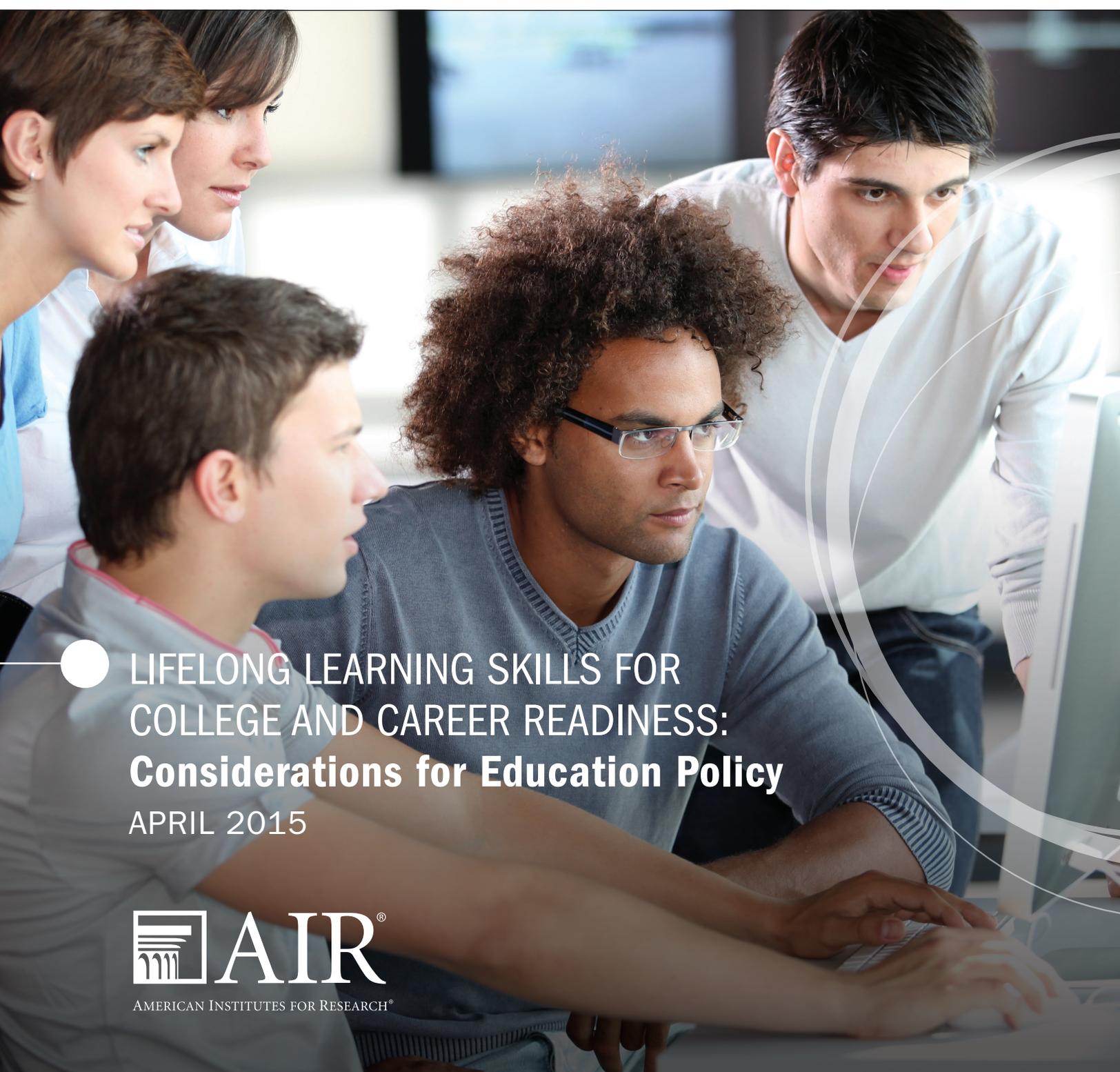


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LIFELONG LEARNING SKILLS FOR
COLLEGE AND CAREER READINESS:
Considerations for Education Policy

APRIL 2015



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Lifelong Learning Skills for College and Career Readiness: Considerations for Education Policy

