How to Cultivate Social and Emotional Learning With Computational Thinking

Content provided by Learning.com

Excel in a Digital World
What does it mean to be future ready?
Naomi Veak
Moderator

Jeff Meyer
Director of Education,
Learning.com
“Accompanying the adoption of advanced technologies into the workplace there will be an increase in the need for workers with finely tuned social and emotional skills—skills that machines are a long way from mastering.”

MCKINSEY GLOBAL INSTITUTE
Skill shift: Automation and the future of the workforce
According to the same report, the fastest growing skills workers will need between now and 2030 are **technology skills** and **social and emotional skills**.

- 60% Increase in number of hours using technology skills
- 26% Increase in number of hours using social and emotional skills
How are these prioritized in education?

A survey by ERDI asked school and district leaders about instructional priorities:

- **Ranking #1**: Social and Emotional Learning
- **Ranking #14**: Tech Literacy
How are these prioritized in education?

A survey by ERDI asked school and district leaders about instructional priorities:

- Ranking #1: Social and Emotional Learning
- Ranking #14: Tech Literacy

Is this the same in your school?
The needed **social and emotional skills** between now and 2030 are:

1. Leadership and managing others
2. Entrepreneurship and initiative-taking
3. Interpersonal skills and empathy
4. Advanced communication and negotiation skills
5. Adaptability and continuous learning
6. Teaching and training others
The needed **technological skills** between now and 2030 are:

1 – Advanced IT skills and programming

2 – Basic digital skills

3 – Technology design, engineering, and maintenance

4 – Scientific research and development

5 – Advanced data analysis and mathematical skills
Jobs of the future require Computational thinking.
Computational Thinking = Complex Problem-Solving
What is computational thinking?

Problem-solving using computational thinking takes place over a multi-step process involving the following:

**Decomposition** –
Breaking the problem down into smaller parts

**Pattern Recognition** –
Identifying patterns in the different parts

**Abstraction** –
Finding the general principles that create the patterns

**Algorithmic Thinking** –
Developing step-by-step patterns that solve the problem
Decomposition

Decomposition means breaking down a complicated problem into its components and working on one component at a time.
WHAT IS COMPUTATIONAL THINKING?

Pattern Recognition

Students leverage pattern recognition by analyzing trends in data and using that information to work out solutions.
WHAT IS COMPUTATIONAL THINKING?

Abstraction

Students apply abstraction by using trends in data to generalize rules that enable them to solve complicated problems.
WHAT IS COMPUTATIONAL THINKING?

Algorithmic Thinking

Students demonstrate algorithmic thinking whenever they create or use a well-defined series of steps to achieve a desired outcome.
Try this....

Sum up all of the numbers between 1 and 200
Times up!
Answer = 20,100
(1, 2, 3, 4, 5... 196, 197, 198, 199, 200)
1 + 200 = 201

(1, 2, 3, 4, 5... 196, 197, 198, 199, 200)
1 + 200 = 201
2 + 199 = 201

(1,2,3,4,5...196,197,198,199, 200)
1 + 200 = 201
2 + 199 = 201
3 + 198 = 201

(1,2,3,4,5...196,197,198,199, 200)
\[ (1, 2, 3, 4, 5 \ldots 196, 197, 198, 199, 200) \]

1 + 200 = 201
2 + 199 = 201
3 + 198 = 201

\[ \text{100 Pairs} \times 201 = 20,100 \]
1 + 2000 = 2001
2 + 1999 = 2001
3 + 1998 = 2001

(1,2,3,4,5...1997, 1998,1999, 2000)

1000 Pairs x 2001 = 2,001,000
FROM THAT, WE GET THIS ALGORITHM

\[ ? = \frac{\text{total numbers}}{2} \times (\text{total numbers} + 1) \]
Essential Attitudes of Computational Thinking

**Confidence** needed to tackle ambiguous problems

**Tenacity** to persist through challenges requiring iteration and experimentation

**Strong communication skills** to facilitate collaboration and presentation

**Curiosity** across all disciplines that leads them to ask and answer big, scary questions

**Growth mindset** that leads to lifelong learning
Computational Thinking

Social and Emotional Learning
“Nuclear technology is sophisticated and was invented by learned individuals who would have scored highly on math and science exams. But what good is knowledge if it is used for destructive purposes – and what good is it if a child knows all their times tables, if their house is destroyed in a nuclear blast?”

LUCY CREHAN
Cleverlands: The Secrets Behind the Success of the World's Education Superpowers
Unplugged Activity

New Student in Class

Grade Level(s): Kindergarten - Grade 2

Subject: English Language Arts

Overview: Students create directions for classroom tasks to help a new student.

SEL Integration: Students work with peers, identify how they can use their knowledge and skills to help others, and receive feedback to enhance their work.


Technology Option: Have students use word processing and multimedia software to create their poster. Include options for tech-centered tasks like using the school library database or logging on to class computers.
Unplugged Activity

Bedroom Blueprint

Grade Level(s): 3 - 5

Subject: Mathematics

Overview: Students build models of a bedroom blueprint to use for designing a new room. They also manage their budget to identify what furniture they will include.

SEL Integration: Students work in groups collaboratively and use data to support decision-making.

Computational Thinking Integration: Students build models to represent data and help them solve problems.

Technology Option: Use spreadsheets to organize and manage data, multimedia software to model the classroom online, and word processing programs to respond to reflection questions.
Unplugged Activity

Egg-cellent Egg Drop

Grade Level(s): 6 - 8

Subject: Science

Overview: Students work in groups to design solutions to for an egg-drop experiment. They will use an iterative process to test and modify their solutions.

SEL Integration: Students work in groups and practice communication skills and develop perseverance when solving ambiguous problems.

Computational Thinking Integration: Students are cultivating design skills to test and modify solutions.

Technology Option: Have students use word processing and multimedia software to record the most successful solution.

Aligns with Common Core Science standards
A New Foundation for Readiness

**Work Will Be**
- Market-Driven and User-Centered
  - Solve Problems
  - Thrive in Ambiguity and Uncertainty

**Think Differently**
- Solve Problems
- Thrive in Ambiguity and Uncertainty

**Work Will Be**
- Modularized and Recombined
  - Communicate and Create with Numbers
  - Learn Anything, Anywhere

**Work Will Be**
- Grounded in Relating
  - Take Initiative and Self-Advocate
  - Make Friends with People and Machines

**Work Will Be**
- Data and Metrics Driven
  - Make Friends with People and Machines
  - Cultivate Inclusive Communities

**Core Social-Emotional Skills**
- Social Awareness: Empathy and Perspective-Taking
- Self-Discovery: Deep Self-Knowledge
- Emotional Regulation

**Foundational Cognitive & Metacognitive Practices**
- Communicate and Create with Numbers
- Learn Anything, Anywhere
- Make Friends with People and Machines
- Cultivate Inclusive Communities

©2017 KnowledgeWorks Foundation. All rights reserved.
Questions?
Sources & Citations


- www.learning.com

- https://www.iste.org/standards

- https://casel.org/


- McKinsey

- Cleverlands