

Benefits of Computer Education

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Abstract

Computer science has become a more integral part of everyday life as technology advances. Because of its importance, a Scratch program was developed to teach students at Cardinal Forest Elementary School basic computer programming skills. This project focused its research on whether a computer education helped the students benefit in other ways besides simply learning more about computers and if there is a pattern in the children who benefit the most from a computer science education.

Introduction

Does an education in computer science actually benefit young children? Or would they be better off learning more about the subjects that correspond to their core curriculum? By teaching elementary school students basic computer programming skills, they should be gaining something more than just a larger knowledge about computers. The goal of this research project was to investigate just what benefits a computer science education provides students and whether a certain type of child benefits more. For example, some children are very shy and prefer to work by themselves, while others are more talkative and willing to ask their classmates for help. Does this computer science program help the shy children learn the value of getting help from their peers, or do the more rambunctious children benefit more because they learn that they need to listen to the teacher's directions?

Background

Because technology plays a dominant role in children's lives, it is important for them to gain an understanding about computers. There has been some research in the area of computer education, particularly by Kylie Peppler and Yasmin Kafai who have written dozens of papers regarding a computer science education's effect on children. The Cardinal Forest Elementary School Scratch program's goal was to develop the programming skills of the children at Cardinal Forest and help them become fluent in technology by creating their own 'computer culture.' In one study, Peppler and Kafai concluded that students eventually realize that in order to create more advanced projects, they need to work together and ask for help (Seeds of a Computer Culture). In another experiment, Peppler and Kafai discussed the the importance of connecting the areas of art and computers (Creative Coding). Because Scratch is a program that can be easily used to create a multimedia presentation, students can make projects that express themselves and the curriculum should encourage the students to do just that.

Greg Gates, a student who graduated from TJ last year, also did research in computer science education. In fact, it was he, along with Mr. Allard, who first created the Scratch program at Cardinal Forest Elementary School. Because the program was originally developed by Gates, his research was particularly insightful. He worked with the students at Cardinal Forest Elementary School and focused his research on whether the children would be able to learn basic computer programming skills. Gates concluded that the children became more technically savvy as the year progressed and they also became more interested in computer science, and technology in general.

Development Sections

By using Scratch, a program developed by MIT, the students of Cardinal Forest Elementary School will be taught basic computer science skills and problem solving techniques. Each week, curriculum was developed to be taught during the Thursday class sessions. Using the knowledge gained through the

curriculum, the children will become more familiar with computer science and will be able to create their own programs. The Scratch program should hopefully influence the student's progress in other academic aspects and in order to measure the amount of benefit the Scratch program has on the children, a survey was created and will be distributed to the students' teachers for completion. This survey (see appendix) measures the students learning style, as well as learning ability, and the students personality. The survey will be completed again at several intervals during the year to see if any changes in the child have occurred.

(Expected) Results and (Conclusion)

All types of children participated in the Scratch program this year. However, did a particular type of child benefit more from the program and what were those benefits? It is likely that shy students will benefit the most from Scratch because they will need to learn to work together and ask each other for help. These reserved students will need to go outside of their comfort zone if they want to finish their programs and learn the techniques needed to do so. As the computer class teaches these students the value of teamwork, hopefully they will apply this knowledge in their other classes and it will be evident that they are more open to working with others. Teamwork is a lifelong skill and it is never too early to learn it; if this Scratch program is able to help students benefit in the long run, it will be easier to convince other schools to implement computer courses in their curriculum. The more outgoing students will also benefit from the computer science program because they will learn that, instead of talking when the teacher's talking, they need to listen if they want to learn how to complete their program. As the students begin to understand the importance of listening to directions, they should be able to apply this knowledge to their other classes and they will learn more effectively. Furthermore, as computers become more integral to everyday life and younger children are required to manipulate technology, it is more important for children to learn more about technology. Using computer science, children can learn more about what makes their electronic devices work, and can also learn how to problem solve and manipulate coding to make their program do what they want it to.

Appendices

Appendix A:

Scratch Survey *not yet completed

Students' Name: _____

Teachers' Name: _____

Please list 3 words that describe this students' personality:

What are this students' strongest subjects and skills?

This student: (circle the word that is more accurate)

is shy

is outgoing

pays attention in class

does not pay attention in class

is curious and willing to learn

does not enjoy learning

listens and follows directions

has difficulty listening and following directions

is willing to work with others

has difficulty working with others

can successfully problem solve

has difficulty with problem solving

Literature Cited

"Seeds of a Computer Culture: An Archival Analysis of Programming Artifacts from a Community

Technology Center" (Peppler and Kafai)

"Creative Coding: Programming for Personal Expression" (Peppler and Kafai)

"Elementary Education in a Technology Age" (Gates)