River Ridge High School
Excelling on the AP Exam

Andrew Forsman
Engineering Teacher
New Port Richey, FL

Implementation

Grades Taught	9-12
Length of Use	2 years
Students Enrolled this Year	29

Courses Covered

- CompSci 1 – CompSci4
- GameDev 1 – GameDev 3
- WebDev 1 – WebDev 2

Success Highlight

"The scores on the AP exam were much higher than I expected, and I believe CodeCombat is the reason why this was the case."

River Ridge High School in New Port Richey, FL is 38 miles north of Tampa and a short drive to the waters of the Gulf of Mexico. One of eighteen high schools in the district of Pasco County, River Ridge High houses one of only two Career Academies that teach engineering. Students apply to be accepted into the program and are welcomed into a learning community of like-minded students and dedicated teachers.

One of those dedicated teachers at River Ridge High School is Andrew Forsman. With a master's degree in civil engineering, Forsman only had minimal experience with computer programming, but jumped at the chance to teach the school's first AP Computer Science Principles (AP CSP) class when Assistant Principal, Jessica Meek, approached him about teaching the course.

River Ridge was one of only two schools in the district preparing to offer AP CSP, so expectations were high. "As last school year was the first year we offered computer science, our goal was to get as many students to pass the AP test as possible," Forsman says. To achieve this mission, Forsman had to find a curriculum solution that would allow him to work through his own inexperience with coding, to guide as many students as possible to AP CSP exam success, and to truly inspire his students to learn Python.

Challenges

Forsman's first challenge was to find a way to teach computer science despite his inexperience. While Forseman was vaguely familiar with coding for robots through another engineering course he taught, it was very different from the Python and programming concepts he would have to teach in an AP CS level course. "I had a minimal amount of experience [coding]. I never really took [...] any kind of computer programming classes in college or high school," Forseman explains. "So I didn't really have any formal schooling in it."

Forsman had the added challenge of looking for a program that would support differentiated instruction in his classroom. Experience levels vary in his class Forsman explains, “Five or six of the 17 [students] I had, have been on the robotics team, so they had been coding for three to four years. Then I had another group of kids that had no experience at all. So I definitely had a mixed variety.” Forsman was determined to introduce advanced coding concepts to all his students in order to ensure success on the AP CSP exam and meet the goals set by the administration. Assistant Principal Meek felt it was important to support coding and computer science at the school because as she states, “Coding is in high demand in such a wide variety [of] careers and pathways." In Florida alone there are 18,272 open computing jobs and 500,000 across the country.[1] Meek’s biggest expectation was not only for the most amount of students to pass the exam but also “that the number of students increases each year."

Forsman’s final challenge was one that he hadn’t anticipated being so difficult: to find a product to teach real Python that would capture the curiosity of his students and be rigorous enough to teach advanced programming concepts. Solutions that Forsman was using “allowed students to learn the Python language,” he says, but they “did so in a matter that was not very engaging.”

Implementation

Forsman was driven to find a program for River Ridge that would help him meet his three goals. Forsman explains his most important criteria for choosing a solution was allowing lessons to be self-paced and having as much support within the game as possible: “I wanted a platform that allowed self-guidance [...] My personal computer coding experience was very limited prior to teaching last year and [I] wanted as much assistance as possible.”

In 2017, the school supported Forsman by providing AP training and sending him to the AP Summer Institute (APSI),[2] which offers AP educators intensive professional development. It was at APSI that Forsman learned about CodeCombat. “I was just looking for content and thinking about what can I use to teach it,” he says. “And the AP instructor there introduced me to CodeCombat. He said he uses it for all his classes and all his kids love it.”

[1] https://code.org/promote/fl
[2] https://apcentral.collegeboard.org/professional-development/workshops-summer-institutes/about-summer-institutes

When Forsman took the opportunity to test out CodeCombat for himself he realized it was just what he needed for his class. A few months later, Forsman had secured full curriculum licenses for 18 AP students. Forsman found that CodeCombat was flexible enough for all his students and didn't compare to any other coding product he tested:

> **"CodeCombat is the best. The curriculum is the most intuitive and easy to understand of any curriculum to teach computer science."**
>
> **Andrew Forsman, Engineering Teacher**

High Engagement Results In High Achievement

Forsman uses CodeCombat with his current roster of AP students two to three times a week for up to 45 minutes at a time. In each nine-week marking period, students are given CodeCombat assignments to complete in either JavaScript or Python. In the second semester, if students are eager to learn more languages like Java or C++, Forsman encourages students to do so on their own. Most of his students typically enjoy learning Python the most. "Some kids that do robotics will do C++, but most of them end up choosing Python just because they liked what CodeCombat was and how they learned it," Forsman said.

