuing a similar path.

Measuring productive behaviors and dispositions is more difficult. The Forum for Youth Investment, supported by the W.T. Grant Foundation, identified eight tools for assessing the skills of communication, relationships and collaboration, critical thinking and decision making, and initiative and self-direction. The focus is on specific skill- and ability-oriented outcomes and prioritizes skill areas amenable to intervention in outside-school programs. Assessments such as the Work Readiness Credential (WRC), based on the Equipped for the Future standards, also test behaviors and dispositions. For all of these areas, constructs must be defined carefully and the challenges in measuring interpersonal and intrapersonal skills with validity and reliability recognized.

A balanced assessment system of state and local, formative and summative assessments is needed — to guide instruction and to promote accountability. District and schools must make it a priority to foster and sustain robust teacher communities of practice that collaboratively build their skill to formatively assess student progress against standards and outcomes, finding evidence of learning in the regular examination of student work. The development of local assessment systems enables districts and communities to determine their priorities for students, based on local values and labor market needs. At the same time, the state plays an important ongoing role in supporting balanced assessment approaches and promoting quality and comparability among local assessments (Ananda, 2002).

The Need for Teacher Preparation and Professional Development

This Framework has implications for teacher training as well. Teachers in pathways should be competent in four domains: knowledge, pedagogy, professional skills, and foundational comprehension. They should know the academic concepts underlying work in industry, intellectual skills to solve problems in the real world, and knowledge of how to work in a community of practice. Necessary pedagogical skills include how to engage students in project-based and cooperative learning, build on students' interests, prior knowledge and skills, use authentic and consequential tasks to engage student motivation, and use multiple assessment measures and ways for students to demonstrate their competencies. Teachers should have appropriate professional skills that equip them to work in pathways, including understanding how to collaborate with other teachers and industry partners (CDE, 2010c, p. 141).

Many teachers don't have the opportunity to develop all of these competencies. In response to this need, San Diego State University is partnering with ConnectEd and three other California State Universities (at Fresno, Sacramento, and San Bernardino) to develop a teacher preparation program for Linked Learning. Working with pre-baccalaureate students, the San Diego program adds a "Linked Learning lens" to the California Single Subject Teaching Credential. Core proficiencies are divided into content knowledge, curriculum design, practice pedagogy, and

philosophy. A key feature of the program is placement of student teachers in pathway schools and programs for their practicum. (CDE, 2010c). High Tech High in San Diego has created a Graduate School of Education, where students engage collaboratively in inquiry- and project-based approaches to learning, mirroring the approaches they will use in their classrooms (HTH, n.d.).

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APPENDIX A:

Linked Learning College and Career Readiness Framework With Notes

Framework Category	Descriptors	Measurement Options
I. Knowledge	Content knowledge in three domains considered essential for skill development, success in postsecondary education and careers, and effective participation in a global society (P21 2009; Carnevale & Desrochers 2003)	
A. Core subject area content	Core academic content as defined by the Common Core State Standards and other state-defined academic standards, enabling students to pursue the full range of postsecondary education and career opportunities and providing the foundation for further learning and skill development (CDE 2010; P21 2009; Conference Board 2006; NASDCTEc 2008; Conley 2009) Core subjects include: ▪ English/Language Arts ▪ Mathematics ▪ Science ▪ Government and Civics ▪ Economics ▪ History ▪ Geography ▪ Humanities/Arts ▪ Foreign Languages Within these are included: ▪ Key terms and terminology ▪ Factual information ▪ Linking ideas ▪ Organizing concepts (Conley 2011)	Current standards-based assessments CCSS assessments in development for English language arts and mathematics Future assessments based on the Next Generation Science Standards in development.
B. 21st century knowledge: global, civic, environmental, financial, health, and media literacy	Themes critical to effective participation in local and global society that cross subject and career areas (P21 2009). These include understanding the following issues: ▪ Global (e.g., knowledge and understanding of other nations and cultures, including the use of non-English languages) ▪ Civic (e.g., knowledge and understanding the local and global implications of civic decisions) ▪ Environmental (e.g. knowledge and understanding of the environment and the circumstances and conditions affecting it; knowledge and understanding of society's impact on the natural world) ▪ Financial (e.g., knowing how to make appropriate personal economic choices; understanding the role of the economy in society) ▪ Health (e.g., obtaining, interpreting, and understanding basic health information and services and using such information and services in ways that enhance health; understanding preventive physical and mental health measures, including proper diet, nutrition, exercise, risk avoidance and stress reduction) ▪ Media (e.g., understanding both how and why media messages are constructed, and for what purposes)	Curriculum-based assessments aligned with existing standards (e.g., the California Environmental Principles and Concepts developed by the CalEPA)

