Issue Brief:

Computer Science as a Foreign Language Credit

Background and recommendation

As part of a national movement to put computer science into the core of our education system, proposals have surfaced to allow computer science or a coding course to count as a foreign language graduation requirement. Along with a diverse group of states and partners, Code.org and Computing in the Core support a policy of allowing computer science to count as a *mathematics or science graduation requirement*. We appreciate efforts to expand and promote computer science, but we are strongly concerned that allowing computer science courses to count as a foreign language credit will undermine the ability of students to have access to this critical field.

Alignment with mathematics and science

Computer science is its own academic discipline, but in reality, computer science is more closely aligned with mathematics than any other academic subject. Computer science curriculum contains parts of both mathematics and science (computation and theory) and engineering components (design within constraints). Computer science fits well within these disciplines and specifically strengthens math concepts like geometry, functions, and variables, as well as science concepts such as experimentation and modeling/simulation. Additionally, computer science strengthens students' knowledge and skill in problem-solving and critical thinking.

Misalignment with foreign language

Although we use the term "programming language" to refer to C++, Java, Python, and so on, coding is fundamentally different from spoken and written world languages. French, Japanese, and Spanish, etc., are natural languages, while programming languages are constructed languages created for the purpose of using a computer to build and run software. Spanish has a vocabulary of 10,000 words, and a very consistent grammatical and sentence structure. In contrast, a typical computing language has a vocabulary of about 100 words, and the real work is in how to put these words together to build a program of unlimited complexity. Both are "languages," but the learning involved is very different.

Departmental and teacher certification problems

Ideally, computer science should be considered as its own subject within the K-12 system; however, these courses have generally been aligned with mathematics, science, or business. This has already confused administrators, educators, and decision-makers about how to treat computer science, and allowing it to satisfy a foreign language credit would add to this confusion. Additionally, in many states, teacher certification pathways for computer science will

go awry if courses are shifted into foreign language departments. The idea that foreign language teachers will end up instructing students in computer science may seem unlikely, yet departmental and teacher credentialing conflicts have arisen in districts that allow computer programming to count as a foreign language.

College and university admissions requirements
If computer science is counted as a foreign language credit toward high school graduation, students who take it as a replacement for a spoken language may fail to be accepted into colleges and universities that require traditional spoken foreign language credits as entrance requirements.

Computer science is more than coding
We are advocating for the expansion of *computer science* education, not just coding. In a computer science class, a student learns how the Internet works and methods to analyze big data sets, as well as the societal implications of computing and computers -- all topics important to any field, even if the student does not write a line of code. *Coding* is the tool that students use to implement computer science and create software, and is fundamental to rigorous computer science. The combination of learning the concepts of computer science, then applying the skills through coding, is what empowers students.

Widespread support for computer science as a mathematics or science credit
27 states and Washington, DC have adopted policies allowing AP or rigorous computer science to count toward a mathematics or science credit. And at least five states are already moving to adopt this policy. Code.org along with Microsoft, Amazon, Google, Facebook, the College Board, the Computer Science Teachers Association and numerous other organizations support a policy allowing computer science to count toward mathematics or science graduation requirements.