CRACKING THE CODE ON STEM

A People Strategy for Nevada's Economy

Incorporate Computer Science Into the P-12 Core Curriculum

Problem

Familiarity with the basics of computer science will continue to grow in importance as the Nevada economy becomes increasingly technology-driven. This imperative is already evident in Nevada's expanding IT sector, which faces difficulty finding workers with the requisite training needed to succeed. Providing students the opportunity to learn computer science early on in their academic careers can help address this critical need by preparing them for the workplaces of the future and inspiring interest in careers that require computer science expertise. Regardless of whether students go on to pursue further training in computer science, this baseline knowledge will give them an ability to understand and participate in conversations about technology as the innovation economy evolves in the coming years.

At present, Nevada only requires students to obtain a half-credit in computer literacy, which focuses on basic computer and web use and does not include exposure to computer science. A handful of high schools, including the Advanced Technologies Academy in Las Vegas and Galena High School in Reno, offer Career and Technical Education (CTE) courses of study in computer science that provide multiple years of instruction in this field. However, as of the 2013-14 school year, only 550 students in the state were enrolled in a computer science CTE course of study. Furthermore, because computer science is neither a requirement for graduation nor a component of the Next Generation Science Standards, most Nevada schools have little incentive to make computer science a standard part of their curricula.

Recommendation

To help all Nevada students learn the fundamentals of computer science prior to high school graduation, the state should actively encourage all districts to incorporate computer science into the P-12 core curriculum. To start, the existing half-credit computer literacy requirement should be repurposed as a computer science requirement that introduces students to the basics of computer programming. This change in graduation requirements would allow the state to make a sizable step toward cultivating a STEM-strong workforce. In addition, such an action would also position Nevada as a national leader on P-12 computer science education,

which is only beginning to take hold in school districts throughout the United States. Meanwhile, as districts move to provide coursework that fulfills the new requirement, they should also explore ways to integrate computer science at the elementary, middle, and high school levels.

Implementation Specifics

Ensuring that all Nevada students have the opportunity to become acquainted with computer science prior to graduation will give them an important advantage in the increasingly tech-driven economy. Accomplishing this goal will require a state-level change in curricular priorities. The Board of Education could begin this shift by changing the half-credit in computer literacy now required for graduation into a half-credit computer science requirement. As is now the case, students could fulfill this requirement in either middle school or high school. The Board of Education would need to establish the basic parameters for this requirement, ideally based on the standards set out by the Computer Science Teachers Association. In addition, the state should help districts with implementation by identifying web-based and/or blended-learning curricula that meet the new standards. Given that districts would need to purchase curricular materials and train a sufficient number of teachers to reach all students before graduation, the new requirement would likely need to be phased in over several years.

Utah's efforts on this front may offer a helpful model. Beginning in the 2013-14 school year, high school students can fulfill the half-credit computer technology graduation requirement by taking Exploring Computer Science (ECS), a one-semester course that introduces students to the fundamentals of computer science. The course can be taught by any teacher who completes a five-day ECS professional development workshop and passes an Internet and Computing Core Certification (IC3) exam. Approximately 20 Utah high schools currently offer the course, and the state plans to increase that number in coming years.

At the same time, districts should begin investigating how they might incorporate computer science into the P-12 curriculum. One promising approach involves partnering with an organization like Code.org, as the New York City Department of Education, Chicago Public Schools, Broward County Public Schools (FL), and Charles County Public Schools (MD) have done. Code.org's district partnership model provides access to computer science curriculum and courses, ongoing professional development for teachers, support for grades K-12, and outreach materials targeting students and parents—all at no cost to the district.

Budget Implications

Changing the existing half-credit computer literacy graduation requirement to a half-credit computer science requirement could be accomplished at no cost to the state. However, given that few Nevada high schools currently offer courses that could fulfill such a requirement, districts would likely need to invest in appropriate curricula and related professional development. A partnership with an organization like Code.org would help districts accomplish this curricular change at minimal cost. Alternatively, districts could seek out philanthropic and/or private-sector funding to support implementation.

References

Code.org. “Code.org Pilot District Partnership Model.” Available at http://code.org/files/DistrictPartnershipPlan.pdf.

Computer Science Teachers Association. 2011. “K-12 Computer Science Standards.” Available at https://csta.acm.org/Curriculum/sub/CurrFiles/CSTA_K-12_CSS.pdf.

Exploring Computer Science. “Curriculum.” Available at www.exploringcs.org/curriculum.

For More Information

Mark Muro
Washington Director
Brookings Mountain West

Senior Fellow and Policy Director
Brookings Metropolitan Policy Program

202.797.6315
mmuro@brookings.edu