COMPETENCY-BASED EDUCATION

Staying Shallow or Going Deep?

A Deeper, More Personal Look at What It Means to Be Competent

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Introduction

The standards movement, as we know it today, entered education as an innovation borrowed from business and industry in the 1980s, impelled especially by *A Nation at Risk* (National Commission on Excellence in Education, 1983), in which Standards and Expectations constitute one of five recommendations to improve American schools and America's competitive position in the world. Today, standards are an accepted way of doing business in schools. Educators identify what a student is to know and do (the standards), link them to grade levels, and measure them on annual assessments. Standards form the skeleton of curriculum and increasingly serve as the driver for educators' instructional plans—and the focus for student learning. But does mastering this trail of discrete learning elements, even when braided and spiraled, sufficiently prepare all students for success in college and career? If we can identify the specifics of academic learning and call them standards, what do we call the capabilities that propel that learning in the first place—such as critical thinking and problem solving, intrinsic motivation, and self-direction? Aren't these capabilities as important—if not more important—for success in college and the workplace (Adams, 2014) as academic knowledge and skills? And shouldn't we care more about whether a student can integrate and apply what he or she knows to real-life problems than simply whether a student can get the right answer on a test? Advocates of competency-based education (CBE) believe that designing learning systems that emphasize the mastery of competencies as the gatekeeper for earning credit and progressing may better equip all students for their future. However, the way educators define what is meant by *competency* may determine whether CBE fulfills its promise to better prepare students for college and career.

What does it mean to be competent in the 21st century? The current emphasis on college and career readiness reflects the recognition that, to be successful, today's students will need far more than a basic grounding in traditional academics. There is growing consensus that to thrive in our rapidly changing world, students will need an expanded set of competencies that includes the mastery of core academic concepts, as well as analytical thinking and problem-solving skills, intrapersonal and interpersonal skills, and the capacity to transfer learning to new problems and contexts (Alliance for Excellent Education, 2011; Aragon, 2015; Council of Chief State School Officers [CCSSO], 2013; Parsi, 2015; Pellegrino & Hilton, 2012; Redding, 2016; U.S. Department of Education, n.d.). This expanded set of competencies is often referred to as deeper learning (Fullan, McEachen, & Quinn, 2016; Pellegrino & Hilton, 2012; William and Flora Hewlett Foundation, 2013) or personal competencies (Redding, 2014). Many states have established definitions of *college and career readiness* that extend beyond academics to reflect an emphasis on the acquisition of these deeper learning and personal competencies, such as a focus on

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mastering and applying complex sets of skills in real-life settings and identification of intrapersonal and interpersonal competencies needed for postsecondary success (Mishkind, 2014). Educators and employers are also adding employability skills to their list of learning targets for students to ensure that they are career ready (English, Cushing, Therriault, & Rasmussen, 2017).

To realize CBE's promise as a strategy for ensuring postsecondary success for students, educators will need to ensure that their definitions of competency reflect the full range of skills, knowledge, and dispositions that students will need to be truly college and career ready.

CBE, an educational approach that focuses on the mastery of competencies—rather than seat time—as the measure of student learning, is increasingly being recognized as a key strategy for ensuring that all students can reach the higher bar of college and career readiness (Martinez & Poon, 2015; Worthen & Patrick, 2015). In a competency-based approach, students earn credit by demonstrating that they have met specific learning targets—that is, competencies. However, definitions of what is meant by *competency* vary from state to state and may range from the mastery of individual academic learning standards to expectations that students apply broader sets of knowledge and skills to solve complex problems. To realize CBE's promise as a strategy for ensuring postsecondary success for students, educators will need to ensure that their definitions of competency reflect the full range of skills, knowledge, and dispositions that students will need to be truly college and career ready.

In this paper, we examine the growing trend of CBE and its link to college and career readiness standards; explore varying notions of what it means to be competent; and offer two learner competency frameworks that encompass the range of knowledge, skills, and dispositions that many states associate with college and career readiness. We conclude this paper by offering a framework and set of steps that states, districts, and schools can take to define competency in ways that reflect an emphasis on the full range of the knowledge, skills, and dispositions necessary for students to achieve college and career readiness.

SECTION I:
The growing competency-based education trend

What is competency-based education?

CBE is a personalized approach to education that awards credit on the basis of a student's demonstrated mastery of competencies—regardless of how long that learning takes (Le, Wolfe, & Steinberg, 2014; Surr & Rasmussen, 2015). As defined by Le et al. (2014), in a competency-based model, the level of expectation for student learning is high for all students, with each student responsible for meeting established learning goals—that is, competencies. To ensure that all students succeed in meeting learning targets, educators provide more personalized learning opportunities and supports and allow students to learn at varying times and places, assess their learning when they are ready, and progress at their own pace. Despite affording students greater flexibility and support, students in CBE settings can earn credit only when they have demonstrated mastery of established learning targets.

