## Overview

### About:
ComPASS trains high school teachers in San Diego County to teach CS Principles using Alice with interactive (clicker questions plus discussion) pedagogy and peer teaching.

### Institution
University of California San Diego and San Diego State University

### Data for:
2012/13

### PI/Leader:
Diane A. Baxter

### Age of Program:
1.5 years (launched Jan 2012)

### Location:
San Diego County, California

### School Districts:
SD County (San Diego, Sweetwater, Grossmont, Oceanside . . . .

### Teachers Served

#### Served:
- 12 teachers in 2012-2013
- 10-15 teachers in 2013-2014

#### Dosage:
16 (content) + 20 (pedagogy + practice) + 8 (content refresher/enrichment; reflection and peer discussion) = 44 hours

#### Grade(s):
9th grade through 12th grade

#### Characteristics
In-Service HS & CC teachers from:
- Business Technology
- Digital Media
- CS
- Sciences (Biology, Physics)

Pre-service 2° teachers at SDSU

### Program Budget

#### Sources:
National Science Foundation + 3 (small) industry sponsorships for curriculum development and student scholarships to summer programs at SDSC

#### Budget:
$333,000/year (including IDC)


**ComPASS Learning Goals**

*ComPASS* high school teachers will feel confident using peer learning techniques to teach Computer Science (CS) Principles using Alice to diverse student populations.

*ComPASS* teachers will be able to teach a college-level CS Principles curriculum developed by Beth Simon for UCSD freshmen and adapted for high school teachers with assistance and input from teachers who are teaching the course during the three years of this project.

*ComPASS* teachers will know how to share teaching resources and support one another to sustain this course through social media launched through this project, a strengthened local chapter of CSTA, and the national CS 10K Community of Practice connections.
ComPASS PD Structure

Structure (20-month cycle for in-service PD)
- Fall: TeacherTECH Introduction to Alice (recruitment)
- Spring: Exploring CS Through Alice: big ideas, foundation concepts, and pedagogical elements; Initial survey for PD Evaluation baseline.
- Summer: Pedagogy Boot Camp (5 half-days: pedagogy observation, practice, and reflection) Half stipend paid with administrative commitment to teach the course in fall.
- Implementation Academic year: Implementation support through weekly phone calls, class visits, peer observation, & web-based social networking and support, TeacherTECH enrichment sessions. Stipend balance paid when final PD assessment survey returned.

Team members:
- Diane Baxter (Administrative PI);
- Beth Simon (CS P faculty at UCSD and CSP curriculum and pedagogy expert);
- Leland Beck (CS P instructor for pre-service students and freshmen at SDSU);
- Sasha Chizhik (Education Studies researcher at SDSU and evaluator);
- Jeff Sale (Community of Practice and portal support at SDSC);
- Ange Mason (Program Manager);
- Tasha Frankie (CS Principles Instructor for UCSD freshmen and in-service teachers)
- Gabriela Ponce (REU Student identifying curriculum weaknesses with student learning outcome analysis)

Participants:
- High School teachers from San Diego County Schools; Undergrads at UCSD and SDSU; SDSU pre-service teachers. First year’s cohort from schools. Second cohort from mixed economic levels.
ComPASS Successes and Challenges

Successes:
• Teachers are reporting strong student engagement and compelling success stories with diverse students
• Teachers are excited by their experiences teaching CS Principles
• Two (largest) districts in the region have endorsed the course at the district level, seeking to implement it in ALL their high schools.
• Teachers report that students previously not college-bound are applying for college, many with CS majors.
• Teachers are reporting high levels of CS interest among girls and underrepresented minorities after CS Principles course.
• Teachers have told us that students are seeing positive impacts in other courses due to their strengthened analytical and communication skills gained through the CS Principles content and pedagogy.

Challenges:
• Social media that we use for sustained support seem to take time that most teachers don’t have.
• Without AP or even college-prep (A-G requirement) status for the CS Principles course, student recruitment can be challenging.
• Students aren’t placed in classes unless counselors know the value of the course; most don’t yet.
• Counselors use the course as a “dumping ground” for students needing credits only, throughout the year.
• Sustained implementation is not guaranteed without systemic endorsement.
Measures of Success

1. Are ComPASS curricular materials and pedagogy effective for HS students?
   
   – Student exams and projects will measure effectiveness of the materials and pedagogy in achieving student learning objectives.

2. Do ComPASS teachers feel confident teaching CS Principles?
   
   – Post-implementation surveys and teacher interviews measure teacher confidence to teach CS Principles using Alice and peer-learning techniques.

3. Can peer support sustain CS Principles course expansion throughout county schools?
   
   – Attendance at local CSTA meetings, participation in professional meetings, identification of pathways for district-supported Professional Development, and teacher leadership in supporting peers through coaching and e-mentoring using social media all measure the strength of the peer support network.

4. Do students, parents, counselors, and school administrators recognize and support the value of CS Principles as a high school course for all students?
   
   – Counselor placement of students into CS Principles classes, Principal support for including the course in the class schedules, parent statements of support for the course to teachers and principals, and student enrollment numbers are measures of success.
In their own words . . .

• B. has been accepted into the Computer Science program at UCSD! B. told me that when he first came into this class, he was mildly interested in computers; he got more and more interested and decided because of his interest in this course to pursue Computer Science as a major. – Art (teacher)

• J. has been accepted to SDSU, CSU SF, CSU LA, and one other university. He stated that due to this course, he really wants to become either a computer scientist or engineer. – Art (teacher)

• At the Educating for Careers Conference (in Sacramento) from March 10-12, I will be presenting Computing as the 4th R: AP CS Principles -- University-Level General Education Computing all by myself. – Daniel (teacher)

• Alice is a great program for both beginners and experts, since you can making simple methods for beginners or huge complicated methods for experts. – Aaron

• I think that Alice is the best program to make really cool stuff because you can build anything within your imagination. – Juan

• I have really enjoyed using Alice because I have learned ways to make Alice scenes and make creative animations. Alice program can be very difficult, but once you learn the material and vocabulary it is a very easy program to use. – Leah

• Alice is a great way to express the creative mind while learning the basics of computer programming and 3D animation. If your world does not work the way it should, there is almost always a way to get around it. – Abel

• Alice is a really good program but I want to make my Alice world cooler. I want to know what else it can do.- Trung

• Alice is really fun but how it helped me with a computer programming in that it made it easier to do. For example I can have methods to simplify what I am doing. How it also helped me is that I now can do things without being confused. – Sergio

• Sometimes Alice could be a little confusing, but that was the fun part of learning how to program in Alice. It asked you questions that brought out the hard thinker in me. You are constantly challenging your brain when you start to program in Alice. – anonymous student

• The best thing that I liked about Alice is that when X. gave us a world to debug, it was sometimes the most hardest thing but it made your brain think outside of the box. Sometimes, you would have to make little changes, but whatever it was, it always made you think and that's what really made me love the program Alice. – Anasazi

• I think that Alice is a great way for programmers like me to sail away on a great adventure in making various types of different worlds of their own. For instance their was an Alice competition on book trailers, so why not make a trailer about books, like The Hobbit, The Giver, Star Girl, or whatever is pleasing to you. Its very simple. Regular programming is way to difficult but with this you can do anything!- Kevon

• I really enjoy using Alice because you can make a random cartoon or game and other stuff. The thing is the cooler you want your program to be the harder it is to program and the longer it takes to complete but in the end it was worth it. - Leo