How Social-Emotional Learning and Development of 21st Century Competencies Support Academic Achievement

by Margaret Hilton

The National Research Council (NRC) of the National Academy of Sciences recently concluded that social and emotional learning (SEL) is an integral part of deeper learning that supports development of 21st century skills and knowledge and enhances the academic achievements that are so clearly linked with adult success. This article, based on the NRC’s *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*,

- defines these terms in a way that clarifies the role of what is traditionally called social-emotional learning in developing these competencies,
The NRC committee identified three broad domains of competence—the cognitive domain, the intrapersonal domain, and the interpersonal domain—that are closely related in child and adolescent development. Based on its analysis of research-based classifications of human skills and abilities, the committee assigned clusters of more specific skills to each domain, as shown below:

- **The cognitive domain**, which includes thinking, reasoning, and related skills (cognitive processes and strategies, knowledge, creativity);
- **The intrapersonal domain**, which involves self-management, including the ability to regulate one’s behavior and emotions to reach one’s goals (intellectual openness, work ethic/conscientiousness, positive core self-evaluation); and
- **The interpersonal domain**, which involves both expressing ideas to others and interpreting others’ messages and responding appropriately (communication, teamwork, and collaboration, leadership).

The committee defined “deeper learning” as a process that allows an individual to take what was learned in one situation and apply it to a new situation, referred to in cognitive science as “transfer” of learning. Through deeper learning, students...
develop both content knowledge and skills in a subject area, including knowing how, when, and where to apply their content knowledge to a new problem or challenge. The committee referred to the blend of transferable knowledge and skills developed through deeper learning as 21st century competencies.

**The Importance of 21st Century Competencies**

To date there has been only limited research on the importance of students’ 21st century competencies in terms of adult success. Most of the research has established simple correlations between later success and one or more 21st century competencies, and only a few studies have established a causal relationship. Cognitive competencies have been more extensively studied than those in the other domains, showing consistent, positive correlations of modest size with positive adult outcomes. Among intrapersonal and interpersonal competencies, conscientiousness—being organized, responsible, and hardworking—shows the largest (but still modest) correlation with increased educational attainment and higher adult earnings. Anti-social behavior, which has both intrapersonal and interpersonal aspects, is negatively correlated with these outcomes.

The committee noted that in contrast to the limited research on the importance of particular 21st century competencies, a larger and stronger body of research shows that years of educational attainment are positively related to higher adult earnings, good health, and civic engagement. It is clear that employers highly value individuals with more years of education, but it is unclear what blend of cognitive, interpersonal, and intrapersonal competencies individuals develop over the successive years that make them more productive and valuable—further research is needed to examine this question. More generally, the committee recommended further research to increase our understanding of the relationships between 21st century competencies and positive adult outcomes.

**The Social & Emotional Dimensions of Deeper Learning**

Deeper learning of concepts and procedures in the cognitive domain is closely intertwined with the development of competencies in the interpersonal and intrapersonal domains—a process often referred to as social and emotional learning. As defined by the committee, deeper learning reflects both the cognitive and socio-cultural perspectives on how people learn. From the cognitive perspective, deeper learning produces a network of concepts, facts, procedures, and strategies, including productive beliefs about one’s own learning—an intrapersonal competency. From the socio-cultural perspective, learning takes place as individuals participate in the practices of a community, using the tools, language, and other cultural artifacts of the community. As discussed below, empirical research supports the committee’s view of deeper learning as an integrated process of cognitive, social, and emotional learning.

**Deeper Learning of School Subjects**

The committee reviewed the Common Core State Standards in mathematics and English language arts (ELA) and the NRC Framework for K–12 Science Education (the Next Generation Science Standards had not been completed at the time of the study), and found that they all call for deeper learning and the development of 21st century competencies. Both the Common Core math standards and the NRC science framework include a “practices” dimension that calls for students to actively use and apply (i.e., to transfer) disciplinary knowledge, and the Common Core ELA standards call on students to synthesize and apply evidence to create and effectively communicate an argument.

The committee concluded that a cluster of cognitive competencies—including critical thinking, non-routine problem solving, and constructing and evaluating evidence-based arguments—was strongly supported in standards documents across all three disciplines. Coverage of social-emotional learning to develop intrapersonal and interpersonal competencies was uneven, but the standards documents for all three disciplines include discourse and argumentation, which involve both cognitive and interpersonal competencies.

The inclusion of cognitive, interpersonal, and intrapersonal 21st century competencies in these education standards documents reflects research demonstrating the importance of all three domains.
for mastery of school subjects. For example, feelings of self-efficacy about one’s own learning—an intrapersonal competency—have been shown to support learning of subtraction among elementary school students and learning of mathematics among low-income minority middle school students. In another example, researchers have found that instruction which focuses on content but also embeds development of self-regulated learning (another intrapersonal competency) has increased academic achievement in writing, reading, mathematics, and science among diverse groups of students from early elementary school through college. In the interpersonal domain, the development of interpersonal competencies improves learning by helping students forge positive relationships with teachers, peers, and parents. On the other hand, as noted above, persistent antisocial behavior over the elementary school years predicts a lower likelihood of completing high school and attending college and also predicts lower earnings in adulthood.

