Orange High School (OHS) is a public school in Pepper Pike, Ohio with a socioeconomically and ethnically diverse student population of about 650. Due to the high performance of AP students and the sheer number of tests administered in comparison with the modest size of their student body, OHS has consistently been ranked as one of the top schools in not only the state, but the country by Newsweek, despite competition from several private schools in the area. Orange offered AP Computer Science A/AB until 2007, but restructuring within the Math Department resulted in cancellation of the course.

By late spring of 2013, the growing interest and demand for computer science education by both the students and the community forced the resurrection of the course for the 2014-2015 school year. While the administration agreed with the need for a CS program, the problem of finding a qualified and certified teacher to take on this challenge persisted. Nationally, K-12 schools sorely lack computer programming and science offerings, in part because the professionals trained to teach these courses are either drawn to the numerous unfilled, high paying jobs in this field or they lack the proper credentials to teach these subjects in secondary schools. Teacher preparation and certification requirements in
the field of CS are vastly different from state to state. Consequently, schools become less willing to allocate monetary or time resources needed to implement a proper program. Orange High School has a reputation of leading the way to change, however, and fortunately had a certified, veteran teacher on staff, Mrs. Erin Cingel.

With several students registered for the course when it was brought to Cingel's attention, she agreed to head to the state AP conference during the summer of 2014 to prepare for this challenge. While Cingel felt overwhelmed with the task, she also understood the urgency and need for a CS program at Orange High School. “I was concerned because I wanted to do a good job, but I realized I had a lot to learn and do in a short amount of time. Yet, I was also excited for the opportunity for the students,” explained Cingel.

“Then somewhere, somehow, an email from Edhesive came across my desk. I remember seeing it and thinking that this could be exactly what I need to both learn the material and prepare me to teach this course.” With approval from Principal Dr. Paul Lucas, Cingel acquired the curriculum.

Implementation and Success at Orange High School

Together with robotics teacher Mr. Ryan McMonigle, Cingel worked through the course ahead of her students the first year, encouraging them to collaborate and utilize the student forum. Cingel also benefited from the teacher forum, included in Edhesive’s curriculum, elaborating that she “found the teacher forum to be one of the most beneficial aspects of the course. I could ask questions and post code without my students seeing, and receive timely answers.” Through the following year, Cingel began to build a scope and sequence for a thorough CS pathway, recognizing the value of building confidence and content knowledge early. OHS then added Edhesive’s Intro CS course, implementing it as a semester-long elective to offer a solid coding foundation as well as the opportunity for career exploration. In 2016, OHS continued with the AP CSP pilot course taught by Mr. McMonigle using Edhesive’s curriculum. “Most of my freshmen and sophomore Intro students from last year moved on to AP CSP this year,” mentioned Cingel. “The Intro course is all about making CS fun for the kids while building their confidence so they’re more apt to continue.”

Today, Cingel is supplementing the coursework with original assessments and activities. For example, she uses an original Java program for each class to randomly assign partners for an assessment called a TIP, or Timed In-class Program. The students are given a problem to solve, and must use the Pair Programming approach to design an algorithm and code a solution. Pair Programming requires one student to be the navigator, who watches and checks the program for errors, while the other student, the driver, types
up the program. Cingel wants her students to learn how to collaborate, work with different people, and engage in the material. "I have experience, but I still need Edhesive! Even with confidence in the coursework, I still use Edhesive for the invaluable teaching forum and the automatic grading features. When students are working on their assignments at home in the evenings, I can't be there to give them timely feedback when they need it to learn how to debug their own programs, but Edhesive can." To add to this, using a printed textbook for this type of content is obsolete, according to Cingel.

Since resurrecting AP CS A with Edhesive, the average passing rate on the AP exam is 77% with an average score of 3.6. "Edhesive is the backbone of the course, with an amazing pacing guide and thorough online activities. I supplement the assessments with offline free response questions found in past AP Exams. I use the College Board's scoring guidelines to give my students as much test preparation as possible." Cingel noted that she has several past and current students who wish to pursue programming after exploring all that computer science has to offer.

**Reflection**

OHS has worked to grow their computer science program from nothing to a well-structured pathway of solid programming experience. "Educational institutions can’t deny the growing demand for graduates with STEM experience, specifically in the field of computer science. Even some experience in programming empowers students, giving them a venue to demonstrate creativity and critical thinking skills. Students are able to draw connections to their math courses because in programming, students are required to not just use algorithms, but actually write and code them!"

To other schools considering Edhesive, Cingel states that "there are several programs out there that schools could explore. At the end of the day, you will get what you paid for. It’s important to just start somewhere to get a program off the ground. Other programs don’t have what Edhesive has: the sense of community on the forums, video instruction for differentiation, a pacing guide, and a teaching materials such as Powerpoints and comprehensive assessment solutions. There are a vast amount of other resources and MOOCs out there, but Edhesive is specifically designed for teachers."
Outcomes at Orange High School

- OHS now offers a complete CS pathway via Edhesive, including Intro CS, AP CSP, and AP CSA.

- The average passing rate on the AP exam is 77% with an average score of 3.6.

- Multiple students from OHS have decided to make a career out of programming.

Highlights for Teachers

- The timely responses and professional collaboration on the teacher forum are invaluable aspects of the course.

- Automatic grading allows students to receive real-time feedback on their work so they can learn how to debug their own programs.

- “There are a vast amount of other resources and MOOCs out there, but Edhesive is specifically designed for teachers.”

Edhesive makes online learning accessible, personal, and meaningful. We combine online instruction from nationally recognized experts with the personal support of local teachers, who offer students face-to-face guidance and support.

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