

## Final Project Proposal 1st Quarter 2008

Computer Systems Project Proposal - October 2008

### 1. Title (or subject area) of the project

Computer Education

### 2. Purpose and scope of the research project

I will be working directly with students at Cardinal Forest Elementary School in Springfield, VA for my research project. Once a week, the students come to a Scratch session. Scratch is a program developed by MIT to teach younger students about computer science. The program allows students to work without having to memorize code or worry about syntax. The purpose of my specific project will be to work with the students on designing their own Scratch programs. Previously, they have been lead to accomplish certain tasks using Scratch. Accomplishing the teacher-proposed programs teaches them about step-by-step processes and problem-solving, but my research will look at the next level up. Designing their own programs will allow students to express their creativity in a technological environment. They will have a sense of ownership for the project that they create. I will explore students' reactions to feedback and constructive criticism regarding their projects. Problem solving skills can be developed through work on their own ideas and issues. I think that they will be more compelled to solve their own problems instead of running to the teacher since it is their own project design, not the teacher's. That sense of independence in a learning environment is important to developing the way a child approaches his or her education.

### 3. Background and review of current literature/research in this area.

A limited number of Scratch communities have been established across the country. Scratch: a platform for sharing user-generated programmable media, (Monroy Hernandez) describes Scratch, an on line community geared toward youth that provides a place to share programmable media.

Programmable media is defined as something that exhibits a certain behavior based on the code written by the programmer; a picture is not an example, but the picture dancing across the screen is. Scratch provides a platform for sharing work with peers and receiving feedback. The authors plan to conduct a study with middle school students. They will look at the inspiration Scratch provides, the community that develops, the amount of participation, and the infrastructure of Scratch (what should be improved?). Users of Scratch benefit in three ways: inspiration, creative appropriation (learning by example and re-utilizing code), and feedback in both directions. There are different levels of participation, including passive, active, consumer, and producer. Research could be continued by using more test groups for learning with Scratch, like the community at Cardinal Forest Elementary School.

In Arlington, VA at Campbell Elementary there is a similar class called "Creative Computer Exploration with Scratch." It will be interesting to see if our program plays out in much the same way as theirs does. The class in Arlington is divided into an introductory class and an intermediate class, unlike the program at Cardinal Forest. I am working with students of all skill levels, all in the same class.

Creative Coding: Programming for Personal Expression, (Peppler and Kafai) discusses the outcomes of a study done on youth that used computer programming as a creative outlet. It argues that the use of media art in school should also involve the constructive process of coding that is behind the visual and audio side of the art. Elementary school students do not receive much instruction in the area

of using digital media as a form of art. Education in creative coding, or programming, lends itself to careers in growing fields like Video Game Art, animation and Computer Graphics, and Robotics. students were able to make personal connections to the projects they worked on, using programming as a creative outlet. Without an education in programming, youth will not be able to participate in the creation of digital media, and the education should therefore be expanded through programs like Scratch. The interdisciplinary experience offered by creative coding may appeal to a wider audience, making computer science more attractive to women and minorities.

#### 4. Procedure and Methodology.

The first step of my project is to make sure that all the students in the program have a basic understanding of Scratch. About half of the enrolled students have previous Scratch experience; these students will mostly likely be the subjects of my research. While beginning students are working on predesigned projects, I will work with those students who demonstrate the skills necessary to design and execute Scratch programs. I will provide a theme for their projects since students in the first and second grade need some direction. Students will design their projects on paper first, allowing me to review them and begin to make suggestions. I can observe their reactions to my suggestions by watching the work that they choose to do after they receive the feedback. If the feedback from me goes over well, I may be able to have them review each other's project. The progress of my research depends entirely on the progress that the students make; my plans will have to be adjusted based on what I observe.

#### 5. Expected Results & Value to Others

I expect to obtain a greater understanding of how elementary school children learn and how programming helps in their lives outside of Scratch. The problem solving skills they develop through designing and executing programs will apply in other areas of their education. I hope to see that students are able to design creative projects based on the skills that they develop. The results may be presented to the greater school community as an example of success in teaching programming at such a young age since this type of program is uncommon in most schools. Other educators will be able to build on my research and establish their own Scratch communities. The initiative to infuse technology into the classroom is an important current issue. Technology is an integral part of today's society, and an early start in computer education can set the stage for success in the future.