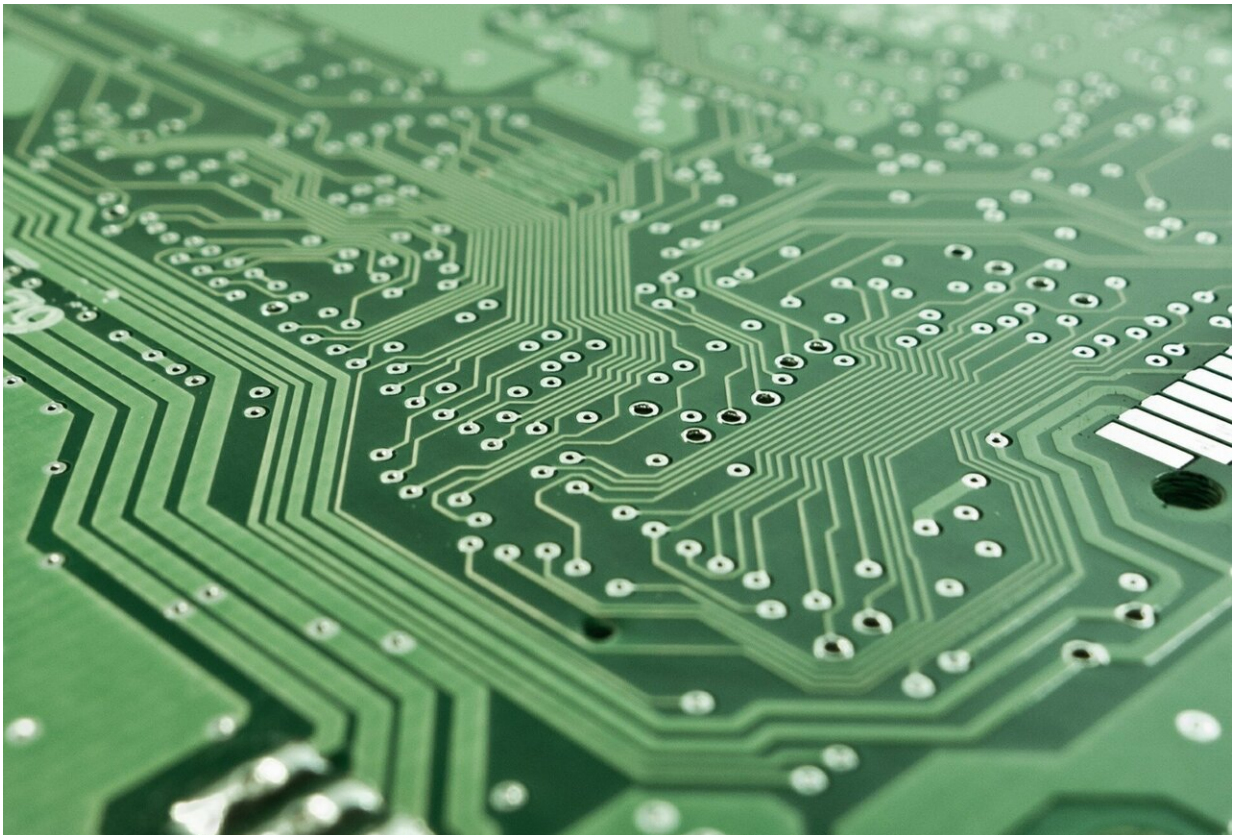


# New approach to teaching computer science could broaden the subject's appeal

May 23 2023, by Lauren Margulieux

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Despite [growing demand for computer science skills](#) in professional careers and many areas of life, K-12 schools [struggle to teach](#) computer science to the next generation.

However, a new approach to [computer science education](#)—called [integrated computing](#)—addresses the main barriers that schools face when adding computer science education. These barriers include a [lack of qualified computer science teachers](#), a lack of funds and a focus on courses tied to standardized tests.

Integrated computing teaches computer science skills like programming and computer literacy within traditional courses. For example, [students](#) can use integrated computing activities to [create geometric patterns in math](#), [simulate electromagnetic waves in science](#) and [create chatbots for literary characters](#) in language arts.

As a [professor of learning technologies](#), I have been [designing integrated computing activities](#) for K-12 students for the past five years. I work with faculty and students in teacher training programs to [create and test integrated computing activities](#) across all academic subjects.

In [my research](#), I have found that integrated computing solves three major hurdles to teaching computer science education in K-12 schools.

## **Challenges to teaching computer science**

Fitting a new academic discipline into an [already crowded curriculum](#) can be a challenge. Integrated computing allows computer science education to become part of learning in other classes, the way reading skills are also used in science, math and language arts classes.

Teacher knowledge is [another difficulty when it comes to teaching computer science](#) in K-12 schools. While people who specialize in computer science are often recruited to more lucrative careers than teaching, integrated computing develops all teachers' computer science knowledge. Teachers do not need to become computer science experts to teach computer literacy and programming skills to their students.

In fact, the most surprising result of my research is how quickly teachers learn to teach integrated computing activities. In about two hours, [teachers can use a pre-made computer science lesson](#) in their classrooms. In the future, I will teach them to use [artificial intelligence](#) to create their own lessons for their students. For example, a science teacher recently asked me how she could create a data analysis activity for her class. AI tools would allow her to [quickly design the technical aspects](#) of this activity.

And finally, integrated computing also addresses students' reluctance to take elective computer science classes when they have little knowledge of computer science. In 2022, over half of U.S. public high schools offered computer science, but just [6% of students](#) took these classes. Students who do take computer science in high school typically have had [early exposure to computer science](#). Integrated computing can give all students [early exposure](#) to computer science, which I believe will increase the number of students who take computer science courses later in school.

## **Computer science for everyone**

Early exposure to computer science in school is especially important for students from groups [underrepresented in computer science](#). A [2022 report](#) from Code.org, a nonprofit that advocates for more computer science education in K-12 schools, found that students who are Latino, female or from [low-income](#) or [rural areas](#) are [less likely](#) to be enrolled in foundational computer [science](#) courses.

Teachers who want to build their [computer science](#) knowledge and apply it to their classroom can try these free self-paced, online [integrated computing courses](#) that I developed, and which are tied to micro-credentials. Also, this sortable list of [integrated computing activities](#) provides free lesson plans. The activities require only a computer—no

[prior knowledge](#) is needed, and young learners can complete them outside of class, too.

Integrated computing provides a path to increase [computer](#) literacy for all K-12 students. As technology advances at an increasing rate, I believe schools must take care that our young people do not fall behind.

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