Framework Category	Descriptors	Measurement Options
C. Career-related and technical knowledge	Knowledge about an industry sector and associated careers, technical knowledge, and college majors, providing context for learning in the core subjects; informing decisions about postsecondary education and future careers; and providing the basis for development of academic, 21st-century, and technical skills (NASDCTEc 2008; ACTE 2010) Examples of career areas include: ▪ Agriculture, Food, and Natural Resources ▪ Architecture and Construction ▪ Arts, A/V Technology, and Communications ▪ Business Management and Administration ▪ Education and Training ▪ Finance ▪ Government and Public Administration ▪ Health Sciences ▪ Hospitality and Tourism ▪ Human Services ▪ Information Technology ▪ Law, Public Safety, Corrections, and Security ▪ Manufacturing ▪ Marketing ▪ Science, Technology, Engineering, and Mathematics ▪ Transportation, Distribution, and Logistics Example of knowledge in the Agriculture, Food, and Natural Resources (AFNR) industry: ▪ Issues affecting the AFNR industry, including biotechnology, employment, safety, environmental issues, and animal welfare. (NSDCTEs 2008b, p.22)	CTE standards-based assessments of knowledge

Framework Category	Descriptors	Measurement Options
II. Skills	Academic, 21st-century, and technical skills needed for success (ACTE 2010, Carnevale & Desrochers 2003), best learned in the context of academic, thematic, or career-technical disciplines and through application	
A. Academic skills in core disciplines	Core academic skills as defined by the CCSS and other state-defined academic standards, enabling students to pursue the full range of postsecondary education and career opportunities and providing the foundation for further learning and skill development (CDE 2010; Conley 2009) According to the Conference Board (2006, p.16), referencing the No Child Left Behind Act of 2001, “basic knowledge and skills” include the following: ▪ English Language (spoken) ▪ Reading Comprehension (in English) ▪ Writing in English (grammar, spelling, etc.) ▪ Mathematics ▪ Science ▪ Government/Economics ▪ Humanities/Arts ▪ Foreign Languages ▪ History/Geography	Current standards-based assessments CCSS assessments in development for English language arts and mathematics Future assessments based on the Next Generation Science Standards in development.
B. 21st century skills	Skills identified as essential in the knowledge economy that characterizes work in the 21st century (P21 2009; Binkley et al. 2010)	
1. Metacognition and knowing how to learn	Includes the following concepts: ▪ Understanding and applying strategies for learning, including individual and organizational self-assessment (SCANS 1991; Binkley et al. 2010; Carnevale & Desrochers 2003; Conley 2011) ▪ Applying and adapting new knowledge and skills in both familiar and changing situations, using learning theory such as personal learning styles (visual, aural, etc.), formal learning strategies (note taking or clustering items that share characteristics), and informal learning strategies (awareness of unidentified false assumptions that may lead to faulty conclusions). (SCANS 1991, p. 33) ▪ Involves self-awareness, the ability to dedicate time to learning, autonomy, discipline, perseverance, and information management in the learning process; the ability to concentrate for extended and short periods of time; the ability to reflect critically on the object and purpose of learning; the ability to communicate as part of the learning process (Binkley et al. 2010, p.20)	Simulations Teacher- and employer-scored ratings of student work
2. Creativity and innovation	▪ Use of a wide range of idea creation techniques (such as brainstorming) ▪ Creation of new and worthwhile ideas (both incremental and radical concepts) ▪ Elaboration, refinement, analysis, and evaluation of one’s own ideas to improve and maximize creative efforts (P21 2009) ▪ Demonstration of originality and inventiveness in work; communication of new ideas to others; integration of knowledge across disciplines (Conference Board 2006)	Performance-based assessments; teacher- and employer-scored ratings of student work, including projects, portfolios, and workplace performance
3. Critical thinking and problem solving	High-level thinking skills exercised in the course of authentic knowledge work (Binkley et al. 2010). Includes ▪ Problem formulation (Conley 2011) ▪ Sound reasoning and analytical thinking; use of knowledge, facts, and data to solve workplace problems (Conference Board 2006) ▪ Making judgments and decisions; solving unfamiliar problems (P21 2009)	CCSS assessments Performance-based assessments; teacher- and employer-scored ratings of student work, including projects, portfolios, and workplace performance