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In recent years, there has been growing interest in CBE as an approach that can help ensure that all students successfully meet states' rigorous college and career readiness goals (Martinez & Poon, 2015; Silva, White, & Toch, 2015; White, 2013; Worthen & Patrick, 2015). A 2015 report by the International Association for K–12 Online Learning (iNACOL) indicates that 42 U.S. states are engaged in some stage of planning, piloting, or implementing CBE initiatives (Worthen & Patrick, 2015). In a policy brief released by KnowledgeWorks (2013), the authors argue that the federal Race to the Top Fund (U.S. Department of Education, 2009), a U.S. Department of Education competitive grant program, lays the groundwork for "a shift towards competency based education" (p. 5). Although not explicitly endorsed, a U.S. Department of Education–dedicated webpage includes highlights of the likely benefits associated with a CBE approach (http://sites.ed.gov/oii/competency-based-learning-or-personalized-learning/). Most recently, the Every Student Succeeds Act (ESSA) (Pub. L. No. 114–95; 2015) includes more flexible assessment provisions that enable states and local education agencies to use competency-based approaches to state or local testing, as well as more innovative assessment approaches such as performance assessment and portfolios to better capture students' mastery of a broader set of learning goals (ESSA, 2015, Sections 1203, 1204). The CCSSO Innovation Lab Network College and Career Ready Task Force (2013) reached a similar conclusion: states committed to supporting college and career readiness for students should redesign their learning and assessment systems to feature challenging, personalized, and competency-based approaches. Although there is not one common, agreed-on definition for CBE, a number of national organizations and researchers have identified CBE's most essential features. (See Appendix A for a comparison of CBE definitions

offered by four organizations.) One often-cited definition of CBE, offered by iNACOL and CCSSO[1] (Patrick & Sturgis, 2013; Sturgis, Patrick, & Pittenger, 2011), includes the following features:

- Students advance on the basis of mastery.
- Competencies include explicit, measurable, transferable learning objectives that empower students.
- Assessment is meaningful and a positive learning experience for students.
- Students receive timely, differentiated support according to their individual needs.
- Learning outcomes emphasize competencies that include the application and creation of knowledge, along with the development of important skills and dispositions.

The promise (and limitations) of competency-based education

Despite CBE's growing popularity as a strategy for promoting college and career readiness, most available research on CBE has not directly examined student outcomes but rather has focused on the implementation of CBE policies and practices (Le et al., 2014; Patrick & Sturgis, 2013; Priest, Rudenstine, & Weisstein, 2012). A recent study conducted by American Institutes for Research (AIR), supported by funding from the Nellie Mae Education Foundation (Haynes et al., 2016), sought to address this gap in the research.

Researchers developed teacher and student surveys to measure six key CBE features, similar to those identified by the Center on Innovations in Learning (CIL), Jobs for the Future (JFF), CCSSO, and iNACOL (see Appendix A), and examined the extent to which these features were present in CBE and comparison settings. Next researchers explored relationships between students' self-reported exposure to CBE practices and expected changes in their learning capacities—for example, in intrinsic motivation, self-regulated learning strategies, and academic behaviors—over the course of their ninth-grade year. This set of learning capacities has been associated with academic success (Farrington et al., 2012) and is often included in states' definitions of college and career readiness (see page 6).

The results of this study offer the field new evidence for both the promise and limitations of the CBE trend. The AIR study found several positive associations between students' experiences of core CBE features and positive changes in their learning capacities—many of the dispositions, skills, and behaviors associated with college and career readiness. For example, students' reports of having clear learning targets were associated with positive changes in intrinsic motivation and self-management. Students' reports of being expected to demonstrate mastery of course requirements to earn credit was positively associated with higher levels of self-efficacy, cognitive control, and intrinsic motivation. And students' reports of having flexible course pacing, such as being allowed extra time to finish mathematics assignments, was positively associated with improved intrinsic motivation and self-efficacy in mathematics.

[1] iNACOL's CBE definition was refined during a 2011 Summit attended by more than 100 CBE leaders (Sturgis, Patrick, & Pittenger, 2011).

Although findings showed positive associations between selected features of CBE and student outcomes, the study also found that school-level implementation of CBE practices was neither comprehensive nor uniform. There were wide variations in the implementation of CBE practices within schools deemed "CBE." Many schools had simply raised the bar, expecting students to demonstrate mastery of specific academic standards to earn credit (i.e., a standards-based approach), but they had not necessarily implemented other aspects of a CBE approach, such as personalized learning and flexible pacing or assessment. These findings suggest that not all schools labeled CBE are consistently implementing the full array of CBE policies and practices at the classroom level. Many of these CBE schools may instead be implementing a model more closely aligned with a standards-based approach—focusing on students' mastery of a narrower set of academic goals.

Distinguishing competency-based education from standards-based education

How can we distinguish CBE from standards-based education? CBE and standards-based education share a common focus on students' mastery of specific learning targets as the measure of success. At the same time, CBE differs from standards-based education in various ways, including the nature and breadth of desired learning goals. First, let's take a look at standards-based education. *Standards-based education* refers to "systems of instruction, assessment, grading and academic reporting based on students demonstrating understanding or mastery of the knowledge and skills they are expected to learn as they progress through their education" (Glossary of Education Reform, 2014). In a standards-based approach, *learning goals* are defined as the mastery of constituent knowledge and skill precisely defined within individual learning standards. These individual learning standards typically represent an academic skill or specific piece of content knowledge.

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CBE also focuses on students' mastery of learning targets. In fact, in a CBE system, students earn credit only when they can successfully demonstrate competency in specified areas. However, the learning targets identified within a CBE approach typically differ from those in a standards-based education approach in that the CBE targets are broader than the mastery of individual standards and include the capacity of the students to apply what they have learned. As noted in Le et al. (2014), CBE and standards-based approaches "judge mastery differently" (p. 3). For example, the definitions of CBE offered by Le et al. suggest that achieving competency means that a student has mastered both academic knowledge and skills, as well as other cognitive, intrapersonal, and interpersonal skills. In a similar manner, the definition of *competency* offered by iNACOL and CCSSO refers to competency as students' capacity to apply their learning, as well as generate new knowledge (Patrick & Sturgis, 2013; Sturgis et al., 2011).

