Designing Educational Computer Games to assist Autism Children Learn Using Games-Based Learning

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Abstract

Autistic disorder qualifies as learning disability. A treatment and therapy progress especially in the educational process of autistic children is necessary to assist them. The method used today to assist autistic children are rather conventional and a few teachers even used some unspecified courseware to assist the children learn in the classroom. This paper describes how to design an educational computer games which integrate a suitable technique such as Discrete Trial Training (DTT) known as Applied Behavioral Analysis (ABA) into games. It is hoped that the educational games developed using this technique can help children with autistic disorder to learn using game-based learning.

Keyword: Educational Computer Games, Games-Based Learning, Autism, Behavioral Analysis

1.0 Introduction

According to Siegel B. (2003), Autism is a pervasive developmental disorder characterized by impairments in social interaction, communication, and restricted, repetitive, and stereotypic patterns of behaviors, interests, and activities. Symptoms of autism can be broadly grouped into three domains

- Social Autistic Learning Disabilities
- Communicative Autistic Learning Disabilities
- Non-Social Autistic Learning Disabilities

As own efforts to get clear understanding, autism is a life-long developmental disability that prevents people from understanding what they see, hear, and otherwise sense. It is a development disorder characterized by unusual, repetitive, or severely limited activities and interests, problems with verbal and non-verbal communication and impaired social interaction.

According to Williams M.(2000), people learn using all five senses whereas 83% through the sense of sight, 10% through the sense of hearing, 4 % through smell, 2 % through touch and finally 1% through taste. Since so much learning is done involving the sense of sight, this ongoing prototype should capitalize on this fact and use it to the fullest advantage in helping autism students to learn more effectively. Multimedia elements consist of texts, graphic, animations, video and sound effects

Therefore, we try to design an educational computer games to help an autism children learn more fun and enjoyable. More researchers find that computer games can attract the emotion of children to learn more effective with increase the social aspect value.

According to Raybourn, E.M & Bos, N. (2005), computer games are not only used for entertainment proposes. Games and simulations are often used for training and teaching in management science, economics, psychology, sociology, intercultural communication, political science, military strategy, interpersonal skill development and education. Games open up possibilities for simultaneous learning on multiple levels, players may learn from contextual information embedded in the dynamics of the game, the organic process generated by the game play, and through the risks, benefits, costs, outcomes and rewards of alternative strategies that result from decision making. Raybourn, E.M. & Waern, A. (2004)

Games and Disability Learning

To focus on the children with autism, psychologists have shown that they can often improve the quality of life for many children with autism and help them to integrate more successfully into society using behavioral programs (Ibrahim, 2009). The approach to treatment for children with autism is termed Discrete Trial Training, which is also known as Applied Behavioral Analysis (ABA) or Lovaas Method. DTT/ ABA is a procedure that uses the principles of learning theory to improve behaviors that are deemed socially significant and it is based on the theory of behaviorism. The use of BTT/ABA approach to treat children with autism was pioneered in the late 1960s and 1970s by Dr. Ivar Lovaas at UCLA. Lovaas was well trained as a Skinnerian behavioral psychologist.

According to Siegel B. (2003), below are the components of Discrete-trial training approach which can help to compensate for difficulties in learning for autism children.

- Cause-effect learning and observational learning
- Attention
- Motivation
- Stimulus control
- Generalization
- Communication

To match the DTT approach propose by Siegel, B. the designing educational games is not easy. The designing educational games is a rich task, in that it offers opportunities for children exercise a wide spectrum of skills (such as devising game rules, creating characters and dialogue, visual design, and computer programming) to create a complex artifact. It is also authentic on the grounds that the resulting artifact is of value in popular culture and can be enjoyed by friends at home or at school (Smeets, 2005; Judy, 2008)

This is caused because the designing educational games actively engage learners because they construct their own game using a software tool; it is not a passive experience. Pupils can learn autonomously using the software as a sounding board for their ideas – they can embody their creative ideas in a testable way in their game and then try it to evaluate their ideas. Furthermore, as the concept of audience is extremely important when making games, peer collaboration is a necessary component. The purpose of making a game is to create an artifact which somebody else will enjoy, and so inviting others to play test the game is a natural part of the process.

Computer games provide an environment for active, critical learning. Through games one learns to appreciate the inter-relationship of complex behaviors, sign (images, words, actions, symbols etc) systems, and the information o social groups. (Gee, 2003; Raybourn, E.M & Bos, N.,2005)

Games in Autism Multimedia Courseware

Based on the propose design have been discussed, here is the games which are integrate in the two of autism multimedia courseware titled About Us and Math for Autism (Numbers). The coloring game emphasis on color recognition, thus facilitating the children to kindle their focus on certain pair or group of similar colors. 32 set of colors are chosen in the game with 4 scheme set each.

Fig.1 : The color palette for coloring the sense such as hear.