Framework Category	Descriptors	Measurement Options
4. Systems thinking	- Understanding complex interrelationships (SCANS 1991) - Analysis of how parts of a whole interact to produce overall outcomes in complex systems (P21 2009) - Understanding roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment - Identifying how key organizational systems affect organizational performance and the quality of products and services - Understanding the global context of industries and careers (NASDTEc 2008)	Performance-based assessments; teacher- and employer-scored ratings of student work, including projects, portfolios, and workplace performance
5. Communication: listening; speaking, writing, and nonverbal communication	- Using active listening skills to obtain and clarify information (NASDTEc 2008) - Articulating thoughts and ideas clearly and effectively - Public speaking skills - Written communications, including memos, letters, and complex technical reports that are clear and effective (Conference Board 2006)	CCSS assessments for written communication Performance-based assessments; teacher- and employer-scored ratings of student work, including projects, portfolios, and workplace performance WorkKeys for listening for understanding
6. Collaboration and working with diversity	- Building collaborative relationships with colleagues and customers - Ability to work with diverse teams, negotiate and manage conflicts, and learn from and work collaboratively with individuals representing diverse cultures, races, ages, gender, religions, lifestyles, and viewpoints (Conference Board 2006)	Teacher- and employer-scored ratings of student work processes WRC situational judgment assessment
7. Information management and digital media applications	- Accessing and evaluating information efficiently (time) and effectively (sources) - Evaluating information critically and competently - Using information accurately and creatively for the issue or problem at hand - Managing the flow of information from a wide variety of sources - Applying a fundamental understanding of the ethical/legal issues surrounding the access and use of information - Using technology as a tool to research, organize, evaluate, and communicate information (P21 2009)	Curriculum-based assessments, drawing on relevant standards
C. Technical skills: technical skills in at least one career area of interest	- Technical skills as defined by the NASDTEc and state CTE standards (CDE 2005) in the 16 career cluster areas and associated career pathways; use of technical knowledge and skills required to pursue careers in all career clusters, including knowledge of design, operation, and maintenance of technological systems critical to the career cluster (see cluster list under Career and Technical Knowledge) (NASDTEc 2008) - Technical skills as the foundation for future training and to promote greater “portability” (Carnevale & Desrochers 2003; ACTE 2010) - Technical skills as a means to facilitate academic learning (Murnane 2008) and strengthen cognitive abilities (Rose 2006) - Engagement with objects and tools as a means to expand cognitive capacity (Resnick 1987) Example of technical skills in the Agriculture, Food, and Natural Resources (AFNR) industry, Plant Systems pathway: - Produce and manage plants in both domesticated and natural environments using application of principles of anatomy and physiology to enhance plant production - Manage soil/media nutrients using tests of appropriate materials and/or by examining data	CTE standards-based assessments of skills

Framework Category	Descriptors	Measurement Options
III. Productive Behaviors and Dispositions	Self-concepts, behaviors, and dispositions deemed critical to success, also called “attitudes, values, and ethics” (Binkley et al. 2010); “soft skills” or “noncognitive skills” (Sedlacek 2008); “life and career skills” (P21 2009); “personal qualities” (SCANS, 1991); “intrapersonal and interpersonal skills” (NRC 2011); and social-emotional skills (Durlak et al. 2011)	
A. Productive self-concepts	- Knowledge of one’s strengths, weaknesses, abilities, and interests - Self-esteem - Belief that success results from hard work as opposed to luck (Deke & Haimson 2006; NCDG 2003; Sedlacek 2008; Carnevale & Desrochers 2003; Binkley et al. 2010)	Student self-report assessments, such as the California Healthy Kids Survey, Resiliency Module
B. Self-management	The set of skills enabling individuals to appropriately plan, execute, and complete their own work, as required in both postsecondary and workplace settings. Includes the ability to: - Set goals - Establish priorities - Manage time - Study alone and in groups - Execute tasks with precision and accuracy - Persist - Take initiative and direct one’s own efforts - Tackle obstacles resourcefully - Complete tasks and projects (Conley 2009; Kyllonen 2008; Conference Board 2006)	Teacher, mentor, and employer observations NAF Internship Assessment WorkKeys talent assessment
C. Effective organizational behaviors	The set of skills enabling individuals to work effectively with others within organizations and under changing circumstances. Includes: - The ability to interact effectively with co-workers and provide leadership as appropriate - The ability to be flexible and adaptable - Responsibility and accountability to others - Ethical behavior (Conference Board 2006; Carnevale & Desrochers 2003)	Teacher, mentor, and employer observations NAF Internship Assessment WorkKeys talent assessment

