



Educational games for miss-concentration students (ADHD students)

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Abstract

Increasing a kid's concentration is a major problem for both teachers and parents, but the presence of educational games solves almost 70% of this problem and the other percentage relies on teacher and parent roles to increase the kid's concentration using different methods and this is the main role of our game here. Our game's name is Cube Invasion and we derived its name out from its context because it is a 3D game with cubes which surround the kid's player and he try to hit most of the boxes to get the highest score in a less time and tries not to lose to the time or not get the least amount of score to pass the level. We can achieve our goal of the game (increasing the kid's concentration level) by making the game's surroundings a lot harder in the intercourse of the game; so we have here four kinds of surroundings for the kid to interact with—green box: this is the main box for the kid to hit; yellow box: this is a box with a negative attitude that the kid should be aware of; white box: this is a box for increasing time if he runs out of time; red box: this is a rare box and it appears and disappears in a second and requires a high concentration level to hit it. We used Unity game engine for gaming control and programming because it is the most famous game engine right now and it provides a lot of helpful things for the kid to interact with. We use the after effects for the game design and development of both introduction video, game components and animation of the game. Our game storyline talks about a peaceful planet called Pill-earth where everyone loves each other. We have our hero and his lover (girlfriend) sitting in the park and all of a sudden an invasion of cubes comes to the planet to occupy it and spread hatred among the planet's inhabitants. They abduct the hero's girlfriend and he gets angry and tries to restore her and free the planet from this disastrous occupation. At last, he succeeds in killing the leader and restoring his lover and freeing the planet. This story makes the child interact more with the game.

Keywords: ADHD treatment, educational games, FPS games.

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1. Introduction

ADHD is the abbreviation of attention deficit hyperactivity disorder And it is a mental disorder of the neuro developmental type. Its main points are excessive activity, problems paying attention or the difficulty to control his/her behaviour. Most of the cases that have symptoms appear before the age of 12 or after they cross 6 months. Problems can appear in at least two setting, such as school, home or recreational activities. When children have problems paying attention, this may result in a poor performance in school. Although it might be bad for society, but many children with ADHD can have a good attention span for tasks they find interesting. The exact cause of the disorder is unknown for the majority of the cases, although it is the most commonly studied and diagnosed disorder in children and infants. After 2015, the number of affected people rose to 51.1 million globally. ADHD can affect boys three times more than girls. About 30%–50% of the people are diagnosed in their childhood and continue to have symptoms in adulthood. Between 2% and 5% of adults continue to have the symptoms. So, in order to fight this disorder with new technological methods, our game comes in to play. It is a game with the aspect of first person shooter (FPS), where the player (the kid) tries to hit as many cubes as he can in a closed environment before time runs out. In our game, we use Unity game engine as the main development tool for designing, programming and running the game. The Unity game engine is a multi-functionality game engine that can support 2D and 3D graphics along with drag and drop, with the benefit of C# scripting. There are two additional scripting languages, like Bo which was deleted when they released Unity 5 and JavaScript which began its removal process in the beginning of Unity 2017.1. Unity supports the following APIs: Direct3D on Windows and Xbox One; OpenGL on Linux, MacOS and Windows; OpenGL ES on Android and iOS; WebGL on the web; and professional APIs on video game consoles. In addition, Unity provides many other APIs. Unity allows 2D games to import outside animated patterns along with the advanced 2D world viewer. As for 3D games, Unity can compress textures and mipmaps along with other different graphical settings that suit every platform it supports. It supports terrain design, reflection mapping, landscape layout and SSAO, which stands for screen space ambient occlusion. Unity also provides developer services: Unity Ads, Unity Analytics, Unity Certification, Unity Cloud Build, Unity Every play, Unity IAP, Unity Multiplayer, Unity Performance and Reporting and Unity Collaborate. It can create a custom vertex, part (or pixel), tessellation, compute shades and shading Unity's own surface using Cg which is a modified version of Microsoft's high-level shading language. Our game storyline talks about a peaceful planet called Pill-earth where everyone loves each other. We have our hero and his lover (girlfriend) sitting in the park and all of a sudden an invasion of cubes comes to the planet to occupy it and spread hatred among the planet's inhabitants. They abduct the hero's girlfriend and he gets angry and tries to restore her and free the planet from this disastrous occupation. At last, he succeeds in killing the leader and restoring his lover and freeing the planet. This story makes the child interact more with the game (Horachek 2014).

2. Objectives and aims of the research

1. ADHD and how to identify it.
2. ADHD treatment and its kinds.
3. Introduction about different kinds of games.
4. Educational games and their role in our lives.
5. Introduction to our game.
6. Our game's role in fighting ADHD.

3. Games made by unity

Some of the games are Aegis Defenders, Battletech, Crow fall, Dusk, Fe, Ghost of a Tale, The Last Night, The Lost Legends of Red wall, Odd world: Soul storm, OK K.O.! Let's Play Heroes, Ooblets, Pillars of Eternity II: Dead fire, Shadow gun Legends, Subnautica and Runner3.

