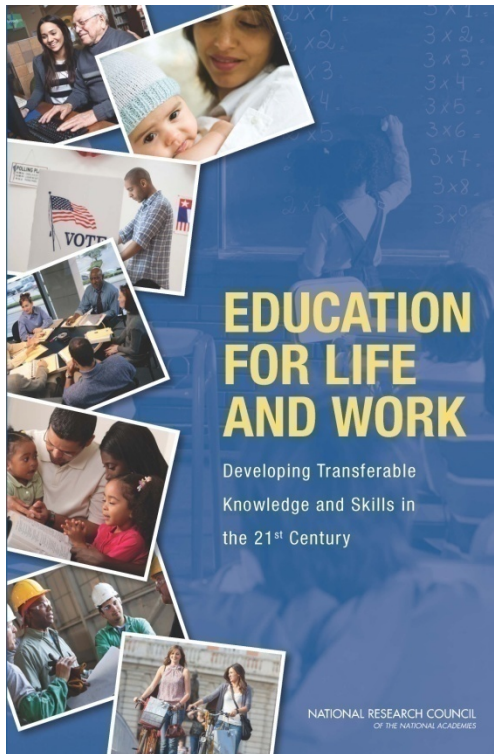


## Education for Life and Work: Developing Transferable Knowledge and Skills in the 21<sup>st</sup> Century



Committee on Defining Deeper Learning and  
21<sup>st</sup> Century Skills

Division of Behavioral and Social Sciences and Education  
National Research Council

# Committee charge

**Define** the set of key skills referred to as “deeper learning,” “21<sup>st</sup> century skills,” and by other labels

**Describe** how the skills relate to each other and to the learning of reading, mathematics, and science and engineering

**Review** research on their importance for positive adult outcomes

**Discuss** how to teach and assess them

**Identify** features of interventions that develop them

# Study sponsors



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# TERMINOLOGY

# Deeper learning

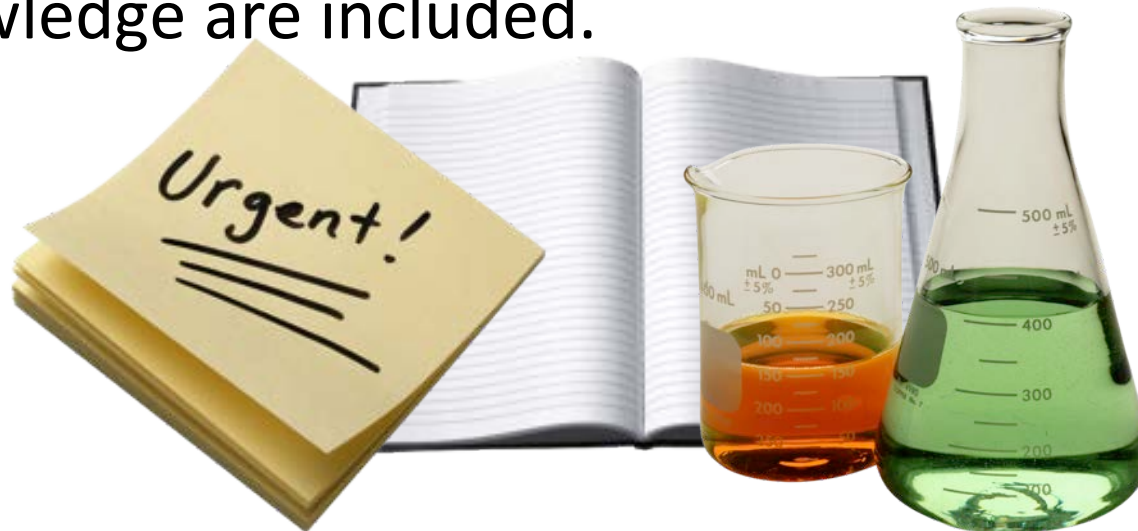
**Deeper learning** is the process of learning for transfer. It enables an individual to take what was learned in one situation and apply it to new situations.



# 21<sup>st</sup> Century competencies

The product of deeper learning is **transferable knowledge**, including **content** knowledge in a subject area and **procedural** knowledge of how, why, and when to apply this knowledge to answer questions and solve problems in the subject area.

