BeadLoom Game

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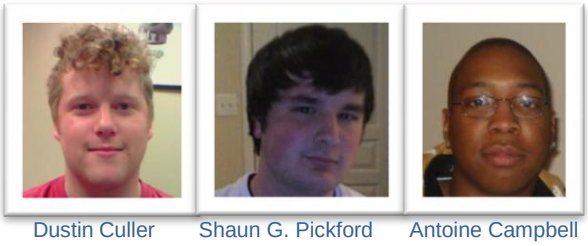

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Introduction

This summer in the Games + Learning Lab, we worked on creating a game from Virtual Bead Loom, ~~which is~~ a culturally situated design tool (CSDT). BeadLoom Game allows players to replicate designs (or puzzles) in the least amount of moves using iteration and other simpler patterns.

Background

Virtual Bead Loom was a tool created by Ron Eglash and designed to help students learn Cartesian coordinates and iteration. Due to the design of the tool, students rarely used advanced functions such as linear or triangular iteration. BeadLoom Game creates an environment which rewards students for finding the ideal solution to a puzzle. Each puzzle requires different functions to be completed, therefore more students began using the higher level functions instead of creating images point by point or line by line. Like the tool, students can create their own original art and save it as a custom puzzle. It also allows students to play other students custom puzzles to find a better solution or beat it in a faster time.

Research

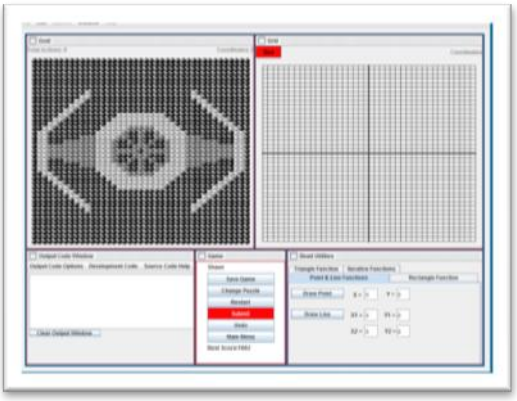
To test if BeadLoom Game shows learning gains over the Virtual Bead Loom tool, we devised a pretest, mid-session test, and post test for two summer camp sessions during the summer. The first camp was comprised of a group of middle school students and the second would contain only high school students. The pretest would be taken before the students used any software.

The students of each summer camp were divided into two groups for half of the first day. One group would work with Virtual Bead Loom and the other would work with BeadLoom Game. After each group worked on their specified software, they were given a mid-session test. These tests were used to determine how the students using BeadLoom Game differed from those using Virtual Bead Loom.

For the remainder of the week, there were times when the summer camps were required to use a specific software (either BeadLoom Game or Virtual Bead Loom) and some time where students could choose what they worked on (either BeadLoom Game, Virtual Bead Loom, or any of the other CSDTs on the CSDT site). The students choices during these times were recorded to determine students interests. At the end of the week, students took a post test to determine their overall learning gains from the software they had tried.

Impact

BeadLoom Game hopes to increase students knowledge of Cartesian coordinates, iteration, and layering. Virtual Bead Loom is a great tool for providing practice with these concepts and creating custom designs. BeadLoom Game encourages students to find better ways to solve a puzzle, which often requires a student to use more advanced functions such as linear and triangular iteration. BeadLoom Game should provide the additional motivation for continued play, adding to the replayability of Virtual Bead Loom. Through continued use of BeadLoom Game, we hope to see that students become more familiar with the basic concepts. BeadLoom Game.



BeadLoom Game Interface

We also improved the Interface of BeadLoom Game from the Java port version we received to make it more intuitive as well as added a menu system to accommodate the Game and other features.

Conclusion

More students choose BeadLoom Game over Virtual Bead Loom when given a choice during free time. Students also enjoyed creating custom puzzles, so much so that some of them created custom puzzles at home and in there time away from the summer camp.

Though statistical analysis of the results of the data from the summer camps has not been calculated. The middle school camp showed an improvement from an average of 6% on the layering section of the pre test to 34% on the post test. They also showed an improvement from a score 52% on the pre test to 61% on the post test on the iteration portion of the tests. At the mid-session test, the BeadLoom Game group went up 12.8 points in iteration where as the Virtual Bead Loom Group went down 5.8 points. The BeadLoom Game Group also went up 11.3 points in layering when the Virtual Bead Loom group only increased 2.5 points on layering portion of the test.

Future Work

Once the current research on BeadLoom Game has been complete, research can begin determining which features and functionality affect learning gains of the game. Many of the features that have been built into BeadLoom Game have a simple boolean toggle switch for turning them on and off. This will allow for easy testing to determine which features are vital to learning gains. With this research, we can hopefully provide insight to developers of other educational games to determine what functions and features should be emphasized or deemphasized to maximize learning gains.