

CS1: Lessons Learned from a Media Application Approach

Three years ago our department held a summit to discuss ways we could change our existing introductory course to make appropriate for both incoming majors and non-majors. We took an interest in the media approach developed by Mark Guzdial and Barbara Erikson at Georgia Tech. Their approach was to start the course by having students work with pictures and sounds, the assumption being that students would learn to program by manipulating objects in those domains. Students who had been in the Georgia Tech course had great things to say about the material and indicated strong motivation for learning because of the interest in pictures and sounds.

However, when we tried that approach here, we found that most students were not distinguishing between fundamental concepts of CS and physical attributes of sound or the incidentals of how sounds and pictures are stored. Even with a lot of extra help from our student fellows (tutors), students were not making the kind of progress we believed necessary in the course.

We did like, and so did our students like, the application areas of pictures and sounds, and they liked being able to modify objects in both domains. The problem was not the motivation, but rather the confusion students were experiencing about just what the fundamental principles of CS they were supposed to be learning.

Having made that diagnosis, we tried two new approaches, using the same application domains and compared those approaches with the Georgia Tech one. The Georgia Tech method had students applying methods to pictures from the very beginning of the course without really writing any complete programs. During the semester, the students were exposed to basic control structures such as assignments, conditionals, and iterations, and eventually they wrote their own methods.

We decided to try one approach that spent the first few weeks with traditional control structures applied to simple domains that students were already familiar with and then moving on to pictures and sounds. During the same semester while one instructor was doing the traditional method, another was using an interspersing approach. The students did some traditional programming and then used pictures or sounds as an application area for that particular topic. For example, when loops were introduced, students did applications in which they treated pictures as two dimensional arrays and wrote methods such as inverting a picture or shrinking a picture.

We found that both of these approaches worked much better than the jump right in approach. Students still had the fun of applying the material to interesting application areas, but they had no problem sorting out what the CS concepts were and what the ideas in the application domain were.