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Introduction

Lifelong Learning Skills (LLS) provide the foundation for learning and working. They broadly support student thinking, self-management, and social interaction, enabling the pursuit of education and career goals. Collectively, LLS are the means by which students master academic content and translate knowledge into action. There is a growing consensus among researchers that LLS are discretely identifiable and actionable levers of support for meeting college and career readiness (CCR) objectives. In an attempt to highlight this, and to consolidate some of the key evidence behind LLS, the College and Career Readiness and Success Center (CCRS Center) at American Institutes for Research has developed an [annotated bibliography](#), which summarizes a broadly applicable and representative sample of LLS research. This executive summary describes uses for the annotated bibliography, highlights key takeaways from the research, provides a sample of LLS assessments, and suggests policy considerations for policymakers and leaders in education.

HOW TO USE THE EXECUTIVE SUMMARY AND ANNOTATED BIBLIOGRAPHY

This executive summary offers a synthesis of the key takeaways from the annotated bibliography and presents policy considerations for integrating LLS into education objectives. Policymakers and staff working in state education agencies (SEAs) can use the resources found in the annotated bibliography to develop and support a rationale for integrating LLS into a state's college and career readiness strategies and initiatives. More specifically, the resources can inform (1) setting goals and expectations for the competencies beyond content knowledge and academic skills that students need to succeed in postsecondary and training settings, (2) developing or strengthening resources and structures to promote the integration of LLS within the P–20W education and workforce system, (3) establishing and promoting the pathways and supports that foster LLS in service of postsecondary preparation, and (4) measuring school and student progress toward mastering LLS and achieving other college and career readiness and success goals.

Key Takeaways From Lifelong Learning Skills Research

Table 1 summarizes the key takeaways from the research on Lifelong Learning Skills. It can be used as a quick-reference guide to the major components of LLS and their relation to CCR outcomes of interest. Each of the supporting research citations can be found in the annotated bibliography.

Table 1. Components of LLS and Their Relation to CCR Outcomes

LLS Components	Key Takeaways	Supporting Research
 CRITICAL THINKING, PROBLEM SOLVING, AND CREATIVITY	<ol style="list-style-type: none"> 1. <i>Critical thinking, problem solving, and creativity</i>, collectively referred to as “cognitive skills,” are predictive of academic and career performance. 	Kuncel & Hezlett (2010)
a. Critical Thinking	<ol style="list-style-type: none"> 1. It is possible to explicitly train individual critical thinking strategies. 2. Critical thinking is an essential process in the <i>transfer of knowledge</i>, whereby students use knowledge or skills learned in one subject and apply it to solve problems or advance understanding in another. 	<p>Klauer & Phye (2008)</p> <p>Salomon & Perkins (1989)</p>
b. Problem Solving	<ol style="list-style-type: none"> 1. Problem-solving skills are often best learned within subject-specific contexts (e.g., English language arts and mathematics) and are somewhat restricted in their applicability across subjects. 2. Problem-solving skills are a predictor of academic performance. 	<p>Mayer & Wittrock (2006)</p> <p>Greiff & Funke (2013)</p>
c. Creativity	<ol style="list-style-type: none"> 1. It is possible to teach and improve creativity. 2. The most effective methods for teaching and improving creativity focus on critical thinking and problem-solving strategies. 	Scott, Leritz, & Mumford (2004)

LLS Components	Key Takeaways	Supporting Research
 SELF-REGULATION, CONSCIENTIOUSNESS, MIND-SETS, AND MOTIVATION	<ol style="list-style-type: none"> 1. <i>Self-regulation, conscientiousness, mind-sets, and motivation for learning</i> can be used as predictors of academic performance. Collectively, they are as predictive of academic performance as critical thinking, problem-solving, and creativity skills. 2. Efforts to develop these skills are effective in later childhood, when interventions to improve critical thinking, problem-solving, and creativity skills may be less effective. 3. Interventions to improve these skills are associated with subsequently improved critical thinking, problem-solving, and creativity performance. 	<p>Farrington et al. (2012)</p> <p>Cunha, Heckman, & Schennach (2010)</p>

