Rediscovering the Passion, Beauty, Joy, and Awe: Making Computing Fun Again, part 5

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Categories and Subject Descriptors

K.3.2 [**Computer and Information Science Education**]: Computer science education

General Terms

Experimentation

Keywords

Computer science education

1. SUMMARY

In 2006, computing education was suffering from a crisis – enrollments were dropping sharply at universities and colleges across the United States, and interest in computing from high school and middle school students was waning significantly. At the 2007 SIGCSE Symposium, the ACM Education Board organized a special session to explore the underlying causes [4]. In his keynote at the same conference, Grady Booch exhorted us to share the "passion, beauty, joy and awe" (PBJA) of computing [3]. This led to a series of room-packed sessions at the following four SIGCSE symposia to explore that idea from different angles [7, 8, 9, 12]. They have provided a forum for sharing:

- **What we've done**: Highlighting successful PBJA initiatives the presenters have undertaken or seen and wish to celebrate.
- **What we should do (curriculum)**: Pointing out where our curriculum is lacking in PBJA, and how to fix it.
- **How we should do it (pedagogy)**: Sharing how a change in attitude / focus / etc. can make strides to improving PBJA.

Fortunately, enrollments have been continually rising, and there are colleges where the numbers are so strong (returning to historic highs), that some claim the crisis is over [14, 15]. Some point to "the Facebook Factor" as the source of inspiration for many young students, claiming this is a "Sputnik moment" [13]. Many dispute this, however, citing statistics that indicate under-represented students have not returned, and continuing negative connotations about the field [1]. This PBJA "movement" was born out of this enrollment crisis, but is not tied to it. There is always value in sharing novel best practices and advocating techniques that make computing fun.

In the past, we tried to gather educators who brought a wide variety of perspectives (e.g., in 2010 we heard from international, domestic, high school, university and industrial representatives). At recent sessions, we've shifted from that "breadth-first" model to a "depth-first" one. This year we have invited three educators who have worked tirelessly toward broadening participation of computing to underrepresented groups. The hope with this panel is to be able to explore best practices in outreach, in terms of extolling the PBJA of computing.

2. BARBARA ERICSON

Georgia Tech's *Institute for Computing Education* has been working to increase the quantity and diversity of computing students since 2004 [10]. We offer computing summer camps for 4th - 12th grade students, hold competitions for Scratch, Alice, and Advanced Placement Computer Science, offer weekend workshops with youth-serving organizations (Girls Scouts, Cool Girls), work with after-school programs, and run teacher workshops. We have tried many approaches for introducing computing including Lightbot 2.0, Scratch, Alice, CS Unplugged, LEGO robots, PicoCrickets, IPRE robots, App Inventor, Greenfoot, Pleo robots, and Media Computation. We introduce hundreds of students to computing each year. We will present a summary of the results from our outreach events and show a few student-created projects. We also have a distance-learning website with step-by-step video instructions of our projects [11].

3. JOANNA GOODE

Exploring Computer Science (ECS) is a yearlong introductory computer science course aimed at broadening participation in computing [6]. It has been used with high school students in Los Angeles Unified School District (LAUSD), the second-largest school district in the country. The driving focus of our curriculum is an inquiry-based approach to teaching and learning. The research-based instructional design is central to the course's curricular materials and accompanying professional development. This approach advocates a student-centered learning community that embraces and integrates student's experiences, cultural backgrounds, and knowledge of community as central to the introduction of computer science theories and applications. To help teachers develop and hone instructional strategies aligned with inquiry and equity, we offer ongoing professional development workshops and an on-site coaching program. We have learned that the focus on pedagogy is as important as the CS content of the curriculum. ECS is now being offered to over 2000, mostly African American and Latino/a students in over 26 LAUSD schools. About 40% of enrolled students are girls. We are scaling up throughout the state of California and supporting efforts in other states and Puerto Rico. LAUSD students who have taken this class in the past three years report increased engagement, interest, problem-solving skills, and indicate an increased likelihood of learning more computer science in the future.

4. COLLEEN LEWIS

In our outreach efforts at UC Berkeley, we are embracing both re-use and innovation. In collaboration with a fellow graduate student, we founded a program to support the pipeline of undergraduate women in computing majors at UC Berkeley. The program, *CS KickStart*, is a one-week intensive program to recruit and support female freshmen who are interested in computer science, but have no prior experience with it [5]. CS KickStart is directly based upon the *Schnupperstudium* outreach program at ETH Zurich [16] and uses curriculum developed at Georgia Tech [10]. Beyond re-use, we have developed curriculum for a middle school outreach program that is being used at numerous schools in the San Francisco Bay area, and the curriculum has been requested by more than 30 educators worldwide. It was also used as a starting point for our *Beauty and Joy of Computing* AP CS Principles pilot course [2]. We will share our experience with these outreach initiatives to meet the needs of local students.

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