Working With Storytelling Alice to Mentor Students at Cardinal Forest Elementary TJHSST Senior Research Project 1st Quarter Paper Computer Systems Lab 2009-2010

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Abstract

I will be working with students at Cardinal Forest (mostly girls in the 5th grade) to observe how well young childrens are able to grasp basic programming concepts presented in Storytelling Alice. I will also be observing the benefits Alice serve in teaching children to become better writers.

1 Introduction

The purpose of this project is to determine the success of Storytelling Alice in teaching young children how to program. I will be observing the success of the students in learning simple algorithms and syntax, while also learning how to teach programming in a way that is comprehensible for elementary school students. The eventual goal is to determine whether or not Storytelling Alice is a successful language for increasing interest in programming at a young age, especially to girl students. I will also be studying the ability of Storytelling Alice to better students ability in writing, based off SOL rubrics.

2 Background

Last year, two girls did a research project at Cardinal Forest Elementary but focused on Scratch programming. This year, Mr. Allard decided to add Storytelling Alice as another language for students to study and I have been put in charge of the mentoring program for this language. This is the first year we will be testing Storytelling Alice at Cardinal Forest Elementary. However, it is not the first time Storytelling Alice has been used to teach young children to program. One article I read about Alice programming dealt with girls and their ability to use a variation of Alice- Storytelling Alice- to learn programming. The article stated that girls have the same ability as boys do to program. This was encouraging for my project because not only am I a girl interested in programming as a career, I hope to spark an interest in programming in the girls I mentor. These researchers also stated that there were many reasons why girls were less likely to choose to pursue a career in programming. Not only are there social norms that encourage boys to program and not girls, at the middle school level, girls confidence in their abilities relating to math and science becomes deflated. This is actually a very promising fact for our study. Because we are working with Elementary School students, not only are we able to encourage programming for girls before they reach middle school level and lose confidence in science-related subjects, we are also working with them at an age when they are unlikely to know about social norms in programming. Hopefully, Alices easily understood set up will help give girls confidence and Alices storytelling nature will be attractive to girls. The other article I read simply studied Storytelling Alice and game making. Both articles mentioned that Alice is very successful in teaching algorithmic thinking and basic programming language and syntax to children. A third article I read discussed the difference between teaching programming with Storytelling Alice and other gaming centered programming languages. Because the gaming community is predominately male, a programming language with a gaming nature would be more attractive to males than females. Storytelling, however, is attractive to both males and females and, if taught at an early age, could help equalize the number of boys and girls interested in programming. There are other benefits to using Storytelling Alice. Concepts that are hard for first-time programmers to understand like variables, parameters, and loops have to be introduced through assignments in other languages. In Alice, however, they are incorporated into the foundations of the language. This could save time in introduction to

programming and could help beginners learn more advanced programming techniques at a younger age. Another great thing about Storytelling Alice is that due to its visual nature, parents and peers that do not know how to program can truly appreciate the codes created because they can watch the success through a video-like presentation.

3 Procedure

Due to its appealing 3D graphics and ability to create games and stories easily, it is an attractive language for teaching young children. Like Scratch, the only coding involved is dragging methods from a list of methods already given in the program. Alice will be reserved for the older and more experienced students because it is harder than Scratch due to the 3D nature. Alice is a very visual programming language. Therefore, the users testing will simply be watching their program run and observing it to make sure it worked as intended. Currently, I have been interacting one on one every thursday with the children. Each student has written his or her own story. Some of the children have problems writing or tend to misbehave in other classes. These children were targeted for Alice so we could help them become better writers and students. I was able to read some of the students work and was surprised by the complexity of some of their pieces. I expect we will probably be using these pieces as a basis for a program in the future. As of now, however, we have been focusing on basic foundation instead of on actually writing code. I assume that we will soon be diving into the concepts of programming with Alice. If we can connect Alice to writing, this will be very beneficial for the children. One class that specifically stands out to me was when I was asked by Mr. Allard to explain the 3D plane to the 5th graders and introduce them to the concept of the z axis. At first, the children were confused by my example. However, when I used two pieces of paper and explained that the z plane would be traveling through the paper, the students seemed to better understand my description. This taught me a lot about working with younger students because I learned that in order for them to understand my ideas, visuals are key.

4 Expected Results

I expect that at the end of the year, I will have been able to provide the students in my class a clear understanding of Alice. I hope that I will be able to encourage girls to continue a career or at least continue classes in programming. I hope that I will be able to spread my love and knowledge of programming to young girls and help break the stereotypes of men in technology. My biggest hope is that the students leave the class with a deep understanding of algorithmic thinking and problem solving through Alice and that the students are proud of their accomplishments and projects. I hope they also leave with an enhanced love of programming. I plan to have the students use a personally written story to create an Alice program as a final project.

References

[1] C. Kelleher, R. Pausch, S. Kiesler,"Storytelling Alice Motivates Middle School Girls to Learn Computer Programming" ,
April 28- May 3, 2007.

[2] L. Werner, J. Denner, M. Bliesner, P. Rex, "Group behaviors for systems with significant dynamics"

[3] C. Kelleher, R. Pausch, "Using Storytelling to Motivate Programming"