We refer to this transferable knowledge as **21<sup>st</sup> Century Competencies** to reflect that both skills and knowledge are included.



# Domains of Competence

- Cognitive: reasoning and memory
- Intrapersonal: self-management, conscientiousness /work ethic
- Interpersonal: expressing ideas and interpreting and responding to others' messages





# Intertwined Competencies





# Evidence of importance

The **available research** linking specific competencies with **successful educational, career, and health outcomes** is **limited** and primarily correlational in nature.

**Cognitive** competencies show **positive correlations** (of modest size) **with desirable adult outcomes**.

# Evidence of importance (cont'd)

In the interpersonal and intrapersonal domains, **conscientiousness is most highly correlated with desirable outcomes**, while **anti-social behavior is negatively correlated** with them.

**Years of schooling strongly predicts adult earnings**, perhaps because students develop a mix of cognitive, interpersonal and intrapersonal competencies. Therefore, increasing educational attainment may be a useful complementary strategy for developing 21st century competencies.





# Evidence of Importance for Skilled Technical Jobs

- Job families: Installation/maintenance; health care; construction, manufacturing (Rothwell)
- Require cognitive, interpersonal and intrapersonal competencies (O\*NET; case studies)
- Employers can find people with the required technical skills but who lack the needed work ethic/conscientiousness (Accenture/Burning Glass/HBS)

# Example: Installation/maintenance/repair

- Cognitive: trouble-shooting; diagnosing and solving non-routine problems
- Intrapersonal: work ethic/self-management
- Interpersonal: communication and coordination of work



# CONCLUSIONS

# Teaching for transfer

Emerging evidence indicates that cognitive, intrapersonal and interpersonal **competencies can be taught and learned** in ways that promote effective transfer.



# Transfer is supported when Learners

**Understand general principles**, as emphasized in the CCSS and NGSS

**Understand factual and conceptual knowledge** in a subject area and also applicable **problem-solving strategies**.

**Recognize how, when, and why to apply** their factual, conceptual, and procedural knowledge and skills.





# To design instruction for transfer



Begin with clearly-defined learning **goals** and a **model** of how learning is expected to develop.

Use **assessments** to measure and support progress toward goals.

Provide **multiple, varied** representations of concepts and tasks.

**Encourage questioning** and discussion.



# To design instruction for transfer (cont'd)

Engage learners in **challenging** tasks, with support and guidance.

Teach with carefully selected sets of **examples** and cases.

Prime student **motivation**.

Use formative assessment to provide **feedback**.



# **CHALLENGES AND RECOMMENDATIONS**

# Assessment challenges

Current educational **policies and accountability systems** rely on **standardized assessments** that focus primarily on recall of facts and procedures.

These assessments are easily scored and quantified for accountability purposes. Although inexpensive, they are **not** optimal for **assessing 21<sup>st</sup> century** competencies.

We **lack valid, reliable measures of 21<sup>st</sup> century competencies**, particularly in the intrapersonal and interpersonal domains.

# Recommendations

- Funders should support research to more clearly define and develop assessments of 21st century competencies, particularly intrapersonal and interpersonal competencies.
- New assessment systems aligned with the CCSS should emphasize tasks and situations that call upon a range of 21st century competencies.
- New assessment systems aligned with the NGSS should emphasize measures of 21<sup>st</sup> century competencies reflecting a blend of science practices, crosscutting concepts, and core ideas.

# Instructional challenges

Teachers, faculty and administrators are often **unfamiliar** with the instructional principles that support transfer.

**Professional development** will be needed to help teachers and faculty envision and enact new strategies to foster deeper learning.

Teachers and faculty will **need support** from administrators and peers.



# Recommendations

- Funders should support the development of curriculum and professional development programs that follow the instructional design principles for transfer.
- Funders should support research to more clearly illuminate how to support deeper learning, particularly in the intrapersonal and interpersonal domains.
- The States and the federal government should support deeper learning. For example, Congressional reauthorization of ESEA should facilitate the systemic development, implementation, and evaluation of educational interventions targeting deeper learning processes and the development of transferable 21<sup>st</sup> century competencies.