CODE Sooner

// *Students and faculty* in OU's School of Computer Science are giving high school students a leg-up in STEM curriculum by teaching computer coding before they get to campus. {

By Anne Barajas Harp

Most of America is walking around with a computer millions of times more powerful than those that put a man on the moon. But without coding, that smart phone in your pocket might as well be a moon rock.

Coding is a series of written commands that allows humans to communicate with computers. It underlies each app and every click of a mouse. And that's why the University of Oklahoma's Code Sooner program for high school students has the potential to help shape so many lives and livelihoods.

"I just wanted to do something for the kids of Oklahoma and infuse computer science knowledge," says Sridhar Radhakrishnan, founder of Code Sooner and director of the OU School of Computer Science. "The world is full of computers."

Though a growing number of states – including neighbors Arkansas and Texas – now require high school students to learn computer science, Oklahoma is not yet among them. Radhakrishnan saw a way that OU could help fill the gap.

"I didn't have a plan other than the fact that the low-hanging fruit was teaching curriculum related to Advanced Placement classes," he says. High school AP courses give teachers flexibility to create content if the curriculum meets certain national standards and is submitted for approval. Radkahrishnan and a team of OU graduate and undergraduate students went to work designing video-based lectures, assignments, projects and exams within AP guidelines and launched Code Sooner in the fall of 2017.

Code Sooner is offered at no cost to Oklahoma public schools and delivers online curricula for two AP courses, with live technical support provided by OU computer science students. Five schools and 39 students initially signed up, a number that has mushroomed in just one year to 21 schools and more than 470 students across the state.

Radhakrishnan says that coding is used in almost every profession. Learning the skill set gives college-bound students a leg up and greatly improves the marketability of high school graduates headed straight for the workforce. "The beauty of Code Sooner is that it can reach rural communities, it's not just the urban areas," he says. "That's where the key is, giving the kids in rural Oklahoma an opportunity to get an advanced education."

```javascript
isVideo     = ( (type
isUrl       = ( (source.indexOf "youtube.com/embed"
isElement   = ( (type == "url"
isObject    = ( (typeof subject

// Check if boxer is already active, retain default
if ($("#boxer").length > 1
    return;
}

// Kill event
_killEvent(e);

// Cache internal data
data = $.extend({}, {
    $window: $(window),
    $body: $("body"),
    $target: $target,
    $object: $object,
    visible: false,
    resizeTimer: null,
    touchTimer: null,
    gallery: {
```


Professor Sridhar Radhakrishnan (left) created "Code Sooner," with help from his students like Ariana Paz Pirela.
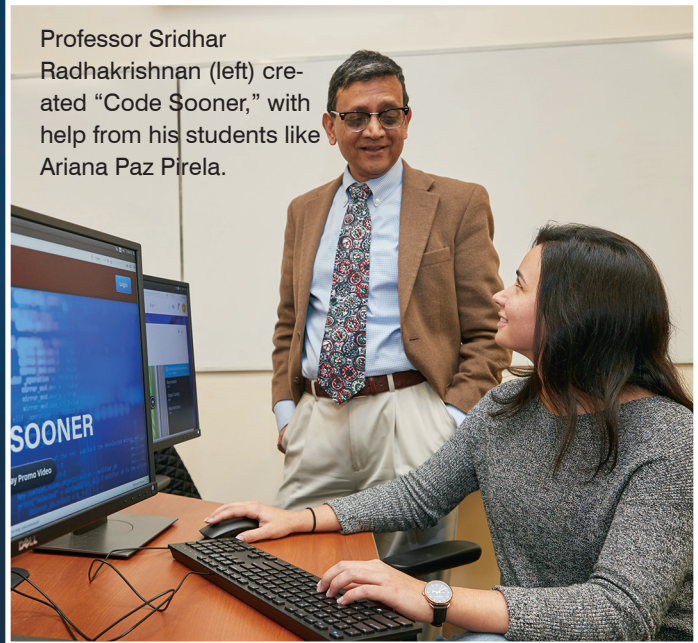
But the benefits of learning computer coding go deeper than job prospects.

"The idea is not that everyone wants to become a computer scientist; the idea is that we want students to become problem-solvers using a computer," Radhakrishnan says. "The problem-solving skills are fundamentally more important. Coding makes you think. You have a problem, you translate the problem with a set of instructions, and you apply the instructions using a coding language that the computer can understand. That's the whole picture right there."

