Elementary Education in a Technology Age
By: Gregory Gates
Computer Systems Lab Research Project 2007-2008
January 23, 2008

Abstract

Technology becomes more advanced and more accessible with every passing day. Education should be utilizing this technology boom in teaching current students. However, this does not seem to be the case. The goal of this project is to try and implement computer programming, through Scratch, as a tool for educating students. Computer science education at a younger age becomes more and more essential as computers become more advanced and more accessible with each passing day.

Background Information

The task of educating the younger generations about programming has been attempted before. The first attempt to create a kid-friendly programming language was Logo, made by Wally Feurzeig and Seymour Papert. This programming language mainly involved telling a turtle how to move around in order to make various pictures with the turtle's "pen." Since then, multiple programming environments and languages have come about to try and engage not only youth but also girls in computer science and programming such as Squeak, Alice, and Scratch.

Despite the bountiful number of tools that modern technology gives u for teaching students, little progress has been made for teaching compute science at the elementary school level. The necessary technology is present in the schools, but it is only being used to reinforce outdated teaching methods. Currently, computers are mainly being used as a medium to transfer information, much like a television. Computers have so much more potential than that. They should be used as a universal construction material, no as a TV screen. Programs like Scratch enable kids to create whatever they want to all by themselves. Children learn better by immersing themselves in whatever they're doing, rather than just listening to a teacher telling them what to do (Papert, 1993).

The goal for this project is to establish something akin to a Compute Clubhouse at Cardinal Forest Elementary School. The original Compute Clubhouse was started by the Massachusetts Institute of Technology in Cambridge in 1993 to "provide more young people with the opportunity to become digitally fluent" (Resnick, 2002). At these clubhouses, kids and older youth "become designers and creators with new digital technologies. Clubhouse members use leading-edge software to create their own artwork, animations simulations, multimedia presentation, musical compositions, websites, and robotic constructions." (Resnick, 2002) I want to start a computer science program at Cardinal Forest where students can think for themselves and create whatever they can imagine.
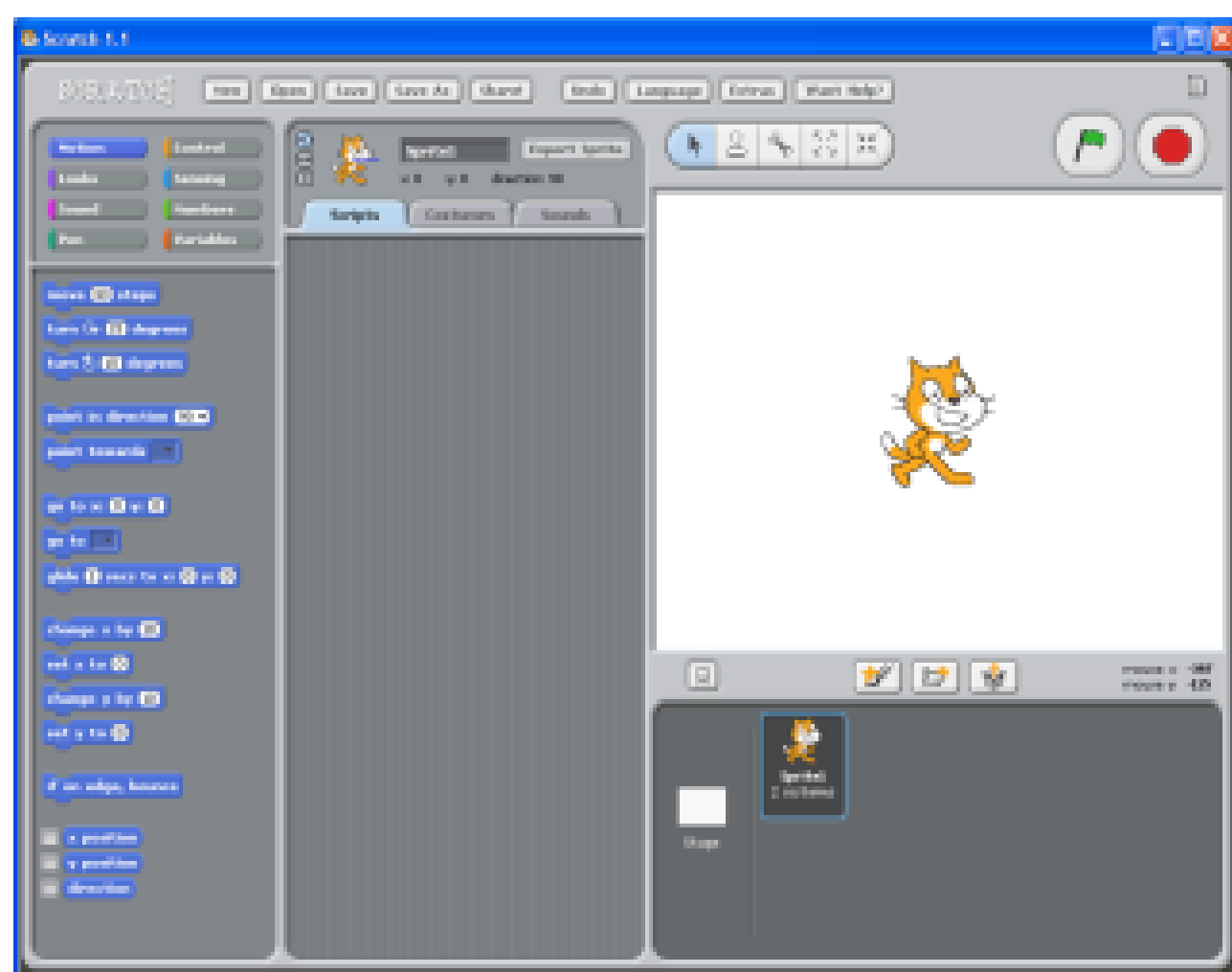
Implementation

Students from first through sixth grade meet in the "Cardinal Computer Lab" at Cardinal Forest Elementary School every Thursday sometime between 11:00 AM and 2:00PM. Each class lasts for 30-45 minutes depending on the age of the kids in the class and the schedules that the teachers have laid out. The tech specialist at the elementary school and I alternate the weeks that we teach. Topics that have been covered thus far include: the coordinate axis, x-y coordinates, angles and degrees, if-then statements, and basic loops. Obviously, the topics include more than just computer science.

Currently, Mr. Allard (the tech specialist at the elementary school) and I spend a majority of the lesson time teaching the students and walking them through a simple project. The end goal is to give the students a broad category or theme (i.e. celebrations or sports) and let the students create their own projects. By doing this, we hope to increase not only the students' creativity but also their independence. If the students teach themselves and work through problems on their own, they will have a better understanding of the subject matter.

Lastly, group projects will be given to promote teamwork amongst the students. These children come from many different classes and grades and they don't know each other very well, so getting along initially may be difficult. However, working in teams is an essential skill not only for computer scientists but in any job and our goal is to give these students a strong foundation for working in groups in the future.

Expected Results

As mentioned before, I hope that this research project will yield good results that would encourage the implementation of a simple computer science curriculum at the elementary school level. The earlier that kids can start to program and become interested in programming, the better. The computer has the potential to start a digital revolution in learning, and I hope that I will be able to demonstrate this through my project.