a. Self-Regulation	<ol style="list-style-type: none"> 1. Self-regulation is a predictor of academic achievement. 2. Interventions to improve self-regulation can significantly improve academic performance, especially in mathematics. 	<p>Duckworth & Seligman (2005)</p> <p>Dignath, Buettner, & Langfeldt (2008)</p>
b. Conscientiousness	<ol style="list-style-type: none"> 1. Conscientiousness is an aspect of personality, highly related to “grit,” (perseverance in the pursuit of long-term goals). Each has been shown to be at least as predictive of academic performance as is IQ. 	<p>Almlund, Duckworth, Heckman, & Kautz (2011)</p> <p>Duckworth, Peterson, Matthews, & Kelly (2007)</p>
c. Mind-Sets	<ol style="list-style-type: none"> 1. Positive mind-sets about learning and social belonging in academic environments are predictive of academic performance. 2. Interventions aimed at improving academic mind-sets result in improved academic performance. Such interventions can reverse the commonly held belief by students that intelligence is fixed and does not grow with effort. 3. Stereotype threat is a predictor of poor academic performance. Interventions to reduce this effect are correlated with an improvement in academic performance. 	<p>Blackwell, Trzesniewski, & Dweck (2007)</p> <p>Walton & Cohen (2011)</p> <p>Dweck, Walton, & Cohen (2014)</p> <p>Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski (2009)</p>
d. Motivation	<ol style="list-style-type: none"> 1. Student motivation for learning is predictive of academic achievement. 2. Students who are motivated by mastery of content demonstrate better academic behaviors (e.g., study skills) and better overall academic performance. 3. Student valuations of a subject and expectations for success are a strong predictor of their academic performance in that subject. 4. Student motivation for learning generally declines over time and is most vulnerable during school transition years, especially during the transition to middle school. 5. Interventions to improve student motivation are effective and can result in better academic performance. 	<p>Dweck (1986)</p> <p>Elliot, McGregor, & Gable (1999)</p> <p>Wigfield & Eccles (2000)</p> <p>Eccles, Midgley, & Adler (1984)</p> <p>Cury, Elliot, Da Fonseca, & Moller (2006)</p>

LLS Components	Key Takeaways	Supporting Research
 SOCIAL AND EMOTIONAL SKILLS	<ol style="list-style-type: none"> 1. Social and emotional skills are predictive of academic and career achievement. 2. The disparity between the school-entry academic skills of students from lower income and higher income households persists across elementary school, whereas the gap in social and emotional skills doubles during that same time period. 3. Interventions to improve these skills are associated with subsequently improved critical thinking, problem-solving, and creativity performance. Various low-cost during- and after-school programs have been shown to improve social and emotional skills. 	<p>Brunello & Schlotter (2011)</p> <p>Duncan & Magnuson (2011)</p> <p>Durlak, Dymnicki, Taylor, Weissberg, & Schellinger (2011)</p> <p>Cunha, Heckman, & Schennach (2010)</p>

ASSESSMENTS OF LIFELONG LEARNING SKILLS

There is no single, comprehensive test for LLS, but it may be useful to use a variety of assessments to assess specific LLS and monitor their development. Most assessments capture a subset of LLS and have not been explicitly validated as predictors of college and career readiness or success. A representative overview of some of those assessments is provided in Table 2. A more comprehensive inventory of LLS assessments can be found in the [annotated bibliography](#).

Table 2. Assessments of Lifelong Learning Skills

Assessment	LLS Components Measured
2015 Program for International Student Assessment	Critical thinking, creativity, and problem solving at an individual, as well as collaborative, level.
Tauk Family Foundation Formative Assessment Tool	A combination of LLS, including self-control, persistence, mastery orientation, academic self-efficacy, and social competence, framed within the larger context of social and emotional skills development.
Academic Motivation Scale	Academic motivation. This assessment has been shown to be a predictor of academic performance.
Motivated Strategies for Learning Questionnaire	Student motivation, cognitive strategy use, metacognitive strategy use, and management of effort. This assessment has been shown to be a predictor of academic performance.

Policy Considerations

Our review of the research on Lifelong Learning Skills yielded a number of policy considerations. We have structured those considerations according to the [CCRS Organizer](#), which can be found in the annotated bibliography and on the [CCRS Center website](#). Included in the organizer are four essential strands by which SEAs can organize their college and career readiness work. These strands include (1) goals and expectations, (2) resources and structures, (3) pathways and supports, and (4) outcomes and measures.