Given the similar focus on the mastery of learning targets in both CBE and standards-based education, it is not surprising that some states engaged in CBE initiatives equate student competency with the mastery of discrete state learning standards—or define *competency* in ways that cannot be easily distinguished from academic learning standards. For example, a comparison of a sample of state learning standards with competency statements collected from six states explicitly focused on CBE showed a lack of clear distinction between states' definitions of standards and states' definitions of *competencies* (Redding, 2016). In fact, this comparative review revealed that the language used to define a standard or a competency was similar in level of specificity, breadth, emphasis on particular areas of knowledge and skills, and expectation that students would demonstrate the application of their learning to satisfy learning targets. For example, in one state, a social studies academic standard included a broad statement that students must "identify common characteristics of contemporary and historical regions on the basis of climate, landforms, ecosystems, and culture" (Arizona Department of Education, 2006, p. 2). Whereas in another state, a statement defining a competency reflected a similar level of breadth: "Students will demonstrate the ability to use and extend properties of complex number systems (includes both real and imaginary numbers)" (New Hampshire Department of Education, 2013, p. 1).

Why does it matter whether states, districts, and schools define *competency* as satisfying individual standards rather than mastering a broader set of transferable knowledge, skills, and dispositions? If the goal of CBE is to promote college and career readiness, then it matters a lot. Many states include in their definitions of what it means to be college and career ready the mastery and application of complex sets of skills in real-life settings, as well as having intrapersonal and interpersonal competencies (Mishkind, 2014). Yet many states do not include these additional competency areas in their academic learning standards.

In 2013, 10 states participating in the CCSSO Innovation Lab Network recognized this discrepancy. In a white paper released by this 10-state consortium (CCSSO, 2013), states identified the knowledge, skills, and dispositions they believed to be essential to students' college, career, and civic readiness and success. The introduction to the framework emphasized the need for states to go beyond college and career readiness standards, acknowledging that "the Common Core Standards are foundational to preparing students for college and career—and as such are absolutely essential—but alone they are not sufficient" (CCSSO, 2013, p. 3).

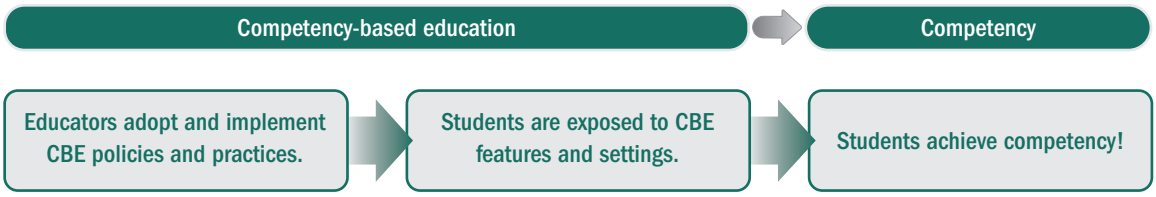
If *competency* cannot be defined as satisfying individual academic learning standards, then what do we mean by a competency? The way states, districts, and schools answer this question will be key to ensuring CBE's efficacy for promoting students' college and career readiness.

SECTION II.
Varying notions of what it means to be competent

What do we mean by competency?

First, it may be helpful to distinguish more clearly between competency and CBE. As defined earlier, CBE is a set of policies and practices built around competencies as the targets of student learning. In other words, CBE is the means, and student competency is the desired end (Figure 1).

Figure 1. Competency Versus Competency-Based Education



All this begs the question: What is a competency?

Redding (2016), writing for CIL in his report *Competencies and Personalized Learning*, states:

> *A competency is a defined cluster of related capabilities (skills and knowledge) with methods and criteria to determine the degree to which a person demonstrates mastery in them. Competencies often correspond to roles, such as student, plumber, or writer; and mastery may be benchmarked toward the ultimate demonstration of proficiency in that role. For example, communication might be a broad categorization of a competency, and it might include subparts such as reading comprehension, speaking, listening, and writing. Or writing might be the competency under a different scheme of categorization with a finer grain size. In either case, the competency would be further defined by itemizing the measurable or observable skills and knowledge that constitute it. Finally, the competency's definition would include criteria and methods for determining mastery of the competency's constituent skills and knowledge, and the assessment would include demonstration or application.* (p. 6)[2]

In their extensive review for the National Research Council (NRC) on the literature about the skills students need for success in school, life, and work, Pellegrino and Hilton (2012) draw on a definition of competency established by the Organisation for Economic Co-operation and Development (OECD) (2005) that similarly encompasses a broad set of knowledge, skills, and the expectation that students apply their learning, along with the addition of interpersonal and intrapersonal skills and dispositions.

[2] According to Redding (2016), one is deemed competent when able to satisfy a predetermined performance level related to the specified cluster of knowledge and skills that define the competency. In school settings, the definition of the competency and the predetermined level of performance differ according to a student's general age or grade, and according to subject or other domains so that a student may demonstrate competence in mathematics, for example, in varying ways and at varying times across the K–12 continuum.

As noted by Pellegrino and Hilton (2012), the OECD definition states that

> *A competency is more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on and mobilizing psychosocial resources (including skills and attitudes) in a particular context.* (p. 23)

Competency as adaptive expertise

These current notions of competency align well with the characteristics associated with adaptive expertise. Thirty years ago, two researchers—Hatano and Inagaki (1986)—introduced the notion of routine expertise and adaptive expertise. Unlike "routine experts" who can transfer their procedural knowledge and skills efficiently to known problems, Hatano and Inagaki argued that some experts have a deeper conceptual understanding of why and when procedures should be applied, and can, therefore, flexibly adapt and invent new procedures and solutions in response to novel problems.

