SPONJ

-The Educational Software Suite for Cerebral Palsy Children

Authored
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All throughout my life, I have felt very strongly for those who suffer from Cerebral Palsy (A neural disorder that is marked by physical [such as spastic tendencies] and cognitive difficulties). That is why I volunteered at the Indian Institute of Cerebral Palsy in Kolkata, India during the summer of 2005. During my interactions and studies with these children, I saw that they really enjoy interacting with computers but did not have the proper means to do it, and I felt that Sharpgent software could aid them in their studies and careers tremendously. Therefore, I decided to make a software program that was suited to their needs – because per my discussion with the leading physicians in the field of Cerebral Palsy, this kind of program development had not yet taken place.

Thus, I decided to create a software program for people suffering from CP. I corresponded with neurologists and CP experts in India and America. I studied the behavioral and cognitive symptoms of people with CP and conducted numerous tests to discover that fractal images can have extraordinary effects when applied to cognitive psychology and spastic physiology. Subsequently, I studied the computer science applications of fractal images. With computer science and correlating mathematically modeled fractals, I developed intellectual interfaces that translate spastic motion into fluid motion using mouse-motion restriction algorithms I concurrently developed. By implementing these features, I wrote the software program SPONJ – Software Program Of Neural Jollity, which uses a virtual keyboard and lessons of mathematics that I developed.

After developing the software program, I sent it over to the Indian Institute of Cerebral Palsy for testing. With cognitive science and mathematics, SPONJ is able to help children suffering from cerebral palsy by – to a certain limit – using their spasticity to their

advantage. I had to research fractal patterns and go to mathematics teachers to learn how to teach mathematics so that I could implement that into my software program.

The ability of different fields of research such as mathematics and cognitive science to work together to help change lives is truly amazing. When applied to the numerous problems of this world, they can work in extraordinary ways to change lives forever. I would like to encourage students who are interested in undertaking a project merging science and mathematics to think out of the box and find unique combinations of science and mathematics that can be applied to an issue that he or she is interested in. There are many people in this world who need help and who are unable to help themselves and you can use the unique combinations of science and mathematics can help them!

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All throughout my life I have felt very strongly for those who suffer from Cerebral Palsy (A neural disorder that is marked by physical and cognitive difficulties). That is why I went to the Indian Institute of Cerebral Palsy in Kolkata, India to volunteer this summer. Living through routine activities with these children, I realized that they were sorely in need of a software program that could cater to their unique needs. Thus, I decided to make a software program for them. Per my discussion with the leading physicians in the field of Cerebral Palsy, this kind of program development has not taken place.

In this project, I had set out to prove that I can develop an educational software program that is suited for the needs of children suffering from cerebral palsy in an efficient manner. I have also included the *SharpScribe Intellectual Interface*, which will make use of the special mouse motion recognizer (*ArtificialNavigator*) to aid them in their typing efforts.

This Sharpgent *ArtificialNavigator* interface recognizes distinct mouse and keyboard input and translates that to allow the user to achieve his or her desired action of motion.

I have employed various enriching and powerful techniques of the fine arts and also many advanced programming techniques of the JAVA programming language to create an efficient and visually inspiring software program. SPONJ's lessons teach arithmetic mathematics via stimulating examples, definitions, targeted questions and an entertaining game that reinforces the lessons taught while giving the user control of the program through the artificial navigator. The questions were used in the testing process and proved my hypothesis. A total of 30 children of less to medium severity have been tested.

After testing, the children's average scaled scores of the three weeks were 2.989, 5.35, and 7.011, respectively. The children also observed that the *SharpScribe Intellectual Interface* is very accessible and efficient. Their average typing speed has improved from 0.849 words/min to a remarkable 2.238 words/min. Therefore my hypothesis was proven true. The program is successful as it allows the user to gradually improve mathematics skills and typing speed. I am grateful to have been able to touch 30 lives with my software; however, with time, SPONJ has the capability to allow numerous individuals to jump over the hurdles that Cerebral Palsy has set for them.

SPONJ- Software Program of Neural Jocosity- is a step towards the betterment of Cerebral Palsy lives. Some of the sufferers of Cerebral Palsy are under the poverty line and live in slums. SPONJ is inexpensive and does not require extremely costly hardware.