"The thing with coding is that you learn by doing," says Dustin Crowder of Grove, Okla., whose classes have participated in Code Sooner for two years. "Students will ask, 'What's the procedure?' Well, get in there and find it. Mess it up – that's how you're going to learn. As a teacher, you're bringing in problem-solving skills and students are learning to exist on their own. In my opinion, every kid should be exposed to coding. It's everywhere. If you just go onto the Internet and look up coding jobs, they cannot fill the need right now."

Crowder is Grove Public Schools' technology director and had 12 years of experience teaching AP Math, College Algebra and Algebra II at the roughly 1,000-student high school when he began "dabbling with programming" on his own time. He was seeking a method to bridge such existing courses as Computers II, Engineering and Robotics when he discovered Code Sooner.

"Honestly, it was amazing," Crowder says of his first year teaching the program. "Code Sooner provides you with the framework and we were able to add our own projects." When Grove High School's counselor learned what Crowder's class was doing, she presented them with a real-world problem to solve: the student portal program she was using had so many glitches that it required an entire work day to produce weekly academic eligibility reports.

"My students embraced it. We took two weeks and, together, designed a program for our counselor that reduced her eligibility report time from eight hours to five minutes every week," Crowder says.

Like all teachers who sign up for Code Sooner, Crowder received summer training and a small stipend to cover his expenses. "The teachers don't even care about the extra money

– they want an opportunity to prepare with good materials," Radhakrishnan says. "That's where we come in."

Undergraduate and graduate OU teaching assistants form Code Sooner's support team. They are assigned as personal ambassadors to each school, checking in weekly to answer questions and troubleshoot as needed. They also make annual site visits.

"It was unbelievable," Crowder says of his experience with the support team. "I could text them, call them, e-mail them at any time." He also had the ready assistance of NextThought, an online learning company that developed the Code Sooner platform and is located on OU's South Research Campus.

Coordinating the Code Sooner team this year is Ariana Paz Pirela, an OU senior from Caracas, Venezuela, who wishes she had learned to code long before her first college course in computer programming.

"Coding is awesome, not only because it opens a lot of doors in the work field, but also because it makes you think in a different way," she says. "It helps you see everything with a programmer's perspective of asking questions and breaking problems down to solve them. It opens up a world of possibilities once you learn to see things this way."

Paz Pirela uses those same problem-solving skills to serve OU's Code Sooner partners. "My main concern is to make this a good experience for the schools," says the student, who juggles her duties with earning a dual bachelor's/master's degree in computer science. "It was 'learn as you go' while solving their problems and my problems."

Paz Pirela also coordinated the annual Code Sooner Challenge. Schools are given a prompt one month in advance and encouraged to develop coding projects judged in a competition on OU's Norman campus.

Crowder accepted the challenge and fielded both a boys' and girls' team, alongside engineering and robotics teacher Jeanne Smith. "I was very hands-off with them because that's the way they learn," he says of his students. "For the most part, it was 100 percent their project, and that's the way it should be."

The Grove High School girls' team took first place in the 2018 Code Sooner Challenge by designing a JAVA-programmed robot that traveled an interactive OU map. The robot followed

Grove High School students, from left, Alyssa Perry, Autumn Burns and Allysia Sturm celebrate winning the 2018 Code Sooner Challenge.

commands to visit various locales and offered facts about each. Some teams developed virtual reality experiences, including one of a castle and village created from scratch.

"When I saw the projects that these kids had designed, things that I never imagined they were going to be doing at their age, all the extra hours of work and solving technical

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problems and answering questions were worth it. I think if you give a kid an opportunity, they do amazing things," Paz Pirela says.

Though justifiably proud of his team, Crowder says creating, not winning, was not the point of the Code Sooner Challenge. "Like I tell my students on the first day of class, you are literally starting with a blank canvas. You're an artist. Once you learn to code, anything is possible. If you really want to learn coding, just go out there and start building stuff. Let your imagination go; if you can think it, you can build it."

Code Sooner's founder feels much the same about the project he created to bring coding to high school students in towns both large and small. "A real achievement would be if I had 10,000 students from Oklahoma who had taken one of our courses in the next five years. I would be extremely thrilled," Radhakrishnan says. "My goals are lofty."

Anne Barajas Harp is associate editor of Sooner Magazine.