

Elementary Education in a Technology Age

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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 (mainly through the MIT-developed program "Scratch") as a tool for educating students. This type of computer science education at a younger age becomes more and more essential as computers become a more prominent facet of life with each passing day.



Kitty Plays Football

<stage.sprites.scripts.>

So many ways to code!

Implementation

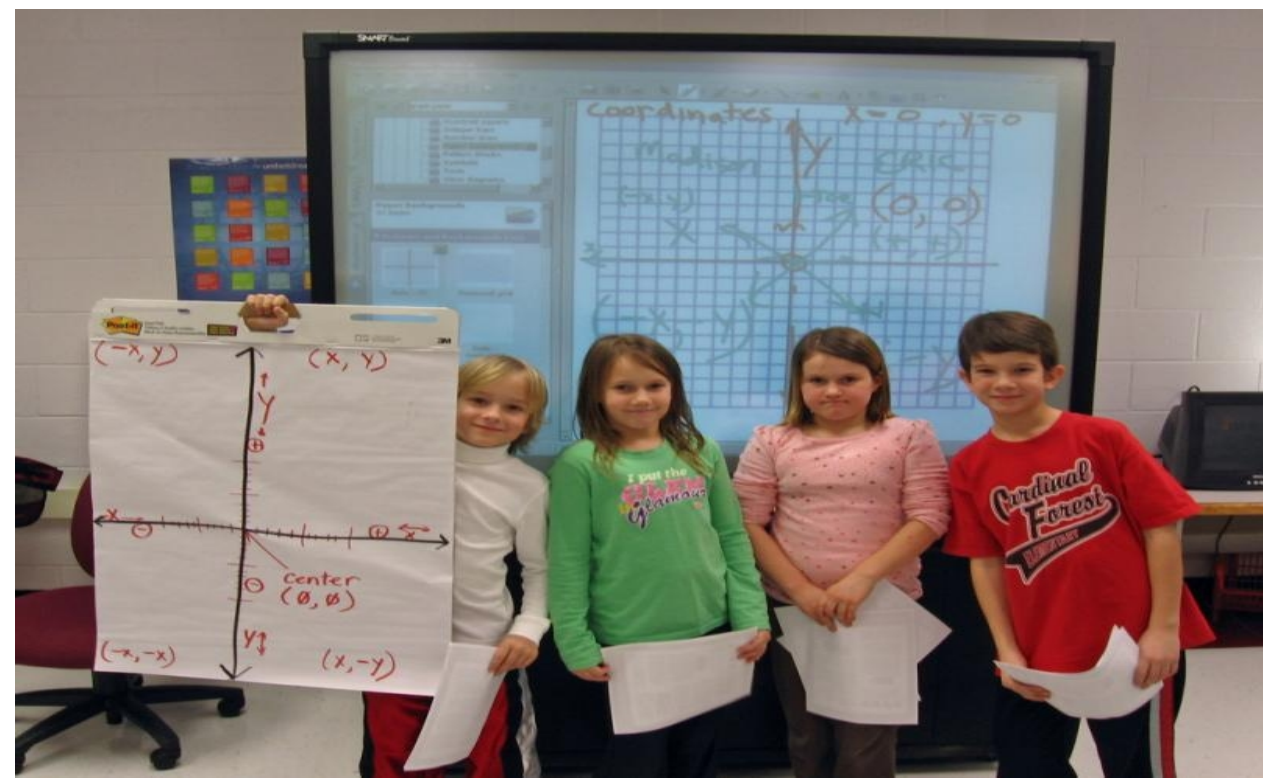
Students from kindergarten through sixth grade meet in the "Cardinal Computer Lab" at Cardinal Forest Elementary School every Thursday between 11:00 AM and 2:00 PM. Each class lasts for 30-45 minutes depending on the age of the kids in the class and the schedules that the teachers have laid out. The school based technology specialist, Mr. Frederic Allard, 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, basic loops, custom sprite/stage creation, and sprite interaction. An essential part of project implementation was ensuring that the computer science curriculum corresponded with the Virginia Standards of Learning. After going through the standards and correlating our project with them, we found that this project not only teaches students computer science, but helps them grow in other areas as well.



I Scratch
Therefore I Am

Thursdays
11 AM - 2 PM
Computer Lab

see Mr. Allard for details



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 (Papert, 1993).

Despite the bountiful number of tools that modern technology gives us for teaching students, little progress has been made for teaching computer 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, not 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)

Kitty Plays Football

The year culminated with a project which came to be known as "Kitty Plays Football." The goal of introducing this project was to challenge the students with a task that included as many of the skills they had acquired over the year as possible. These abilities include the use of: variables, iteration, custom sprite creation, custom changes, and broadcasting amongst other techniques. Students were first asked to create a basic program where Scratch (the kitty) would kick a football straight between the goalpost with no special effects.

Once this basic project was finished, students were presented with new challenges in order to build on the basic project. Some examples of project additions include making the football spin and creating a "Score" variable. The hardest challenge given to the students was to use the "pick random" block in a way to make it so that Scratch didn't always make the field goal (because no football player is perfect).

The relative level of success that the students achieved with this project was surprisingly similar across the grade levels. None of the students managed to fully accomplish the "pick random" challenge without a little help from myself. However, some of the older students did make some valiant attempts and demonstrated that they at least understood the problem. Evaluation of the projects was based on a rubric that Mr. Allard put together detailing the different challenges.