SPONJ helps people with CP learn mathematics and type faster than previously possible. It helps them gain greater control of their hand based motor functions while it keeps them entertained with its integrated game – Sponj vs. Poonj. The key feature of SPONJ is its mouse-motion recognizing and restricting interface. By frequently using it,

users of the interface should gain better control of their hand based motor functions. With these novel features, SPONJ is helping people with Cerebral Palsy type, learn, and live.

Graphs and statistical equations were an integral part of my project. Box plots and Dot plots showed that the testers of SPONJ gradually improved in their mathematics and typing skills:

Dot Plot
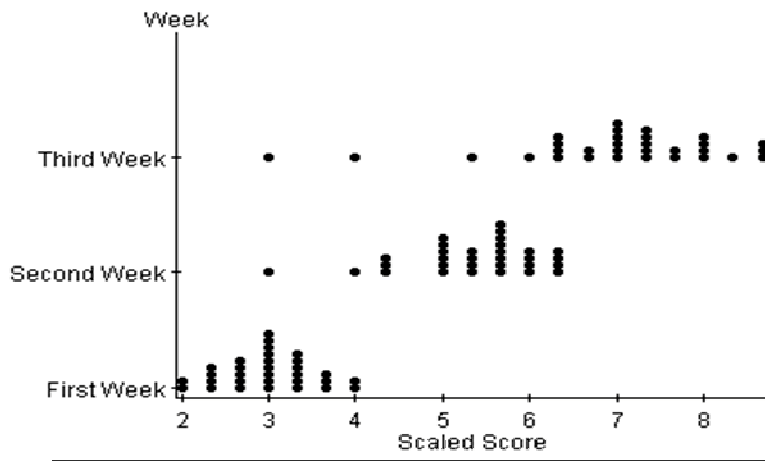
Using the P-Value of the paired T test, I was able to prove that my results were statistically significant. Using the ANOVA test, I was able to prove that SPONJ allows its users to improve gradually. The graph of the results of the typing improvement tests reiterates this fact:

Graph 6: Typing Speed Improvement
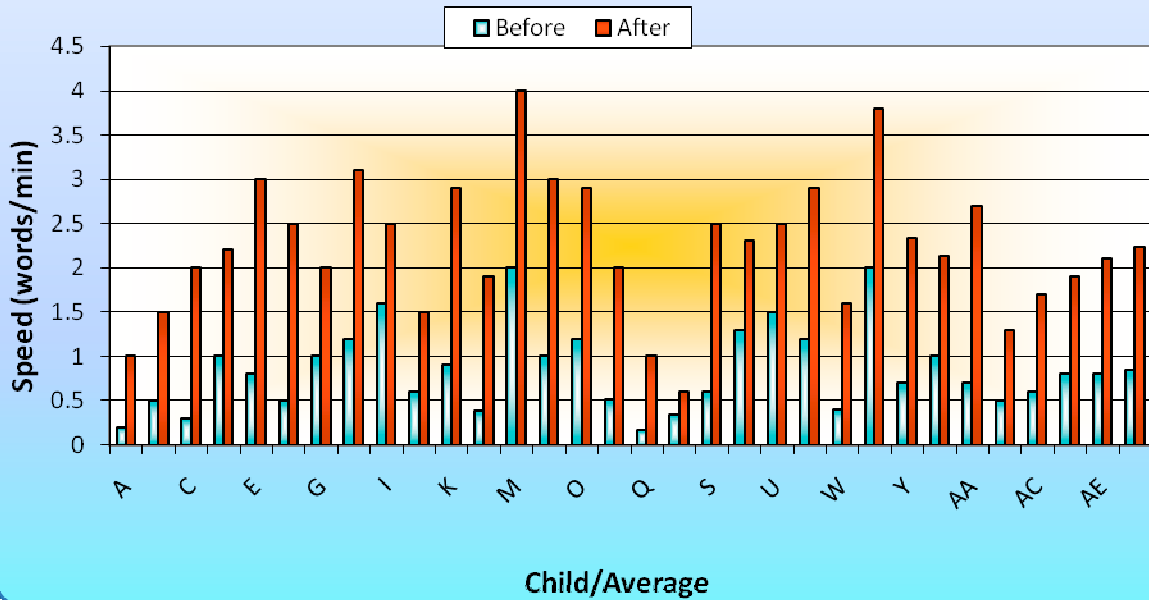
A screenshot of the *Sponj vs. Poonj* Game that adds on to the mathematics lessons and helps users practice interaction with the *ArtificialNavigator* Interface, keyboard and mouse: