

School Counselors Prepare Students for 21st Century Computational Thinking Skills

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Counselors are at the forefront of opening doors to opportunities for all students.



Full Story

Counselors are at the forefront of opening doors to opportunities for all students. They collaborate “with stakeholders such as parents and guardians, teachers, administrators and community leaders to create learning environments that promote educational equity and success for every student” ([ASCA School Counselor Competencies](#)). It is crucial for educational leaders to recognize the impact and service school counselors have in every school community as stakeholders embrace engaging educational environments that support pathways to sustainable and rewarding post-secondary opportunities.

Pop Quiz!

What do these skills have in common?

1. Analytical thinking and innovation
2. Complex problem-solving
3. Critical thinking and Analysis

This list comes from The World Economic Forum [Future of Jobs Report](#). These skills are in high demand by employers today. School counselors recognize that labor market trends in local, national, and global communities impact students. Counselors guide students toward viable careers with these trends in mind. In order to adequately prepare our students for sustainable careers and to ensure all students have access to learn, school counselors are bringing opportunity to those who are traditionally underrepresented in computer science (CS) classes and in computing professions. Counselors recognize that technology is changing *every* career. Engaging students and families in conversations about sustainable careers means talking about the intersection of CS with every vocation.

Did you know that the skills mentioned above are at the heart of computational thinking in CS classes and also areas of interest for school counselors’ student-focused [ASCA Mindsets and Behaviors](#)? These skills transcend the computer screen! Teaching them to all students integrates CS, school counseling goals, and life skills that can and should begin in elementary school and follow students throughout their academic career. This debunks the myth that a school counselor must be tech-savvy to impart these skills to students. Your school counselors are prepared and experienced in these concepts that will broaden the horizons of your students.

One of the first components of computational thinking is decomposition. What does this mean and how does it relate to school counselors? Every day your school counselors are demonstrating this skill to students. The concept of breaking down a problem into smaller parts is a crucial component of a student’s ability to address an area of concern. As counselors, this type of modification shows up in 504 planning and I&RS committee meetings as a strategy we can use to help a student grasp challenging content or behaviors. Modeling decomposition with students allows for the acquisition of this skill which places them in a position of advantage when obstacles arise whether it be on a school project, a computer program, or a situation at home. For example, if a student is having difficulty in a class, the counselor and student break the problem down and view it from different angles. Is the student studying regularly, taking advantage of extra help sessions, prepared for class (both academically with supplies and ready to learn - not hungry, tired), know where to find resources, etc.? Breaking down the problem and considering a variety of possible contributing factors is the essence of decomposition.

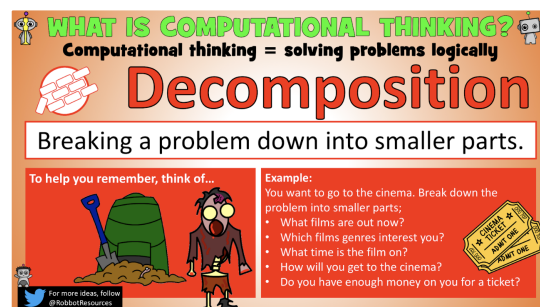
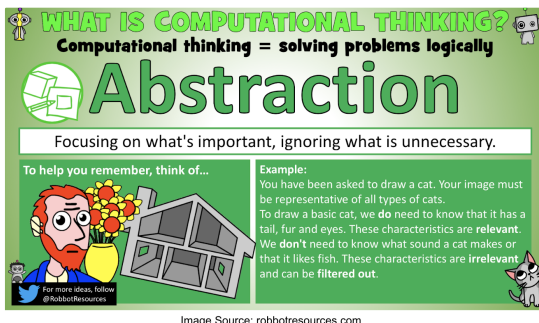


Image Source: [robotresources.com](#)

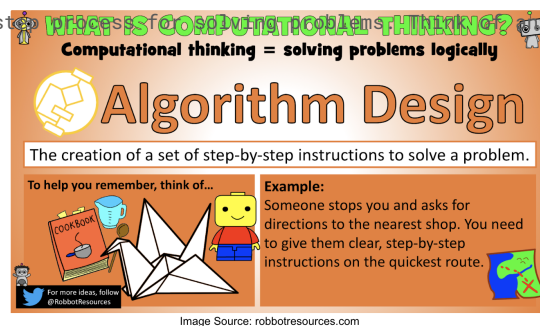
During pattern recognition in computational thinking, students learn to recognize trends and similarities. What worked successfully last time they ran into this problem? What didn’t work? If students have run into this problem before, what did they learn that worked well or didn’t work that they can apply to this situation? In the scenario of a student struggling in a class, the student and counselor might reflect on how the student performed in this subject area the previous year. Is this possibly a new area of study in which the student lacks enough background experience? A counselor might meet with the students’ peers in the class to learn about their study habits, resources they use, and other strategies they employ. Identifying patterns of what has worked and not worked in the past along with identifying patterns of behavior in students

who are doing well in the class provides a framework to create a collaborative plan for the struggling student. It also models a problem-solving strategy they can apply to other situations to support more positive outcomes.

Abstraction is about focusing on the most relevant aspects of a problem and not getting distracted by the red herrings. Rarely do students come to a school counselor with a clear, concise statement about the problem or view of a situation. Often there is a great deal of extra information that feels critical to the student. By taking a step back, counselors can help students focus on what is truly relevant to the problem. This challenge of sorting through details and distractions isn't a problem relegated to children; it's a human problem! We all struggle with this from time to time. Think of the last time you were late to work. You might have run through a list of frustrations that led to you being late, and some might have been legitimate problems to address (the alarm didn't go off) while others might be annoying situational frustrations that may not relate to being late (Why does the dog always take so long to go to the bathroom on cold mornings?). Being able to tease out what is truly necessary to consider when solving a problem is not just a computational thinking skill, but it is also a critical life skill! School counselors view this as "stripping away the drama and pulling out the facts." The key is to identify which aspects are truly relevant to solving the problem.



Computational thinking also encompasses algorithm design, which is a step-by-step algorithm as being like a recipe: very specific, measured ingredients combined in a clearly defined order. When counselors work with students on challenges, they develop a plan that involves a step-by-step process for addressing the obstacle and "debugging" or anticipating challenges and problem-solving. Within the creation of the plan, they need to provide for anticipated roadblocks. How might that student address anticipated challenges? For example, a counselor might verbally "walk through" the student's process of leaving period 1 class to arrive in period 2 class on time. Does the student stay behind and chat with the teacher or peers? Does the student circle back to the locker to pick up supplies or take a longer than necessary route to the next class? Creating a step-by-step "recipe" to get to class on time is a transferable skill for other life challenges.



What are some next steps for collaborating with your school counselor, administration, and CS staff?

Did you know that three out of five schools in the U.S. do not offer computing courses that include programming or coding, yet we know that computing jobs are the way of the future? "The U.S. Department of Labor estimates that by 2020 there will be more than 1.4 million computing-related job openings. At current rates, however, we can only fill about 30% of those jobs with U.S. computing bachelor's grads" (Source: <https://www.ncwit.org/infographic/3435>). This [Computer Science Professional Development Guide](#) developed by Microsoft Edu and in collaboration with champions for broadening participation in computing offers a step-by-step guide about how education leaders can build teacher, school counselor, and administrator capacity to support equitable computer science education.

[NCWIT Counselors for Computing](#) provides professional school counselors with information and resources they can use to support ALL students as they explore CS education and careers. The NCWIT Counselors for Computing "See Yourself in Computing" virtual reality (VR) campaign motivates students to ask, "How can I get started in CS?" Explore the free immersive content with your students using your computer, tablet, or with a VR headset.

School counselors are champions for equity, advocating for a system that supports all students' in accessing learning opportunities to guide them towards sustainable careers. They "demonstrate their belief that all students have the ability to learn by advocating for an education system that provides optimal learning environments for all students" ([ASCA Ethical Standards for School Counselors](#)). Preparing ALL students for post-secondary plans requires all educators to recognize and discuss how CS is woven through every career and how we can spark interest in sustainable careers across K-12.

Additional Resources

[Robot Resources](#) offers a variety of printable posters
[NCWIT Counselors for Computing](#)
[ASCA School Counselor Competencies](#)
[ASCA Position Statement](#), "The School Counselor and Career Development"

About the Authors

Angela Cleveland is the Program Director for NCWIT's [Counselors for Computing](#) which provides professional school counselors with information and resources they can use to support all students as they explore CS education and careers.

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