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Over the years, the notion of adaptive expertise has received growing attention as a key goal for 21st century learning. For example, in their book *How People Learn*, Bransford, Brown, and Cocking (2000) write:

> *The ultimate goal of learning is to have access to information for a wide set of purposes—that the learning will in some way transfer to other circumstances. . . . Since environments change rapidly, it is important to explore ways for students to develop the characteristics of adaptive experts.* (p. 73)

In a subsequent book, Donovan and Bransford (2005) share their belief that our educational system has traditionally emphasized the development of routine expertise, which they argue can result in "ungrounded competence." They explain:

> *A student with ungrounded competence will display elements of sophisticated procedural or quantitative skills in some contexts, but in other contexts will make errors indicating a lack of conceptual or qualitative understanding underpinning these skills.* (Donovan & Bransford, 2005, p. 389)

Bransford et al. (2000) argue that key to developing adaptive expertise is metacognition—"the ability to monitor one's current level of understanding and decide when it is not adequate" (p. 47). Bransford et al. (2000) identify several other defining characteristics of adaptive experts, including having an extensive body of knowledge organized around core concepts and the relationships among these core ideas; the ability to define the conditions and parameters of problems; and the capacity to know when, why, and how to apply knowledge and skills to solve problems.

Metacognition goes beyond "thinking about thinking" and appraising the level of understanding (Redding, 2014); it includes self-regulation of learning through application of learning strategies appropriate to the task. Hartwig and Dunlosky (2012) and Dunlosky et al. (2013) point out that students tend to apply the learning strategies they are most familiar with rather than the ones that are most effective when mastering a learning task. Adaptive experts, then, may possess a larger repertoire of learning strategies and be more adept at applying the most effective ones to a given task. As Bransford et al. (2000) suggest, adaptive experts have a more accurate analysis of the problem at hand.

Bransford et al. (2000) and others (Crawford, Schlager, Toyama, Riel, & Vahey, 2005) emphasize that adaptive expertise is not simply about cognitive capacity. In fact, essential characteristics of adaptive experts are possessing key dispositions, attitudes, and habits of mind. Bransford et al. (2000) argue that adaptive experts do not profess to "know all of the answers" but rather view themselves as individuals who are "accomplished novices" who recognize the limits of their understanding and skill and are receptive to new learning (p. 48). In summarizing years of research on adaptive experts, Crawford et al. (2005) explain:

> *Rather than assuming that their current knowledge and their problem definition are correct, adaptive experts draw on their knowledge in light of situational factors or unique aspects of a case to formulate a possible explanation or a theory of the situation which they test in the given context of the problem at hand.* (p. 6)

The research on adaptive expertise has great relevance for CBE. When educators define competency in ways that align with the characteristics of adaptive experts, they are more likely to promote deeper learning (i.e., the capacity to transfer, apply, and continuously perpetuate one's own learning over time), thereby enabling students to thrive in a rapidly changing and complex world.

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SECTION III.
Which competencies matter for college and career readiness?

Prevailing definitions of *college and career readiness*—a purported goal of CBE—align well with NRC's (Pellegrino & Hilton, 2012) and OECD's (2005) notions of competence and the research on adaptive expertise, particularly in recognizing that students need more than traditional academic knowledge and skills to succeed. The U.S. Department of Education (n.d.), in its discussion of college and career readiness standards, states:

> *There is growing consensus that America's students need to be prepared to compete in a world that demands more than just basic skills. . . . One of the most powerful strategic levers of improvement is to ensure that every student is held to high academic standards. In an environment of high-quality standards, teachers can focus on the higher-order skills that students need to think critically, solve real-world problems, and be successful in the 21st century and beyond.* (para. 3)

A review of state definitions of *college and career readiness* conducted by the AIR College and Career Readiness and Success Center (Mishkind, 2014) also reflects an emphasis on expanded sets of competencies (i.e., more than traditional academic knowledge and skills) as integral to college and career readiness. In the review, the author found common themes across 36 states related to the types of skills and knowledge identified as necessary for students' college and career readiness. In particular, Mishkind identified five categories of skills and knowledge commonly included in states' definitions of *college and career readiness for students*.

State definitions of college and career readiness: Five categories of skills and knowledge

- Academic knowledge
- Critical thinking and problem solving
- Social-emotional learning, collaboration, and communication
- Grit, resilience, and perseverance
- Citizenship and community involvement

As shown earlier, a key characteristic of nearly all states' definitions is the recognition that students need both academic and nonacademic knowledge, skills, and dispositions to be fully college and career ready. In addition, six of the states included in their definitions of *college and career readiness* an emphasis on students' capacity to apply skills and knowledge in novel and real-life settings. For example, New Hampshire's definition of *college and career readiness* states: "Knowledge, skills and dispositions are mutually reinforcing and not contradictory. That is,

evidence and experience confirm that education that advances application of knowledge through skills is more likely to result in student competency of the underlying, rigorous content knowledge" (New Hampshire Department of Education, 2015, p. 26).

A key characteristic of nearly all states' definitions is the recognition that students need both academic and nonacademic knowledge, skills, and dispositions to be fully college and career ready.