4. Method

The qualitative research method was used in this research. Qualitative research is one of the ways of generating knowledge that people develop to unravel their secrets and discover the depths of social systems that they shape with their own efforts (Ozdemir, 2010). This research is a developmental study in which the final result is the mobile game application. Only one type of user can interact and log in to the game, namely players.

5. Procedure

Before the design process commenced, certain measures were taken. Market survey: The researchers searched Google Play Store and Apple Store using various keywords, including Educational Games, Action Educational Games, FPS Educational Games, etc. This process was implemented to determine the existence of similar game app in order to avoid duplication. Experts' opinions: The opinions of experts in mobile gaming and mobile development were sought before, during and after the design process to ensure that the needs of the player (patient) were met. Student's opinions: Sample students were also interviewed as part of the target analysis to assess their needs, as they are the end consumers of the game. The above second and third steps were repeated multiple times before the game was actually complete.

6. System organisation

Below is a summary on how the game is organised, the kind of the input the system will accept, the process and the expected output. The game is divided into three stages where the game has input (game start), process (moving and shooting) and output (win or lose the stage).

7. Input stage

The game is divided into two stages where the main menu and game starts. The first stage is the main menu where the player interacts with the menu in three languages (English, Turkish and Arabic) and adjusts his options and then presses start to advance to the next stage.

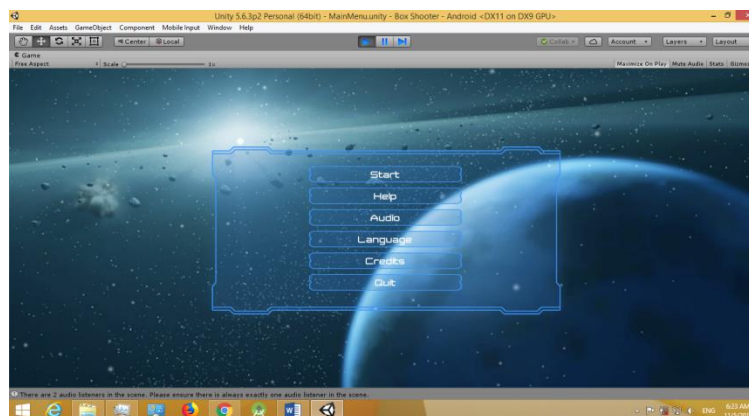


Figure 1. Main game menu

The second stage is the stage where a short movie plays to introduce the player to the game and its storyboard and then the game begins with three different elements where:

My Player: it is a pill-shaped player with physical components and simulations and his firing gun.

Camera: it is the main camera of the game and it follows my player whenever he moves or sees something.

And the last elements consist of another four sub-elements and it is called cubes:

Green cubes: they give +5 points to the score.

Yellow cubes: they give–3 points to the score.

White cubes: they give +3 seconds to the time.

Red cubes: These are rare cubes. They appear and disappear in only 1 second and they give +50 points to the score.

The screen are provided with a game controller to help the player take control of the hero to freely look and start firing with his gun; when the player’s shot hits a target, that is when the process stage commences.

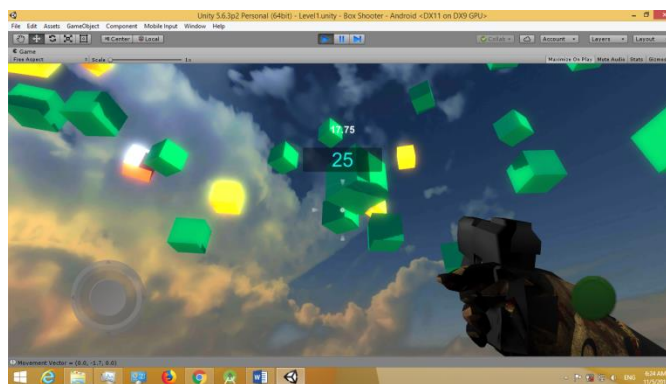


Figure 2. Game in action

8. Process stage

When the player starts to move and shoots the target, the gun output, if it hits the target correctly, calculates the estimated amount of points whether it is positive points or negative ones and then adds them to the scoreboard above the player’s cursor until the timer runs out or the player achieves the required score to advance to the next level. When the player advances to the next level, the output stage commences.

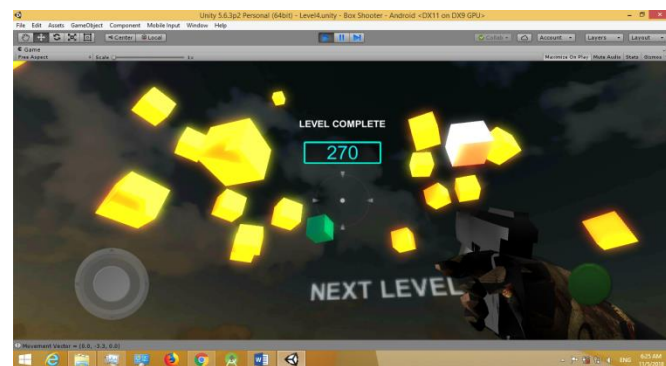


Figure 3. Success in overcoming the level

9. Output stage

The output stage is triggered when the player achieves the required score and hits the next level buttons which appear after successfully completing each level to advance to the next one which is more harder than the previous level where he starts with the input stage then to the process stage

again and finally to the output stage until he reaches and finishes level 5; thatis the only condition where he will exit the game to the main menu.

