Games for Teaching Children

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Abstract

The project will develop one computer video game for children.

When the purpose of video games is to bring happiness to children, mixing some knowledge teaching with gaming can have unexpected effects.

The main teaching goal is math. The game will teach children digits, including acknowledge number, understanding algorithm (adding, minus), and geometric figures (rectangle, triangle, circle).

The difference between computer teaching and traditional teaching is the interaction between computer and human. By playing the game, children will learn how to interact with computers by using a mouse and keyboard.
1.0 Introduction

With the spread of personal computers, teaching by using video games became possible, but actually educators tried to teach children with video games for more than ten years. Williamson (2009) conducted a survey of over 1600 UK teachers and found that 35% have already used computer games in their teaching, and 60% would consider using computer games in the future.

With more and more research on game education published, people find that games can provide not only relaxing, but also high efficiency in education. One of the most significant reasons is that gaming increases the engagement of children when learning (McClarty, K. L., 2012). When playing motivates children’s interest, children will learn initiative rather than receive information passively, and they will learn faster. To arouse the interest of children, game design has become the one of the most important parts for the game.

The game follow by two part for each section:

1) Learning

2) Playing

Children may feel excited at the beginning of learning, and they will learn much faster and more efficiently at this moment, but when repeated learning cools their enthusiasm like traditional teaching. Game designers need a way to attract their interest back, which will increase the efficiency of learning again.

In this game, playing will attract their attention back to learning. Game playing parts are designed based on previous learning sections. Therefore, when children play the games, if they don’t understand or grasp the previous section completely, children cannot pass the game. Then, children will go back to learn again, which strengthens their memory, and come back to play again. Children will not feel bored
at this process because they are not just learning, they are playing. Learning is just part of the game play.

Salen said that “meaningful play” is important - players should feel the playing and time spent were worth it. Therefore, designers should provide some “reason” for players to continue playing: for example, precious game props as reward. (Salen, k. 2004)

In this game, the solutions for different puzzles will be the best reward. Just like children will feel excited when they do well in the first exam (Pallas, A.M. 1987), finishing the puzzle at the first time will give them a sense of accomplishment, which will push them forward to learn and play more. Moreover, when children reach the next section, they will receive new information and new challenges. Their attention will not be distracted until they play for a long time, and the hours of high quality learning is more efficient and engaging than traditional teaching. (Aljezawi, M. E., & Albashtawy, M. (2015))

2.0 Game design

2.1 Mathematical knowledge

Gaming is interesting, and children can learn from playing games, but we are assuming children understand, or at least know, the knowledge behind playing the game. However, not all K-12 children, student have a good understanding on the topic of Math, so teaching before gaming is necessary.

To motivate children to learn rather than force them to learn, the learning part should get their attention and interest. In order to finish this goal, animation and good, cute, or fun images are necessary, just like the image below.
This teaching section allows children to guess the answer by using the apple images above - actually even children don’t know math at all, they can get the answer by counting the apple above the formula.

By clicking on the mouse, they can see the answer then, which is 5.

There are several sections of teaching, and after that, there are some fun games which allow children to check if they really understand what the game has taught before. For This adding and minus learning section, the game allows the player to only move one match to finish the formula.
This part not only tests the knowledge taught before, but also teaches human computer interaction skills - children need to click on the match and drag to the proper position.

This game does not have a game level for teaching computer skills such as mouse click and keyboard typing, because it will be tedious to just teach computer control skill, and children can ask the people around them for help, such as parents and teachers, or even friends.

However, the game provides solutions and children can see those solutions even if they haven't tried yet. The reason is actually most of the learning and action of children come from imitation (Samuelsson, I. P., & Carlsson, M. A. (2008)), a solution that provides them with an idea of how to play the game, and teach them by “action”.
However, for this section, not all solutions will be shown - only two solutions will be shown after children click the button “solution1” or “solution2”. There are two main purposes to not giving all the solutions. The first reason is that games should teach them to learn, not to get answers, they should try to think about the possible answer rather than relying on the solutions. Further, the second reason is finding something that is not shown in the game may trigger the curiosity of children. Just like the “Easter eggs” in traditional video games will motivate players to explore every possible section, a “not exist” solution may inspire them to think more, which means they will learn more. (Salen, k. 2004)

2.2 Geometry Figure

Graphics don’t need that much teaching, but it is important to connect those figures and objects in our daily life, such as school buses and rectangles.

In this section, there is a game for teaching children how to make a figure. Just like the section below which wishes children to make a circle.
Of course, they may not follow the game’s instructions to make a circle, but that is why it is a game, not a book. However, the functionality of this section is teaching, we are still with the player to finish the goal. Therefore, children can leave this section and come back again later to finish it.

Another game section in this part is teaching how to control character, and review some knowledge about figures.
Children will control the pig to move, such as go left and go right.

In this section, they need to understand the logic of the keyboard in order to control the pig. Even if they know the answer - 5 - they cannot access it until they learn how to jump. Furthermore, there will be gravity in the game, and children will learn that they need a hard jump to access “5”.

When Children may not understand or even realize that they need to jump at first, a “7” is set at the beginning scene. By trying all buttons on the keyboard, they will finally learn that they need to jump - of course, a teacher may tell them how to control directly, but children still learn and practise on the game, which reinforce their learning.

3.0 Summary

People used games for teaching a long time ago, and recent research showed that video game teaching is effective. Therefore, I decided to design a game which could help children learn both human computer interaction and basic mathematical knowledge.
My teaching game is composed of two parts: Mathematical science and Geometry. All my game levels, or each section, follow the traditional game design pattern: Learning before Playing. The reason for this design is that children need to learn to review the knowledge before playing - just like you should tell the participants' the game rule before the game begins.

The “move one matches” game in the math section not only teaches children mathematical knowledge, but also the interaction between mouse and game object (computer).

The “touch number” game helps children to review both geometry and mathematical knowledge: children need to identify triangles and count them to solve the puzzle. This part also teaches children the interaction between keyboard and video game character, which includes move and jump.

In general, this game is not a wonderful game, but it teaches children how to use the mouse and keyboard - also the mathematics and geometry knowledge.
Reference:

About The Author TeachThought Staff TeachThought is an organization dedicated to innovation in education through the growth of outstanding teachers. (2017, September 13). 6 *Basic Benefits Of Game-Based Learning*. TeachThought. https://www.teachthought.com/technology/6-basic-benefits-of-game-based-learning/.


