SOUND PROTOCOL

Going All-in on Computer Science Education

By Anthony Schoettle

Prosperous states and the businesses in them increasingly need a skilled workforce, with employees ready for the digital age.

To assure that, Indiana policymakers, business leaders and educators have worked tirelessly to make sure Hoosier students are computer literate with strong foundational skills that can be built upon.

The 2023 State of Computer Science Report puts Indiana sixth in the nation with regard to high schools that offer computer science education, but state officials want to rank even higher.

According to the report, 91% of Indiana high schools offer foundational computer science classes. It also shows Indiana adopted nine new policies related to computer science in 2023 and has expanded courses to many small and rural schools.

Indiana trails only Arkansas, Maryland, Nevada, Alabama and South Carolina in high school computer science offerings, and is far ahead of many states including California, Washington and Florida, which are all below 50%, according to the report. Indiana also scores higher than the national average at enrolling students from diverse races and ethnicities in computer science courses.

Indiana Secretary of Education Katie Jenner declares the state should be "pleased but not satisfied" with its progress. Even though computer science courses are widely available throughout the state, she wants enrollment pushed higher. Despite a 1,000% increase in Hoosier high school students enrolled in computer science courses since 2015, Jenner points out that only 7% of high school students in 2023 are enrolled in those classes. Jenner believes computer science skills are becoming increasingly critical to the state's job market and economy.

Road to success

Indiana's isn't an overnight success story.

"I remember 10 years ago and I look at where we were as a state, and it's amazing what's happened and where we are now," relays John Qualls, president and CEO of Eleven Fifty Academy, an Indianapolis-based coding bootcamp. "There really was a groundswell 10 years ago, a big push not only in computer programming but on the hardware side with robotics as well."

During the 2015-16 school year, the Indiana Department of Workforce Development, working with Eleven Fifty Academy, NexTech and TechPoint Foundation for Youth, funded a program to teach computer programming to students in 25 communities. "We worked with 25,000 kids," Qualls recalls.

As part of that initiative, the state set up 25 training facilities known as CoderDojos, more than any other state in the nation or region in the world, according to Qualls.

"From there, we had a strong effort to get foundational computer science courses in as many schools as we could," Qualls adds. "To the state's and educators' credit, they realized this would be a key foundational piece to making sure we had the workforce of tomorrow ready to go.

"It felt like there was a huge opportunity in this space but we couldn't take advantage of it because we couldn't find the (trained) people," Qualls explains.

Robotics' role

At the same time, then-Indianapolis Mayor Greg Ballard was making robotics in schools a priority. He was inspired after attending a robotics competition and being blown away by what the students – and their robots – could accomplish.

Ballard worked with the TechPoint Foundation for Youth to launch a city-wide robotics initiative, with the inaugural robotics championship held in 2012. Ballard used his philanthropic network to help raise funds with the goal of allowing all Indianapolis high schools the opportunity to compete in a world-class robotics event. Grants covered each school's cost for the equipment required to form a robotics team, and initially, the program served the city's 38 high schools.

By 2016, more than 180 grants had been awarded to public schools for robotics teams, getting nearly 3,000 students into robotics on an annual budget of $170,000, which was covered primarily by corporate donors concerned about STEM talent in Indiana that industry insiders said was already behind corporate demand.

Building on that, Indiana now leads the nation in the number of K-12 students – 21,000-plus annually – participating in robotics competitions. The Hoosier state has robotics teams from schools in every county and across every grade level. Just over a third of Indiana's robotics students are girls; 45%

Indiana has more elementary and middle school robotics teams than any state in the nation, leading to greater computer literacy throughout high school.

are from resource-limited communities and 35% are students of color.

Promising applications

Dana Calfee, a STEM and computer science specialist at the Indiana Department of Education, says encouraging professional development for teachers and promoting programs that help students integrate skills like computer science into their educations and lives is a big part of the state's success.

One of those efforts is the Indiana STEM Cadre. The program provides coaches and training in fourth to eighth grade classrooms.

"Part of the focus on that coaching model is to really look at the foundational practices across math, science, technology and computer science and determine intersections of practice that really, really get kids engaged with STEM learning," Calfee notes.

There also have been initiatives to fund educational technology companies that can bolster the level of education throughout the state. The Butler Accelerator for Education and Workforce Innovation powered by gener8tor (a national venture capital firm) is one such initiative, funding five start-up companies focused on transforming education and workforce learning, especially with advanced technology. The Butler Accelerator also worked to increase computer science education throughout the state.

"Edtech is more than a growing part of the tech sector; it's an incredibly important part of ensuring our educational facilities are giving our students the very best start in life and access to all the tools they need to learn and thrive in the ever-technologically driven world," maintains Chelsea Linder, a former gener8tor executive who now serves as TechPoint vice president for innovation and entrepreneurship.

"Indiana has a long history of understanding that computer science and STEM are the future of careers," she adds. "Honestly, this (top six ranking) doesn't surprise me. There's been a real investment by the state in bringing computer science to so many high schools."

There's been much made of artificial intelligence (AI) platforms like ChatGPT's ability to do computer programming. Qualls said that will do little to diminish the needs for human programmers. "For every job AI takes away, it will create three jobs," he states. "AI is just another tool. It's the trained craftsman that's able to use it that is the big deal."

Qualls admits it would be easy to think this movement is all about growing tech companies and the tech sector in Indiana.

"Sometimes we get too focused on computer science and we think it has to do with (just) tech companies," Qualls relates. "It has to do with tech roles. There are more tech jobs or tech roles in non-tech companies than anywhere else. I do believe computer science education is a fundamental piece in making sure all Indiana companies have the talent they need."

Linder adds that Indiana is "lucky to have industries in Indiana like manufacturing and agriculture that need innovation and have benefited from tech adoption. We've benefited from innovative companies like Cummins and others.

"The corporate side has really put an emphasis on this, and policymakers and educators have listened. All of this has put Indiana on the leading edge when it comes to computer science education."

RESOURCES: Dana Calfee and Dr. Katie Jenner, Indiana Department of Education, at www.in.gov/doe | Chelsea Linder, TechPoint, at www.techpoint.org | John Qualls, Eleven Fifty Academy, at www.elevenfifty.org