Although these strands serve as the organizing structure for the policy considerations, the considerations are not meant to be interpreted as sequential action steps; rather, they are highly interconnected and require careful alignment and integration to maximize impact. Goals and expectations can communicate a clear vision for LLS as the foundational skills for student learning and performance. Pathways and supports articulate the exact mechanisms by which students develop the specified foundational skills in the pursuit of postsecondary and career opportunities. Outcomes and measures define student progress toward the outlined goals and expectations as well as the progress of the larger system, informing its continuous development. Resources and structures provide the institutional infrastructure for implementing and evaluating initiatives that integrate LLS with CCR objectives. Collectively, these policy considerations can work in synergy to bring about an educational environment that not only transmits required knowledge but also prepares students for lifelong learning, college and career readiness, and success. We outline those policy considerations in Table 3.

Table 3. Policy Considerations for Integrating LLS Into CCR Initiatives and Related CCRS Center Products

CCRS Organizer Strand and Related CCRS Center Products	Policy Considerations
 <p>GOALS AND EXPECTATIONS Related: Overview: State Definitions of College and Career Readiness</p>	<ol style="list-style-type: none"> 1. Integrate LLS into state definitions of CCR, emphasizing their role in promoting students' ability to flexibly translate and apply their knowledge and personal interests to diverse college and career pathways. 2. Highlight and integrate LLS into existing academic standards, and provide guidance on how these skills map onto and support the implementation of these standards.
 <p>PATHWAYS AND SUPPORTS Related: Employability Skills Framework Professional Learning Module (forthcoming, spring 2015)</p>	<ol style="list-style-type: none"> 1. Provide guidance to districts and schools about how to integrate LLS into their curricula. 2. Offer support to districts and schools selecting evidence-based interventions that support LLS and fit the local context.
 <p>OUTCOMES AND MEASURES Related: Measurement Practice Guide (remaining chapters forthcoming, spring 2015)</p>	<ol style="list-style-type: none"> 1. When deciding whether to implement assessments of LLS, use caution and consider rigor, appropriateness, and burden on the student and teacher—as well as overall staff and system capacity for high-quality execution and analysis of the results—before rolling out the assessments. 2. Provide guidance to schools evidence-based formative and summative assessments of LLS and best practices for using each assessment. 3. Encourage schools and districts to use multiple measures to assess LLS, and give students multiple opportunities to demonstrate competency across various academic contexts. 4. Pilot LLS assessments to determine whether they can be successfully integrated into mainstream accountability frameworks, and collaborate with researchers to validate LLS as indicators of CCR. It is essential that LLS measures be validated on a larger scale before they are used to inform funding and resource allocation decisions.
 <p>RESOURCES AND STRUCTURES Related: CCRS Organizer (additional related tools forthcoming, fall 2015)</p>	<ol style="list-style-type: none"> 1. Facilitate cross-division and cross-agency collaboration to ensure that early childhood, P-12, higher education, and workforce pathways and supports for LLS align. 2. Engage and inform community stakeholders (e.g., parents and industry) to promote and harness opportunities to develop LLS outside of the classroom (e.g., at home, externships, etc.) 3. Collaborate with institutions of higher education to develop guidance for districts on teacher practices that promote student LLS for integration into teacher preparation, induction, professional development, and evaluation. 4. Examine and align all relevant sources of funding—including those that are outside of the SEA—and engage in inter- and cross-agency collaboration to finance complementary and nonduplicative LLS initiatives.

Conclusion

Lifelong Learning Skills enable students to acquire the knowledge they need and to pursue the various paths that lead to college and career readiness and success. The annotated bibliography on Lifelong Learning Skills can help prepare policymakers and other leaders in education to integrate LLS into CCR initiatives. The policy considerations designed to support that goal can be more effective if considered as a group rather than as stand-alone action steps. Each policy action builds upon and mutually reinforces the other. For example, having resources and structures in place enables the effective development and execution of pathways and supports. Outcomes and measures, in turn, should be driven by and operate in service of defined goals and expectations. Any specific policy action to promote LLS and CCR should reflect the alignment of such actions across the CCRS Organizer strands. Lifelong Learning Skills can and should be integrated into state efforts to promote college and career readiness and be aligned across them. Doing so will ensure that all students are college and career ready and prepared for a lifetime of success.

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