Recognition of an expanded set of competencies also is reflected in the JFF definition and in CCSSO's recent Innovation Lab Network (ILN) white paper (CCSSO, 2013). Ten states participating in the CCSSO ILN conducted an extensive review of the research to identify the knowledge, skills, and dispositions associated with postsecondary success. As outlined in this report, the members stated:

> *Reflecting on the Common Core State Standards, members asked what kinds of young people their parents and communities hoped would emerge from their transformative state education systems. . . . Along with mastery and application of essential content as typically prescribed and monitored in state standards, assessments, and accountability systems, it is necessary that students cultivate higher-order cognitive and meta-cognitive skills that allow them to engage in meaningful interaction with the world around them. Further, members agreed that these knowledge and skills are not achieved in a vacuum but require the development of underlying dispositions or behavioral capacities (such as self-regulation, persistence, adaptability) that enable lifelong pursuit of learning.* (CCSSO, 2013, p. 3)

SECTION IV.
Connecting personal and deeper competency frameworks with college and career readiness

Defining competency: Staying shallow or going deep?

How can states define competency in ways that better reflect what it means to be college and career ready? In many states, newly established college and career readiness standards, if combined into broader sets of knowledge, skill, and application, have the potential to define *competencies* in a way that reflects college and career readiness, such as more in-depth understanding and the integration of knowledge and skills. For example, the CCSSO's Science Assessment Item Collaborative (SAIC) has identified clusters within the Next Generation Science Standards (NGSS) for each set of its performance expectations (WestEd & CCSSO, 2015). The intent of clustering discrete NGSS standards is to reinforce the notion that students learn science through the integration of content understanding and skills characterized as 3-dimensional learning that includes core disciplinary ideas, crosscutting concepts, and scientific and engineering practices (NGSS Lead State Partners, 2013). Through clustering standards, the SAIC aims to promote "complex interactions and deeper thinking—and allows for the employment of science practices on the part of the student" (WestEd & CCSSO, 2015, p. ii). In this case, the additional step of clustering individual NGSS standards reinforces the integration of knowledge and skill and requires application of learning—two features that reflect broader notions of competency than those that an individual standard would define and assess.

Although clustering academic learning standards helps to deepen states' definitions of *competency*, this approach still falls short of defining the term in ways that reflect most states' conceptions of college and career readiness. To achieve deeper definitions of *competency*, states will need to expand their concept to include additional cognitive, intrapersonal, and interpersonal skills and dispositions, as well as employability skills.

Personal and deeper learning competency frameworks

Two competency frameworks that have emerged in recent years, deeper learning (Hewlett, 2013; Pellegrino & Hilton, 2012) and personal competencies (Redding, 2014), specifically define an expanded set of competency areas aligned with many states' definitions of college and career readiness. The competencies in these two frameworks include areas not typically contained within states' academic learning standards, such as additional cognitive, intrapersonal, and interpersonal skills and dispositions. These two frameworks emphasize many of the key aspects of competency as identified by national educational organizations (see Table A-1 in Appendix A) and align with many states' definitions of college and career readiness. In particular, both frameworks emphasize the way these academic and other competency areas complement one another to enable students to achieve depth of understanding and the capacity to apply, transfer, and perpetuate their own learning over time.

In particular, these two frameworks reflect notions of competency that emphasize transforming students into competent learners rather than vessels for static bodies of knowledge and information (see Table 1). For example, the personal competencies defined by CIL's *Personal Competency: A Framework for Building Students' Capacity to Learn* signal a linkage with school learning, asserting that the same principles apply to learning throughout K–12 education, and outside and beyond the scope of the school, as well as in college and career thereafter.

Table 1. Comparison of Deeper and Personal Learning Competencies Frameworks

Deeper Learning Competencies[3]	Personal Competencies[4]
Cognitive: Content knowledge and thinking skills that enable a learner to apply and transfer knowledge to novel problems and contexts.[5]	**Cognitive:** Prior learning that provides associations and understanding to facilitate new learning.
▪ *Deep content knowledge:* Students build a strong foundation in academic content areas, and draw on their knowledge to complete new tasks. ▪ *Critical thinking and problem solving:* Students think analytically and creatively to evaluate information and design solutions to complex problems.	▪ *Cognitive content:* The knowledge that is held in accessible memory/webs of association and understanding. ▪ *Curiosity:* Inclination to acquire knowledge (also a function of motivational competency).
Interpersonal: The knowledge, skills, and dispositions needed to communicate and collaborate with others effectively.	**Social-Emotional:** Skills and understandings that promote positive social relationships, productive self-management, and self-regard.
▪ *Communication:* Students clearly organize data, findings, and thoughts in written and verbal communication. ▪ *Collaboration:* Students learn to work in teams to achieve shared goals.	▪ *Self-awareness and regard:* Accurate understanding of own skills, preferences, characteristics. ▪ *Social awareness:* Ability to understand others and their perspectives. ▪ *Relationship skills:* Ability to establish and maintain positive relationships. ▪ *Self-management:* Skills to set positive goals and make responsible decisions.
Intrapersonal: The capacity to manage one's behavior and emotions to achieve one's goals.	**Metacognitive:** Self-regulation of learning and use of learning strategies.
▪ *Learning to learn skills:* Students monitor and direct their own learning.	▪ *Cognitive processes:* Student's use of logic, evaluation, and divergent thinking. ▪ *Self-management:* Selecting strategies to solve problems. ▪ *Self-appraisal:* Knowing what I know.
	Motivational: Engagement and persistence in pursuit of learning goals.
▪ *Academic mindsets:* Students develop positive attitudes and beliefs about their identifies as learners and their academic abilities.	▪ *Growth mindset:* Belief in malleable ability based on effort and strategy. ▪ *Acquired relevance:* Openness to new interests, value of learning. ▪ *Self-efficacy perception:* Belief in ability to succeed in a specific task.

[3] Adapted from Bitter and Loney (2015, p. 3). Intrapersonal competency definitions from Pellegrino and Hinton (2012, p. 3).
[4] *Source:* Redding (2014).
[5] The notion of transferability encompasses all three deeper learning competency domains and is not limited to the transfer of content knowledge and cognitive skills.

