

# STUDENT VOICES from AP CSP

## Addressing Challenges Related to Programming

### About Our Student Partners

Over the 2016-2017 school year, **13 student research partners** enrolled in AP Computer Science Principles (CSP) at Wolcott School shared their successes and challenges in the course during every-other-week interviews with the Outlier research team.

Keep in mind that while our student partners were enrolled in an AP CSP course using the Code.org curriculum, the challenges they identified could occur in *any* high school CS course and for *any* student, not just those with diagnosed learning and attention disorders.

164 total student interviews

#### STUDENTS:

- were in 10th – 12th grade.
- had varying levels of prior experience with computer science.
- had at least one diagnosed learning or attention disorder.

62% ADHD/Executive Function,  
54% Writing, 46% Reading,  
31% Math, 15% Language.

### What We Heard: Common Challenges Related to Programming

*I messed up my parentheses...I didn't do the parentheses for the loop, so I kept getting really weird, wonky outputs and I wasn't sure what was happening.*

Some students made programming mistakes like mixing up symbols and putting pieces of code in the wrong order.

When writing a program, sometimes students needed to use math concepts and operations that they didn't understand.

*I think I wrote a code that was 30-something lines and there was an error at one point and I couldn't tell where it was...It took me 2 days to figure out.*

For many students, it took a long time to find errors or figure out what was missing when their programs didn't run.



Programming was a challenge for 8 of the 13 students in the AP CSP course.

Students were not sure what some commands did, or when they should be used.

### How to Help

#### Addressing Programming Challenges in CS Classrooms

The following recommendations are informed by research-based practices for supporting students who learn differently, combined with the practical expertise of our team learning specialists and study findings.

Circulate and assist students in debugging for errors by **modeling** necessary steps and providing example approaches (which may also be posted on the wall for continued reference).

**Project key mathematical terms and operators** on a presentation slide or white board so they are accessible as students work.

Assist students in creating an electronic document (Word, Google) to **record variables used in their programs**. Students can refer to this document to:  
a) compare variables side-by-side to identify errors when debugging, and b) copy and paste the variables into the program.

Create a **reference sheet listing new code** with a short descriptor of the command and the type of variable that should be entered in the command. Encourage students to keep this reference handy while working.

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