

# Brain Game Design For Elderly

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## Abstract

The increasing number of elderly people every year makes the number of Dementia sufferers also increase. To reduce the number of people with dementia, it is necessary to have serious management of people with dementia. With the development of technology such as Android-based gadgets and cellphones, it is very helpful for elderly people to get information and in their daily use. Technological developments can also help the elderly to reduce and prevent Dementia by playing games especially the Brain Game which can help them train the brain's work system because it can sharpen the brain and train the speed of the mind and hands. The Brain Game is designed using the Android operating system platform. Android was chosen because it is easy to use. In designing and developing this game using the AGILE and Extreme Programming methods and using Unity 3D version 2020.

## 1 Introduction

Games are a type of playing activity in which the players have the goal of winning and are carried out in accordance with the rules of the game

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made. Game is a system or program in which one or more players make decisions through control of objects in the game for a particular purpose [1]. The development of science and technology is increasing rapidly, this can be seen directly or indirectly. The development of the internet and mobile technology (handphones) greatly influences people's activities in everyday life [2]. With the many facilities available now, the game can be said to have a lot of fans. Game is a game that aims to entertain players. However, currently games that contain elements of cognitive and memory training are still lacking. Cognitive and memory games are an example of learning media that apply the Learning by doing pattern [3]. This pattern requires players not to repeat failures at each stage of the game. From the pattern applied by this game, players will learn independently. This game is a mobile game application that can help improve the cognitive and memory of the elderly. The game that will be made consists of puzzles, guessing pictures, counting and searching for words. This Brain Game is called the WSU Game (Wuhan Sports University Game). By making this game, the elderly can remember and understand more about counting and recognizing the names of objects. So that the cognitive and memory aspects that require bigger thinking can be honed.

## **2 Research Method**

### **Agile Method**

Agile Development is a fast software development method with changing requirements that occur in a relatively short time. The main concept of Agile Development is application development and teamwork. Focus on working on applications by minimizing documentation. Teamwork in the form of two or more people working on one feature and intensive communication [4]. Agile Development is in the form of literacy or iteration, the goal is to respond and deal with any changes flexibly, thereby reducing the time spent on projects and achieving client satisfaction. Agile development practices are suitable for small-scale projects and work on small teams [5]. Agile development itself is a software development model in the short term. Then, it requires rapid adaptation in dealing with any changes [6]. The most important value of Agile development is that it allows a team to make decisions quickly, with good quality and predictions, and has good potential in handling any changes.

### **Extreme Programming Method**

Extreme Programming was introduced by Kent Beck in 1999. According to

Kent Beck Extreme Programming turns the conventional software process sideways. Rather than planning, analyzing, and designing for the far-flung future, XP exploits the reduction in the cost of changing software to do all of these activities a little at a time, throughout software development. Extreme programming is a software development methodology intended to improve software quality and responsiveness to changing customer requirements [7]. As a type of agile software development, it advocates frequent releases in short development cycles, intended to improve productivity and introduce checkpoints at which new customer requirements can be adopted [8]. Other elements of extreme programming include: programming in pairs or doing extensive code review, unit testing of all code, not programming features until they are actually needed, a flat management structure, code simplicity and clarity, expecting changes in the customer's requirements as time passes and the problem is better understood, and frequent communication with the customer and among programmers [9]. The methodology takes its name from the idea that the beneficial elements of traditional software engineering practices are taken to "extreme" levels [10]. As an example, code reviews are considered a beneficial practice; taken to the extreme, the code can be reviewed continuously.

### Unity 3D Version 2020

Unity 3D Unity is an application used to develop multi-platform games that are designed to be easy to use. The editor in Unity is made with a simple user interface [11]. This editor was created after thousands of hours which have been spent to make it number one in the top ranking rankings for game editors. The graphics on unity are made with high level graphics for OpenGL and DirectX. Unity supports all file formats, especially common formats such as all formats of art applications.

## 3 Brain Game App

Initial Display Prototype



Figure 1. Initial View

Figure 1 is the initial display after the application is opened, this view shows the team that made this brain game application.

#### Main Menu Display Prototype



Figure 2. Main menu display

Figure 2 displays several game options to choose from, namely puzzles, guessing pictures, counting pictures and looking for words.

#### Puzzle Game Display Prototype



Figure 3. Display Puzzle Game

Figure 3 displays several choices of puzzle games, players can choose one by one, there are 3 selected images.

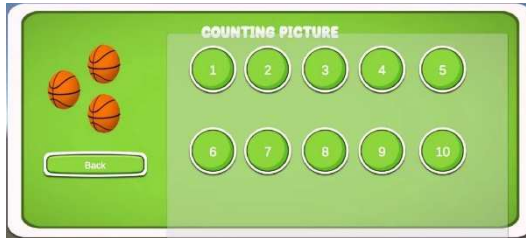
#### Guessing Picture Display Prototype



Figure 4. Display Guessing Picture

Figure 4 displays the shape of an object and the player must choose the answer in the box provided.

#### Counting Picture Display Prototype



*Figure 5. Display CountingPicture*

Figure 5 displays an object and the player must count the number of these objects, then choose the answer in the circle provided.

## 4 Conclusions

We conclude that the Brain game is an android-based application that can be used for elderly. This Brain Game contains elements of cognitive and memory training. Puzzle is an image that is divided into pieces of images that aim to hone intellect, train patience and familiarize the ability to share [12]. Besides that, puzzles can also be used for educational games because they can sharpen the brain and train the speed of the mind and hands. In the elderly with dementia, damage to parts of the brain is found; namely, there is death of cells in the brain and lack of blood supply in the brain. Damage in the brain that can cause interference in the elderly. Puzzle games can be used to slow down the onset of cognitive function decline in the elderly [13]. Game Guessing picture is a game that is done by guessing the picture that has been prepared. In the picture guessing game it is hoped that it can train cognitive memory [14]. Counting picture is a game that is done by counting the number of objects that exist. This game is expected to train the ability to count in the elderly so they can remember the date and time [15].

## 5 Suggestion

In using the Brain Game application, you can use cellphones, gadgets, or PCs. It is recommended to use a gadget or PC so that the game view is bigger.

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