Framework Category	Descriptors	Measurement Options
IV. Educational, Career, and Civic Engagement	The ability to access resources and navigate effectively within postsecondary and workplace environments; the ability to manage a career over time (Conley 2009; NCDG 2003)	
A. Engaging in and navigating the world of higher education: college transition skills	The practical knowledge and skills required to enroll and succeed in postsecondary education, including: ▪ Knowledge of admission requirements and financial aid processes ▪ Understanding protocols for contacting professors and working in study groups ▪ Ability to navigate a postsecondary education campus (both physical and virtual) and understand school culture (Conley 2009)	Student completion of relevant experiences (e.g. completion of college applications and FAFSA form, college tours, interviews with college students and professors, etc.) Assessments developed by college bridge programs
B. Engaging in and navigating the world of work: career exploration and development skills	The practical knowledge and skills required to explore career options, obtain employment, and manage one's career. Includes: ▪ Career research and exploration skills ▪ Resume-writing and interview skills ▪ Understanding the protocols for interacting with supervisors and colleagues ▪ Ability to navigate the physical or virtual workplace, including understanding the functions of various departments and how to access information ▪ Understanding organizational culture ▪ Understanding of how to advance in a career within specific industries and pathways (NCDG 2003; Bailey, Hughes, & Moore 2004)	Student completion of relevant experiences (e.g. completion of resumes, job applications, and mock interviews, informational interviews, job shadows, internships, and other forms of work-based learning.) NAF Internship Assessment
C. Engaging in and navigating civic life	▪ Ability to respond to social, environmental, and economic challenges at local, national, and global levels (Lumina Foundation website) ▪ A set of knowledge and skills that enables students to become engaged members of their communities.	Knowledge of civics and economics, as measured by standards-based social science assessments Student completion of relevant experiences (e.g., completion of informational interviews and job shadows with political officials and community leaders, service learning, and community-based projects) Assessments relevant to these experiences

APPENDIX B: Essential Skills Presented by Recognized Initiatives and Scholars

	California CTE Model Curriculum Standards Foundation Standards	Common Core State Standards	Partnership for 21st Century Skills	Association of American Colleges and Universities	Conference Board	Anthony Carnevale: <i>The Skills and Abilities Employers Want</i>
Academic Content Knowledge	Academics	California's CCSS for English language arts and literacy in history/social studies, science, technical subjects and for mathematics	Core subjects: English, reading or language arts , World languages, Arts , Mathematics, Economics, Science, Geography, History, Government and Civics	Knowledge of Human Cultures and the Physical and Natural World Study in the sciences and mathematics, social sciences, humanities, history, languages, and the arts	Basic Knowledge: - English Language (spoken) - Reading Comprehension (in English) - Writing in English (grammar, spelling, etc.) - Mathematics - Science - Government/Economics - Humanities/Arts - Foreign Languages - History/Geography	
21st Century Themes	Health and Safety		Interdisciplinary Themes 21st Century Themes - Global Awareness - Financial, Economic, Business and Entrepreneurial Literacy - Civic Literacy - Health Literacy - Environmental Literacy	Personal and Social Responsibility, including: - Civic knowledge and engagement—local and global - Intercultural knowledge and competence		