**AN EXAMPLE OF SOCIAL-EMOTIONAL AND DEEPER LEARNING IN SCIENCE**

The role of social and emotional learning in deeper learning of science is illustrated in a study by Herrenkohl et al. of a unit of science instruction where 3rd through 5th graders were investigating sinking and floating. Over a ten–week period, students worked in small groups to carry out a series of investigations to help them understand when and why various objects float or sink. Students’ investigations were carefully supported to promote reasoning practices in science and were also interspersed with teacher-guided whole-class discussions in which students gained experience communicating, monitoring, and critiquing their own thinking and the thinking of their peers as they developed, tested, and evaluated theoretical explanations for the phenomena they were observing.

The teaching and learning activities required students to develop and apply competencies in all three domains. In the cognitive domain, they learned to apply explicit reasoning and planning strategies for designing, conducting, and interpreting their investigations. Their notions of scientific theorizing and their ability to engage in it evolved significantly, as did their conceptual understanding of the phenomena of floating and sinking. In the interpersonal domain, the students became better able to monitor their thinking and recognize when their ideas were or were not well developed or justified. In the interpersonal domain, they became more comfortable with scientific discourse, learning not to become defensive when questioned by peers, and learning the norms and expectations for scientific reasoning and discussion.

**TEACHING COGNITIVE, INTERPERSONAL, AND INTRAPERSONAL COMPETENCIES**

Cognitive research over the last several decades has identified instructional design principles for developing transferable competencies, and the committee recommended that instruction aligned with these principles should begin with the earliest grades and be sustained throughout students’ K–16 careers. Designers and developers of instruction should begin with clearly delineated learning goals and a model of how learning is expected to develop, along with assessments to measure student progress toward—and attainment of—the goals. Instruction should help learners understand the general principles underlying specific examples and emphasize not only content knowledge, but also how, when, and why to apply this knowledge. In addition, the committee recommended that instructional designers incorporate these research-based teaching methods:

- Use multiple and varied representations of concepts, such as diagrams, numerical and mathematical representations, and simulations, along with support to help students interpret them.
- Encourage elaboration, questioning, and explanation—for example, prompting students who are reading a history text to explain the material aloud to themselves or others as they read.
- Engage learners in challenging tasks, while also supporting them with guidance, feedback, and encouragement to reflect on their own learning processes.
- Teach with examples and cases, such as modeling step-by-step how students can carry out a procedure to solve a problem while explaining the reason for each step.
- Prime student motivation by
connecting topics to students' personal lives and interests, engaging students in problem solving, and drawing attention to the knowledge and skills students are developing and their relevance rather than focusing on grades or scores.

- Use formative assessments, which continuously monitor students' progress and provide feedback to teachers and students for use in adjusting their teaching and learning strategies.

More recently, research has focused on social and emotional learning programs that primarily target development of interpersonal and intrapersonal competencies (these programs often include some academic content). Meta-analyses of many studies of in-school and after-school social and emotional learning programs have found that these programs positively affect both interpersonal and intrapersonal competencies as well as academic achievement. Researchers have identified four practices thought to work together to enhance the effectiveness of such programs: a) using a sequenced, step-by-step training approach; b) emphasizing active forms of learning, so students can practice new skills; c) focusing specific time and attention on skills training; and d) clearly defining goals, so students know what they are expected to learn.

The committee compared these practices with the instructional design principles discussed above and identified some similarities and areas of overlap. They concluded that the principles shown to support the acquisition of transferable cognitive competencies might also be applied to instruction supporting the attainment of intrapersonal and interpersonal competencies. However, further research is needed to test this hypothesis.

**Next Steps for Research and Policy**

Because 21st century competencies support academic achievement, their widespread acquisition could potentially reduce disparities in education attainment, preparing a broader swathe of young people for success in work and other areas of life.

However, important challenges remain in two major areas. First, research and development is needed to a) create and evaluate new curricula based on the research-based instructional methods described above, and b) find valid ways to assess cognitive, intrapersonal, and interpersonal skills so improvements can be accurately measured. Second, at the level of education systems and policies, new approaches to teacher preparation and professional development will be needed to help instructors acquire a deep understanding of the role of 21st century competencies in learning core academic content and create environments that support students' learning of these competencies.

To help address these systemic issues, the committee recommended that states and the federal government focus policy attention on the following areas:

**Curriculum:** Funding agencies should support the development of curricula and instructional programs that follow the instructional design principles and research-based teaching methods outlined above.

**Assessment:** The extent to which teachers focus on helping students develop 21st century competencies will be strongly influenced by the degree to which these competencies are included in district, state, and national assessments. States should work through the two Common Core assessment consortia funded by the U.S. Department of Education to ensure that the resulting assessments—as well as those that are developed based on the new science standards—include tasks that call upon 21st century competencies as applied in English language arts, mathematics, and science.

**Accountability:** When reauthorizing the Elementary and Secondary Education Act, Congress should support the systematic development, implementation, and evaluation of educational interventions to facilitate deeper learning and the development of 21st century competencies.

**Teacher Education:** The states should lead development and implementation of new approaches to teacher preparation and professional development to help current and prospective teachers understand how to develop students' 21st century competencies in the context of mastering core academic content.

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