CIL arrived at its formulation of the Personal Competency Framework through its work on personalized learning. In "Getting Personal: The Promise of Personalized Learning," a chapter in CIL's *Handbook on Innovations in Learning*, Redding (2013a) broached CIL's ultimate positioning of personal competency as a component of personalized learning:

The personal competencies are both the propellants of academic and career/occupational learning, and ends in their own right, standing alongside academic knowledge and skills in their significance to success in school and out.

> *Personalization ensues from the relationships among teachers and learners and the teacher's orchestration of multiple means for enhancing every aspect of each student's learning and development. Even with the application of technology to achieve the goals of personalization, the teacher remains a source of motivation for students through her relational suasion with them. The teacher builds the student's metacognitive competencies to effectively direct his own learning and make choices about it. The teacher models and instructs social and emotional learning and behavior. The teacher fosters a classroom culture in which learning and learners are respected, and the thrill of mastery is reinforced.* (p. 126)

CIL's description of four competencies as personal—cognitive, metacognitive, motivational, and social-emotional—draws upon meta-analyses of the factors that affect learning (Wang, Haertel, & Walberg, 1993, 1997) and stresses the fact that the competencies are applied by the learner in a variety of learning situations. The personal competencies work together to propel an individual's learning regardless of context. The CIL work on personal competencies does not speak of "dispositions" but describes learning habits that reflect the four personal competencies as patterns of behavior generalized to apply to a variety of learning contexts, thus demonstrating that these competencies are deeply ingrained and highly transferable. CIL further categorizes competencies as academic, personal, and career/occupational, as they relate to one another in the education system. The personal competencies are both the propellants of academic and career/occupational learning, and ends in their own right, standing alongside academic knowledge and skills in their significance to success in school and out.

The six competencies in the deeper learning framework are characterized as working together to build students' capacity to apply and transfer their learning to novel problems and contexts.

The term *deeper learning*, popularized by the William and Flora Hewlett Foundation (2013), refers to a set of six competencies that fall within three competency domains: cognitive, intrapersonal, and interpersonal (see Table 1). This set of deeper learning competencies emerged as a result of findings from a growing body of research on the knowledge, skills, and dispositions that students need to thrive in college and career (Conley, 2005, 2007; Finegold & Notabartolo, 2010), including many of the 21st century skills valued by both education and business leaders (Murnane & Levy, 1996; Partnership for 21st Century Skills, 2010). The six competencies in the deeper learning framework are characterized

as working together to build students' capacity to apply and transfer their learning to novel problems and contexts (Pellegrino & Hilton, 2012). The NRC report explains:

> *We define deeper learning as the process through which an individual becomes capable of taking what was learned in one situation and applying it to new situations (i.e., transfer). . . . Through deeper learning (which often involves shared learning and interactions with others in the community), the individual develops expertise in a particular domain of knowledge and/or performance.* (pp. 5–6)

In sum, the respective proponents of personal and deeper learning competencies arrive at much the same place in defining the competencies that students need to become adaptive and competent learners—regardless of academic subject area.

SECTION V.
Defining deeper notions of competency

Mastery of knowledge and skills within specific academic domains is necessary but insufficient for the kind of competency students need to be college and career ready (CCSSO, 2013). The deeper learning framework and Personal Competency Framework define a set of competencies that extend beyond academic knowledge and skills and align more fully with definitions of competency offered by national organizations and with definitions of *college and career readiness* established by many states. These two frameworks reflect deeper notions of competency that contain the following shared characteristics:

Mastery of knowledge and skills within specific academic domains is necessary but insufficient for the kind of competency students need to be college and career ready.

- Breadth—Competency implies understanding of broader sets of academic skills and knowledge, as well as other cognitive, intrapersonal, and interpersonal domains.
- Depth—Competency emphasizes conceptual understanding of core ideas beyond retention of isolated facts or proficiency in discrete skill areas.
- Attitudes, mind-sets, and motivation—Competency includes beliefs, mind-sets, motivation, and attitudes, such as sense of self-worth and confidence, regard for others, and emotional understanding and management.
- Metacognition—Competency requires the capacity to reflect on and be intentional in the approach to learning—for example, learning habits and self-regulated learning skills.
- Integration, application, and transfer—Competency includes the capacity to integrate and apply knowledge, skills, and dispositions within a competency area to solve real-life problems and adapt to novel problems and contexts.

Breadth: Both academic and nonacademic domains

The Personal Competency Framework addresses breadth by identifying personal competency in four domains—cognitive, metacognitive, motivational, and social-emotional. Similarly, the deeper learning framework features three domains—intrapersonal, interpersonal, and cognitive. In both frameworks, there is an emphasis on the combination and integration of these areas, as an essential characteristic of learner competency. The competencies included in both of these frameworks serve to expand, complement, and enable students to acquire the academic competencies necessary to succeed in college and career.