	California CTE Model Curriculum Foundation Standards	Common Core State Standards	Partnership for 21st Century Skills	Association of American Colleges and Universities	Conference Board	Anthony Carnevale: <i>The Skills and Abilities Employers Want</i>
Career-Related and Technical Knowledge	Technical knowledge included in technical knowledge and skill	References to career-related content				Occupational knowledge needed to learn technical skills
Academic Skills	Academics	California's CCSS for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects and for Mathematics	Core subjects: English, reading or language arts , World languages, Arts, Mathematics, Economics, Science, Geography, History, Government and Civics		Basic Skills: - English Language (spoken) - Reading Comprehension (in English) - Writing in English (grammar, spelling, etc.) - Mathematics - Science - Government/Economics - Humanities/Arts - Foreign Languages - History/Geography	Basic Skills: Reading, Writing, And Mathematics
21st Century Skills: Creativity and Critical Thinking: Knowing How to Learn	Problem Solving and Critical Thinking	Critical thinking	Learning and Innovation Skills: - Critical Thinking and Problem Solving - Creativity and Innovation	Intellectual and Practical Skills, including: - Inquiry and analysis - Understanding systems (social, technical) - Critical and creative thinking	Critical Thinking/Problem Solving	Foundation Skills: Knowing How To Learn Adaptability: Creative Thinking And Problem Solving

	California CTE Model Curriculum Standards Foundation Standards	Common Core State Standards	Partnership for 21st Century Skills	Association of American Colleges and Universities	Conference Board	Anthony Carnevale: <i>The Skills and Abilities Employers Want</i>
21st Century Skills: Communication and Collaboration	Communication Leadership and Teamwork	Written communication	Learning and Innovation Skills: Communication and Collaboration	Intellectual and Practical Skills, including: - Written and oral communication - Teamwork and problem solving	- Oral communication - Written communication - Visual communication such as PowerPoint presentations, video, etc. - Teamwork/collaboration	Communication Skills: Listening And Oral Communication Group Effectiveness: Interpersonal Skills, Negotiation, And Teamwork
21st Century Skills: Information and Technology Use	Technology		Information, Media, and Technology Skills	Information literacy	Information Technology Application	
Technical Skills; Application of Knowledge	Technical Knowledge and Skills Demonstration and Application	Application of knowledge		Integrative Learning, including: Synthesis and advanced accomplishment across general and specialized studies		Applied Skills: Occupational And Professional Competencies

	California CTE Model Curriculum Standards Foundation Standards	Common Core State Standards	Partnership for 21st Century Skills	Association of American Colleges and Universities	Conference Board	Anthony Carnevale: <i>The Skills and Abilities Employers Want</i>
Non-Academic, intrapersonal and Interpersonal Skills and Behaviors (Productive Dispositions and Behaviors)	Responsibility and Flexibility Ethics and Legal Responsibilities		Life and Career Skills: - Flexibility and Adaptability - Initiative and Self-Direction - Social and Cross-Cultural Skills - Productivity and Accountability - Leadership and Responsibility	Personal and Social Responsibility, including: - Ethical reasoning and action - Foundations and skills for lifelong learning	- Diversity - Leadership - Creativity/Innovation - Lifelong learning/Self-direction - Professionalism/Work Ethic - Ethics/Social Responsibility	Influence: Organizational Effectiveness And Leadership Personal Management: Self-Esteem And Motivation/Goal Setting Attitude: Positive Cognitive Style
Educational Career Management Skills and Civic Engagement	Career Planning and Management					

	National Association of State Directors of CTE (NASDCTEc)	SCANS	ATC21S	Equipped for the Future Work Readiness Skills (Note: Skills and Entry-level tasks are combined)	National Career Development Guidelines	David Conley: <i>The Four Dimensions of College and Career Readiness</i>
Academic Content Knowledge	Academic Foundations (state graduation requirements)		Academic subject matter seen as a domain in which skills are developed		Educational Achievement and Lifelong Learning: Attain educational achievement and performance levels needed to reach personal and career goals	Key Content Knowledge Key foundational content and "big ideas" from core subjects
21st Century Themes	Safety, Health, and Environmental		Living in the World (Knowledge): - Citizenship – local and global - Life and career - Personal and social responsibility – including cultural awareness and competence			
Career-Related and Technical Knowledge	Technical knowledge as presented in cluster standards		Career-related and technical knowledge seen as a domain in which skills are developed			