Another mini game is developed which trains the children about basic human anatomy. The children are required to draw the correct words to the labeled space given. Children are expected to be able to describe parts of the body ranging from the head, thorax, upper and lower limb that are normally used in daily activities.
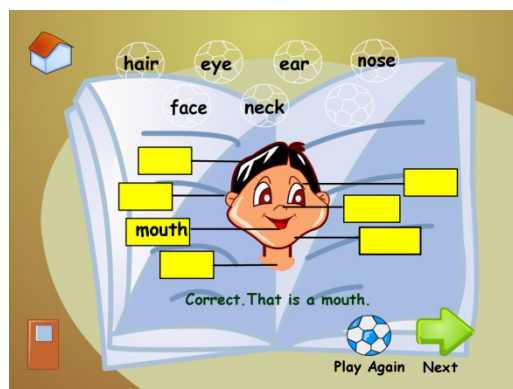
Fig.2 : The drag and drop games to match the words

Puzzle game is created that stimulate two aspects which are shape distinguishing and spelling. Children will arrange blocks to construct shorts words. The shapes are added as clues to assist children to place the pieces together.
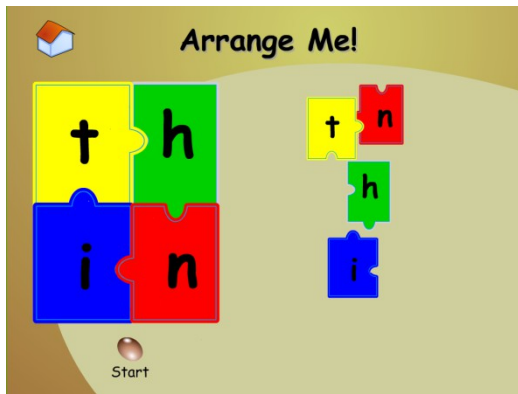

Fig.3 : The puzzle of word

Crucial lesson for autism children is identifying their close relatives and acquaintance. The player is given several characteristics of a person and is necessitated to choose the particular individual implied.
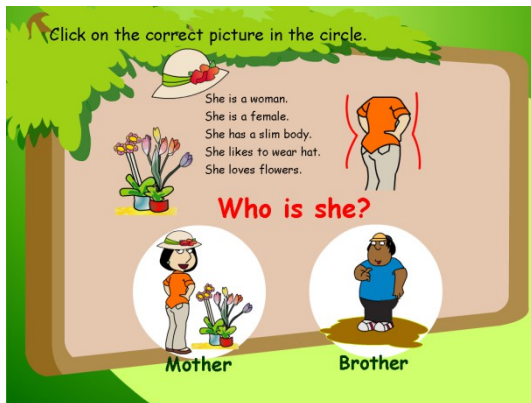

Fig.4 : Games which the autism children should recognize the keyword with the parents

Meanwhile, the design for of Maths game for Autism (Numbers), we proposed four suitable games to learn and play. The first game lets the children choose the correct answer based on the number of objects they count on the screen.
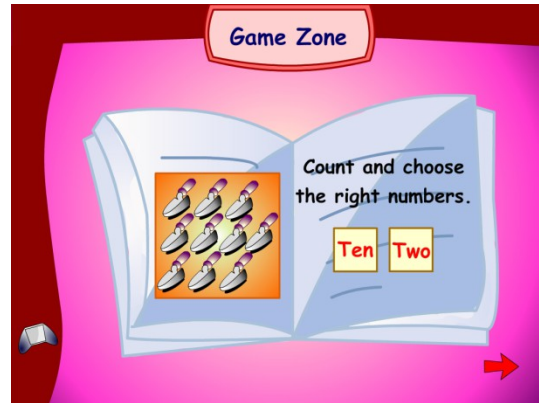

Fig.5 : Games like the quizzes activities

The next game is expanded with higher level of difficulty with more choices of answers given.
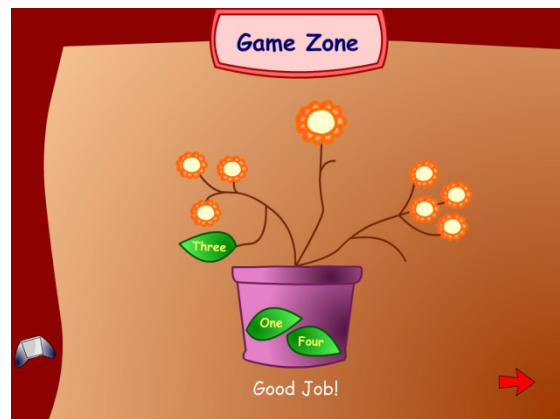

Fig.6 : The drag and drop games to match the numbers and the item.

Beep sound will be played when the player give the correct answer that is equal to the illustration.

Fig.7 : The puzzle games to test the coordination
and memorize

To experiment with the children's memory skills, a
flip game is formed. The player needs to click the
first card and select the matched card next.

Fig.8 : The flip card game to test the children
memorize.

Conclusion

We have describe how to design an educational
computer games with integrate a suitable technique
such as Discrete Trial Training (DTT) which
known as Applied Behavioral Analysis (ABA) into
the games. We hope our paper would provide
generic computer based educational games for
Autism children respectfully.

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