Depth of conceptual understanding

Another way the two frameworks reflect deeper notions of competency is in their explicit emphasis on depth of conceptual understanding. In the Personal Competency Framework, cognitive competency is essentially knowledge stored in memory that is accessible to more readily accommodate new learning. This kind of knowledge base is far more than superficial acquaintance with topics, requiring a more complete understanding. In a similar manner, the deeper learning framework includes in its cognitive competency domain both deep content knowledge and critical thinking and problem solving. David Conley (2015) refers to this kind of deep content knowledge as "keystones," the core ideas and logic within a discipline that help to frame a learner's understanding. Similar to the Personal Competency Framework, the deeper learning framework includes in the cognitive domain the dynamic thinking skills needed to manipulate this deep content knowledge. It is interesting to note that both frameworks align well with the 3-dimensional learning framework offered in the NGSS (NGSS Lead State Partners, 2013). The three dimensions of learning in NGSS are core disciplinary ideas, crosscutting concepts, and scientific and engineering practices. The scientific and engineering practices include such cognitive competencies as "asking questions," "analyzing and interpreting data," "engaging in argument," and "constructing explanations" (National Research Council, 2012, p. 42). NGSS argues that these competencies are needed for students to "investigate and build models and theories about the world" (National Research Council, 2012, p. 30). As explained in the *Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas* (National Research Council, 2012), the eight scientific and engineering practices serve to promote the fluid, integrated, and iterative interplay among these three dimensions of learning. As explained by Dr. Helen Quinn, chair of the Committee for K–12 Science Education, referring to the nature of 3-dimensional learning as envisioned in NGSS (Surr, Loney, Golston, & Rasmussen, 2016), "You cannot inquire about nothing—you have to be investigating and trying to understand a phenomenon, based on theories and models of something specific. This is where the disciplinary core ideas and crosscutting concepts come in" (pp. 12–13).

Attitudes, mind-sets, and motivation

Both the deeper learning and Personal Competency frameworks explicitly recognize the importance of motivation, mind-sets, and attitudes that serve as the propellants and navigators of learning. In fact, the Personal Competency Framework includes motivation as one of its core competencies and social-emotional competency as another. Social-emotional competency consists of elements such as sense of self-worth, regard for others, and emotional understanding and management. In a similar manner, the deeper learning framework includes positive mind-sets, and the intrinsic motivation and beliefs about the necessity of effort in learning, as central to students' achieving deeper learning.

Both the deeper learning and Personal Competency frameworks explicitly recognize the importance of motivation, mind-sets, and attitudes that serve as the propellants and navigators of learning.

Metacognition: Self-regulation of learning

In both frameworks, metacognitive competency entails appraisal of a learning task, selection of learning strategies in pursuit of mastery, adjustment in strategy based on self-assessment or others' feedback, and an ultimate sense of whether mastery has been attained. In both frameworks, there is a close relationship between metacognitive competency and motivation to learn. In the Personal Competency Framework, these are, in fact, two of the four competencies; in the deeper learning framework, they constitute the intrapersonal domain, expressed as learning-to-learn skills, which include self-regulated learning skills that enable students to focus, manage, and monitor their own learning. The close relationship between the skills of learning and the desire to learn is palpable; a stronger set of learning skills enhances the learner's self-efficacy, and greater success with mastery reinforces the patterns of behavior that accomplish it (Locke & Latham, 1990).

Integration, transfer, and application

Perhaps the most essential characteristic of competency in both frameworks is the learner's capacity to integrate his or her knowledge, skills, and dispositions, and subsequently apply or transfer this learning to real-life problems and novel contexts. As described earlier, this aspect of competency is sometimes characterized as adaptive expertise and is key to notions of competency offered by research and policy organizations (National Research Council, 2012; Organisation for Economic Co-operation and Development, 2005; Sturgis et al., 2011). In the Personal Competency Framework, an emphasis on adaptability is reflected in the central position of "learning habits" as mediating variables when the four competencies merge into patterns of behavior that generalize across learning contexts. In the deeper learning framework (Pellegrino & Hilton, 2012), the authors emphasize the flexible and generative nature of deeper learning:

Perhaps the most essential characteristic of competency in both frameworks is the learner's capacity to integrate his or her knowledge, skills, and dispositions, and subsequently apply or transfer this learning to real-life problems and novel contexts.

> *It is the way the individual and community structures and organizes the intertwined knowledge and skills, rather than the separate facts or procedures per se—that supports transfer. While other types of learning may allow an individual to recall facts, concepts or procedures, deeper learning allows the individual to transfer what was learned to solve new problems.* (pp. 5–6)

Conclusion/Summary

Competency is more than the mastery of a discrete academic standard. True competence is deeper and broader. It includes academics as well as a wide range of other cognitive, intrapersonal, and interpersonal skills not typically included in academic subjects or college and career readiness learning standards. Competency also requires the combination of knowledge and skills across multiple domains and implies the capacity to apply and transfer learning from one situation to the next, leading to the ability to adapt and innovate in the face of novel problems and contexts. Although deeper notions of competency outlined in this paper are not a required component of CBE, they are more reflective of educators' goals for preparing students to be college and career ready. Deeper notions of competency are also more firmly grounded in research on the way students learn (Bransford et al., 2000) and more aligned with the competencies valued by employers (Adams, 2014; Trilling & Fadell, 2009). Rather than distracting or diluting from academic learning, research suggests that students' competency in cognitive, intrapersonal, and interpersonal domains is associated with students' enhanced success in school (Farrington et al., 2012; Wentzel & Watkins, 2011). To realize the promise of CBE, educators will need to go beyond individual academic standards when defining what it means to be competent.

Competency is more than the mastery of a discrete academic standard. True competence is deeper and broader. It includes academics as well as a wide range of other cognitive, intrapersonal, and interpersonal skills not typically included in academic subjects or college and career readiness learning standards.

Many states have adopted rigorous college and career readiness standards that lay a solid foundation for defining competency within core academic disciplines. There are three additional steps that states can take to achieve the breadth; depth; attitudes, mind-sets, and motivation; metacognitive skills; and capacity for application and transfer associated with true college and career readiness:

Rather than distracting or diluting from academic learning, research suggests that students' competency in cognitive, intrapersonal, and interpersonal domains is associated with students' enhanced success in school.