	National Association of State Directors of CTE (NASDCTEc)	SCANS	ATC21S	Equipped for the Future Work Readiness Skills (Note: Skills and Entry-level tasks are combined)	National Career Development Guidelines	David Conley: <i>The Four Dimensions of College and Career Readiness</i>
Academic Skills	Academic Foundations (state graduation requirements)	Foundation Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks		• Read with understanding • Use math to solve problems and communicate	Master academic skills (for career management)	
21st Century Skills: Knowing How to Learn; Creativity and Critical Thinking; Systems Thinking	Problem-Solving and Critical Thinking Systems	Foundation Thinking Skills: Thinks creatively, makes decisions, solves problems, visualizes, knows how to learn, and reasons Workplace Competencies Systems: Understands complex interrelationships	Ways of Thinking • Creativity and innovation • Critical thinking, problem solving, decision making • Learning to learn, Metacognition	• Observe critically • Learn through research • Solve problems and make decisions • Reflect and evaluate • Use systems • Understand systems • Monitor and Correct Performance • Take responsibility for learning: Know How to Learn		Key Cognitive Strategies Problem formulation, research, interpretation

	National Association of State Directors of CTE (NASDCTEc)	SCANS	ATC21S	Equipped for the Future Work Readiness Skills (Note: Skills and Entry-level tasks are combined)	National Career Development Guidelines	David Conley: <i>The Four Dimensions of College and Career Readiness</i>
21st Century Skills: Communication and Collaboration	Communications Leadership and Teamwork	Workplace Competencies Interpersonal: Works with others	Ways of Working • Communication • Collaboration (teamwork)	• Speak so others can understand • Listen actively • Convey ideas in writing • Work with others • Diversity • Negotiate • Serve clients • Cooperate with others • Resolve conflicts and negotiate		Communication (as a Cognitive Strategy)

	National Association of State Directors of CTE (NASDCTEc)	SCANS	ATC21S	Equipped for the Future Work Readiness Skills (Note: Skills and Entry-level tasks are combined)	National Career Development Guidelines	David Conley: <i>The Four Dimensions of College and Career Readiness</i>
21st Century Skills: Information and Technology Use	Information Technology Applications	Workplace Competencies - Information: - Acquires and uses information - Technology: - Works with a variety of technologies - Resources: - Identifies, organizes, plans, and allocates resources	Tools for Working - Information literacy - Communication - Technology literacy	- Acquire and use information and communication technology - Use technology - Plan - Allocate resources		
Technical Skills: Application of Knowledge	Technical Skills				Master occupational skills (for career management)	

	National Association of State Directors of CTE (NASDCTEc)	SCANS	ATC21S	Equipped for the Future Work Readiness Skills (Note: Skills and Entry-level tasks are combined)	National Career Development Guidelines	David Conley: <i>The Four Dimensions of College and Career Readiness</i>
Non-Academic, Intrapersonal, and Interpersonal Skills and Behaviors (Productive Dispositions and Behaviors)	Ethics and Legal Responsibilities	Workplace Competencies Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty	Living in the World Personal and social responsibility – including cultural awareness and competence (Skills and Attitudes/Values/Ethics) In addition, each of the other nine skill areas includes a list of associated “Attitudes, Values, and Ethics” for example, “Apply a fundamental understanding of ethical/legal issues surrounding the access and use of information technologies”	- Self-management - Advocate and influence - Guide others - Responsibility - Integrity	Educational Achievement and Lifelong Learning - Participate in ongoing lifelong learning experiences Personal and Social Development - Build and maintain positive self-concept - Develop interpersonal skills, including respect for diversity - Integrate personal growth and change into career development - Balance personal, leisure, community, learner, family, and work roles - Master general employability skills (for career management)	Key Learning Skills and Strategies - Self-management skills: time management, study skills, goal setting, self-awareness, persistence - Precision and accuracy (as a Cognitive Strategy)

	National Association of State Directors of CTE (NASDCTEc)	SCANS	ATC21S	Equipped for the Future Work Readiness Skills (Note: Skills and Entry-level tasks are combined)	National Career Development Guidelines	David Conley: <i>The Four Dimensions of College and Career Readiness</i>
Education and Career Management Skills and Civic Engagement	Employability and Career Development (including entrepreneurship)		Living in the World - Life and Career (Skills, and Attitudes/Values/Ethics) Living in the World - Citizenship, Local and Global (Skills, and Attitudes/Values/Ethics)		Career Management - Create and manage a career plan that meets career goals - Use a process of decision-making as one component of career development - Use accurate, current, and unbiased career information during career planning and management - Integrate changing employment trends, societal needs, and economic conditions into career plans	Key Transition Skills and Strategies Admissions requirements, college types and missions, affording college, college culture, relations with professors



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