10. Transforming design into prototype

Our game was made by Unity game engine and its graphics was made by Adobe’s Photoshop and Adobe’s After effects. It took a lot of coding in order to make the game run without any errors regarding the design process and movement and animation parts, which were combined all together to achieve the movement of the objects to play the game correctly.

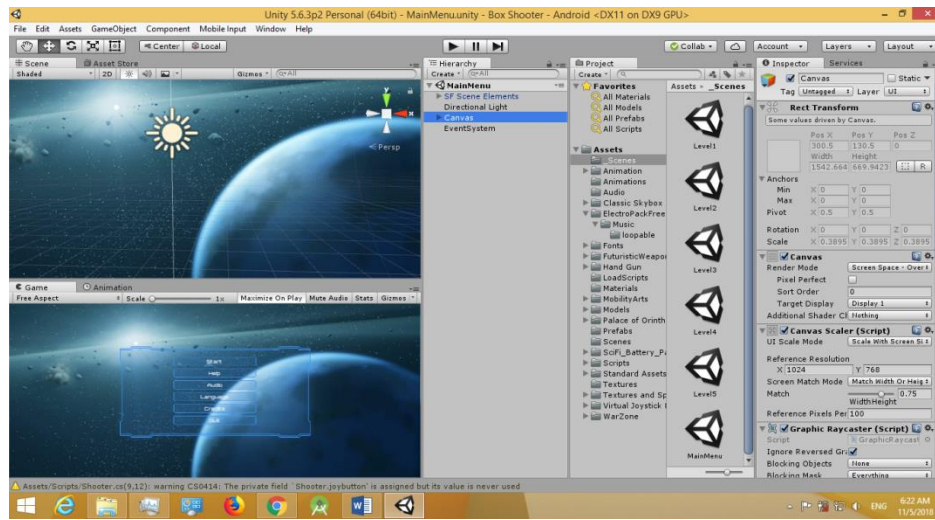


Figure 4. Designing the game 1

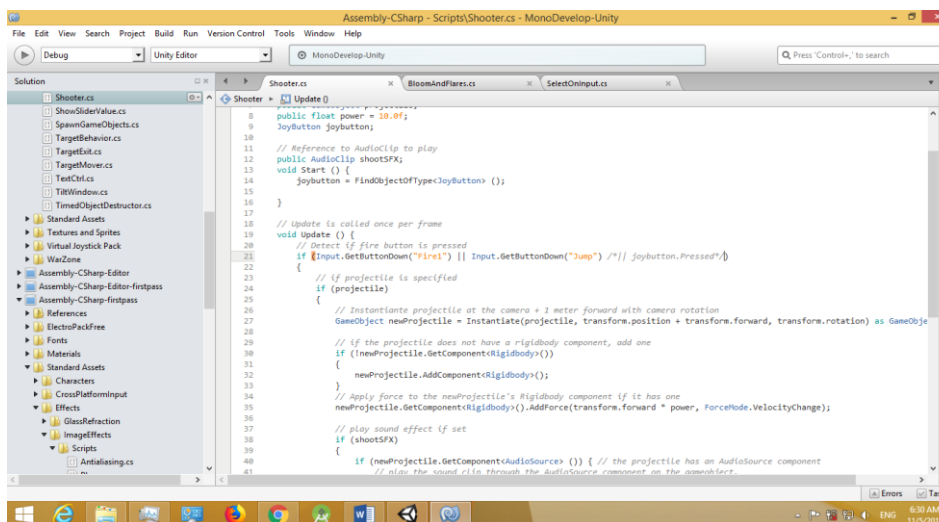


Figure 5. Designing the game 2

11. Conclusion and discussion

ADHD, which can negatively affect relationships between people, daily life, success in school and professional life, is an important social problem. Therefore, early diagnosis and effective treatment of ADHD are very important. In the treatment of ADHD, some research has been done on the location of

the game. In his study titled ‘Attention deficit hyperactivity disorder’, Oner and Aysev (2007) stated that children could not participate in the game quietly.

The analysis of the ADHD disorder gave us a clear view of how to identify the disorder in kids and how to start the cure process. With new technological programmes and cures, we can apply our game to be included in the cure strategy to cure the kid partially or fully of the disorder. We can make new games to be used in fighting the disorder using the new game engine available now to achieve the maximum efficiency. Our game aims to try to identify the disorder and to be included within the cure process of the affected kid to cure him/her. We achieved the aim of this article by making the game more challenging by advancing in the course of the game.

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