Forsman teaches grades 9 through 12. Each student is coming in with varied experience levels and support systems at home-- so it's important that students have the flexibility to complete assignments at their own pace within the established due dates. CodeCombat courses are composed of various levels students play through that teach them concepts such as *syntax*,

47 Total Students
29 Current Students

Students at River Ridge High School have written:

6,594	134,077	121
computer programs	*lines of code*	*games and web projects*

Concepts Learned

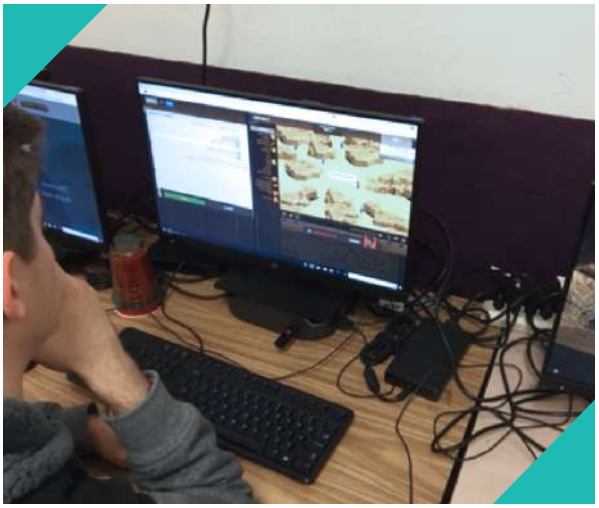
Arguments	Advanced HTML
While Loops	Basic Javascript
Variables	Arithmetic
Algorithms	Input Handling
If Statements	Boolean Logic
Functions	Arrays
Parameters	Break Statements
Advanced Strings	Continue Statements
Basic Game AI	Event Data

variables, loops, and if statements to more advanced topics within the game and web development courses. Forsman explained that on a day when a student is using CodeCombat they will come into class and begin a given CodeCombat level. “As I let students progress at their own pace, many students will be on different lessons,” Forsman said.

Forsman says students being on different levels is fun for them and keeps them engaged in what they’re learning. If questions arise, he is available to assist the student. If Forsman is unable to find a student’s error, he’ll review the level solutions on the teacher dashboard and use that to help students progress through the levels. One of the features of CodeCombat that Foresman appreciates is how each level is “broken down” and “allows students to build their knowledge of Python slowly, but surely in a way that builds student confidence.” Forsman adds, “It has made learning Python very fun.”

CodeCombat works for Forsman’s self-paced class because it gives his students all the tools they need to be independent learners invested in their own success. Forsman says that “The nature of CodeCombat allows my students to progress and meet my goals.”

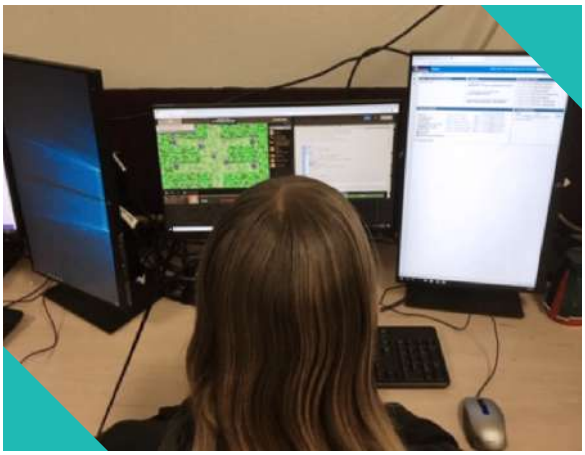
> **“What I found is that [CodeCombat] is very user friendly. A student can just log on and it walks them through the steps of what they need to do. It also assists them with how to solve the problem without necessarily just going to the instructor and saying 'I need the answer key.’”**
>
> **Andrew Forsman, Engineering Teacher**



Forsman is able to take advantage of moments when students may have problems working on a level and transform it into an opportunity for deeper learning when he can help students figure out “what line of code needs to be put in” or “what needs to be changed in order to get the program to function as being asked.” Forsman also encourages students to ask each other for help, fostering opportunities for collaboration saying, “They will help each other out. I will [ask] before they call me over, 'Have you asked him?' because I know a couple kids will be a little bit farther ahead. And then they will.”