- First, states can combine and integrate discrete standards to create competencies that reflect more complex sets of academic knowledge and skills than do individual standards.
- Second, states can further expand and enrich these competency areas by integrating additional cognitive, metacognitive, and intrapersonal and interpersonal skills within defined academic competency areas.
- Third, states can strengthen their definitions by explicitly including an expectation that students be able to transfer and apply learning, and generate new knowledge and skills, in their demonstrations of competency.

Although defining what it means to be competent is a critical first step, it is only the first step. The realities of our high-stakes accountability era necessitate that we also find ways to measure competency. Finding ways to build on college and career readiness standards is an essential and valuable piece of this work. If our aim is to promote deeper competency, however, we will also need to devise ways to authentically and accurately capture students' deeper and personal competencies, and be able to measure their capacity to apply and transfer their learning to real-life situations. This is no small feat. Several states, such as New Hampshire, are currently developing alternative approaches to measuring competency, such as performance assessment tasks that can help capture students' mastery of more complex knowledge and skills, and gauge their capacity to apply their learning to novel problems and contexts (New Hampshire Department of Education, 2015). This wider array of assessment methods may enable educators to both measure and promote students' learning and ultimately build a new generation of assessments that can effectively capture students' deeper and personal competencies (Conley & Darling-Hammond, 2013).

Educators implementing competency-based systems will be more likely to fulfill the promise of CBE when they embrace notions of competency that reflect the full range of goals they have for their students.

Whether described as "deeper" or "personal," notions of competency described in this paper are the ones that school and the workplace demand, and that are associated with success in school, work, and life. Educators implementing competency-based systems will be more likely to fulfill the promise of CBE when they embrace notions of competency that reflect the full range of goals they have for their students.

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Appendix A.

Table A-1. Varying Organizational Definitions of Competency-Based Education

Definitions of competency-based education offered by Jobs for the Future (JFF) (Le, Wolfe, & Steinberg, 2014); iNACOL and the Council of Chief State School Officers (CCSSO) (Sturgis, Patrick, & Pittenger, 2011); the Center for Innovations in Learning (CIL) (Redding, 2016); and American Institutes for Research (AIR) (Haynes et al., 2016).

Terms	AIR's study of CBE key features	CIL's features of CBE	iNACOL and CCSSO's features of CBE	Jobs for the future/students at the center
Learning targets	Learning targets are explicit, shared with students, and based on rigorous college and career readiness standards.	Competencies are defined in terms of their constituent elements of knowledge and skill.	Learning outcomes emphasize competencies that include application and creation of knowledge that are explicit and measurable, and that empower students.	Clear, measurable learning objectives hold all to the same high academic standards. Learning objectives reflect research on what students need to know, be able to do, and apply for college, career, and civic success. These objectives include cognitive, metacognitive, noncognitive, and interpersonal skills.
Learning recognition, credit, and progression	Learning recognition, credit, and progression are based on the mastery of specific learning targets—rather than a student's level of participation, effort, or time in the classroom. Students must show what they have learned before earning credit or advancing.	Credit is not earned until the learner has successfully demonstrated that he or she has met pre-established levels of proficiency in the identified competency area.	Students advance on the basis of mastery, not seat time.	Students advance to the next level, course, or grade on demonstration of skills and content knowledge.

Terms	AIR's study of CBE key features	CIL's features of CBE	iNACOL and CCSSO's features of CBE	Jobs for the future/students at the center
Instructional approaches	Instructional approaches are individualized to each student's needs, are relevant and varied, and offer students ample opportunity to exercise independence and take responsibility for their own learning.	CBE is a component of personalized learning, along with learning technology and personal competencies.	Students receive timely, differentiated support according to their individual needs.	Students receive customized supports to match their individual learning needs in order to keep learning increasingly challenging material in a developmentally appropriate and motivating manner—and to ensure that students struggling in any area will be able to reach proficiency. Learners have opportunities to exercise choice in the way they engage with core concepts and demonstrate core competencies. Schools and students use technological tools in service of flexible and engaging instruction, and to ease implementation challenges.
Pacing	Pacing gives students flexibility to taking more or less time to learn.	The time given for the acquisition of the competency is variable, according to the individual learner's progression in mastery.		Students' progress at different rates in different areas, rather than on a teacher-driven, class-wide schedule. Students who do not demonstrate mastery of a competency on the first attempt continue learning and have multiple opportunities to try again.

Terms	AIR's study of CBE key features	CIL's features of CBE	iNACOL and CCSSO's features of CBE	Jobs for the future/students at the center
Assessment of learning	Assessment of learning offers students flexibility and choice in when and how they show what they have learned.	Criteria and methods for assessing students' levels of proficiency in the competency are pre-established.	Assessment is meaningful and is a positive learning experience for students.	Multiple measures are used to determine mastery, and formative assessments play a particularly important role in instruction. Students receive immediate feedback about their progress toward specific competencies and return to difficult concepts and skills until they can demonstrate proficiency.
When and where learning takes place	The time and place where learning takes place let students learn and earn credit for activities that take place outside the school building and school day.	Learning takes place anywhere and anytime and is recognized accordingly by demonstration.		Flexible uses of time encourage learning experiences outside of the traditional school day and year, and in a variety of formal and informal settings.
Other features				**Culture:** School leaders and teachers foster an education environment that includes high expectations; transparency of learning objectives and assessment; collaborative learning and leadership; continuous improvement; and opportunities for students to learn meaningfully with peers and form relationships with supportive adults in order to maximize motivation, engagement, and achievement.

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