Originally, Forsman would assign specific levels to students during the beginning of the year, but now allows students to choose their own levels in a designated course. “I had certain [levels] assigned first and second quarter,” Forsman explained.

“Now, none of it’s assigned but I still have kids playing in the game and coding. They'll even come in during lunch! They say it's just fun [and] that they enjoy doing it. For me, as a teacher, it's an easy way to get a kid engaged in learning how to code.”



For Forman the most rewarding experience has been witnessing the impact CodeCombat and computer science has had on student educational and social-emotional growth.

Forsman talks about watching the growth of self-confidence in one of his students as they progressed through the class and began developing their own program required for their AP CSP performance task submission:

> **“There was one kid last year that started off not knowing much Python at all. Eventually, for his create task he used a Python compiler to make an awesome program, like a blackjack-esque program where he had any way that you could win or lose in blackjack. It was amazing! He said CodeCombat and learning Python that way helped him do it.”**

Andrew Forsman, Engineering Teacher

Tips for Teachers

Forsman’s top recommendation to teachers is to allow students to feel like learning is a reward by letting them work at their own pace. Help students not feel overwhelmed by assignments by breaking lessons up and giving them clear guidelines and expectations.

> **“When the [student] doesn't have to feel like so much has to be done by a certain period of time, they are open and more engaged in it. And will give it a try. If they know they have to get all of it done in a short period of time they freeze up and don't do as much.”**

Finding Success By Investing in Students

Last year, the student's hard work paid off. River Ridge was working with brand new data at the time, so Forsman had nothing to compare it to except previous performance from the AP physics class he once taught, saying:

> **When I taught classes of 15, the most I ever had was maybe two or three [students] get a three or higher. So when I had 13 out of my 17 [students] get a three or higher a lot of them said what definitely helped them was learning CodeCombat and Python.**
>
> **Andrew Forsman, Engineering Teacher**

Students said they had played so much CodeCombat they didn't realize they were actually learning real Python as they were playing. Forsman said during the exam students were able to go "OK, well this missing condition is here" and ask "Well, what did I do in CodeCombat? I did this." Comparing what they had done on CodeCombat with the questions being asked helped students work through the test.

While implementing AP CSP was expensive, the result of investing in students has paid off for River Ridge and Forsman's students. Forsman said that Principal Meek was "thrilled" with the AP scores and so "excited by the student[s] achievement on the AP exam" that she was willing to renew for another year.

Principal Meek was not only impressed by test scores but also with how well the students are doing overall saying, "Mr. Forsman has done a tremendous job with the students, and they are excelling."

The class started in August 2017 with 18 AP students, but has since increased to 31 students, showing the popularity and success River Ridge had in their first year of AP CSP.

Unlocking Pathways to a Better Future

To Forsman, teaching computer science allows students to prepare for the rapidly evolving job landscape and grants them the ability to consistently problem-solve; a skill necessary for future careers. Forsman talks about the endless opportunities to innovate that computer science gives students. When he assigns a task to his students, "Five different kids can write five different programs that solve the same task," Forsman says. "That's what is really cool about computer programming and computer science."

The real value of investing in computer science is bigger than any one quantifiable number. Investing in students sends a message to them that they are capable and gives them the opportunity to explore pathways they never knew existed. Forsman talks about one student's newfound love of computer science she gained because of CodeCombat and the AP CSP class:

"There was a girl who got into it. And just learning, playing the game and going through the coding of CodeCombat inspired her. She was thinking of going into engineering but then she switched herself. She is going to college now for computer science. She graduated last year. That class and CodeCombat inspired her to want to do that."