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Design of 2D Action Game with a Sense of Accomplishment and Fun

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***Abstract*— Recently, competition games have increased in the game market and many of them charge additional fees due to limitations in their running environment because they are heavy with a large capacity. To solve this problem in this study, a 2D game was designed to give users goals to clear stages according to a story and to allow them feel the sense of achievement and fun. The game designed in this study is a 2D game that helps users relive stress while removing additional fees. This game offers simple operation method, various maps and designs, has no limitations to users, and allows them to get vicarious satisfaction.**

***Keywords*—2D Game, Funny Game, UI Design, Unity, Action game**

I. Introduction

Modern people build up stress while leading a busy life and struggling to survive in the industrialized and globalized world [1][2]. One of the various ways to relieve such stress is game. According to the trends in recent games, there are not many action games and few games have stories. Furthermore, most action RPG games are heavy with a large capacity, which are difficult to enjoy lightly because they often require additional charges.

Therefore, the Action School game was designed in this study and will be implemented later. As the name "Action School" suggests, this is a school-based game where the protagonist fights with enemies with the story of saving a girlfriend who was kidnapped by students from another school. "Action School" was designed to maximize the sense of immersion by improving the sense of hitting by using background and effect sounds and adding a story [3].

It is not a competition game to compete with other users, and the difficulty level is low to allow even beginners to play games easily. The purpose of this game is to relieve stress from daily life and feel achievement and fun. through vicarious satisfaction while playing a game in a virtual world [4].

Two-dimensional games can invest in reinforcing the game contents through a series of 2D images by reducing effort and time required for the development of three-dimensional games. As the graphic elements of the game are only part of the total game contents, the Action School game planned in this study was developed as a 2D game [5].

The composition of this paper is as follows. Section 2 describes studies related to the subject of this study, including market research, benchmarking, and surveys. Section 3 describes the structural design and user interfaces. Finally, section 4 presents the conclusion.

II. Related Research

A. *Market Research & Benchmarking*

Recently, not many RPG games are released and many games require billing [6]. Games with a small capacity have small graphic effects and thus can run quickly in computers. Thus, a story-based action RPG that can be enjoyed lightly was planned in this study. Among the many games on the market, "Front Line" and "Metal Slug" are similar to this game in terms of playing method and skills. Figure 1 shows screen captures of Front Line that was benchmarked.

Figure 1. Benchmarking 1 "Front line Image"

"Front Line" is an arcade action game released in 1983 by Taito. It has advantages in that anyone can enjoy it lightly and a variety of weapons are provided. On the other hand, its disadvantages are difficulty of immersion due to lack of story and lack of personality of characters.

Figure 2 shows screen captures of "Metal Slug" that was benchmarked. "Metal Slug" is a vertical-scroll action arcade game released in 1996 by Nazca. Its advantage is various maps and characters which can reduce boredom, but its disadvantage is high difficulty level that makes it difficult for beginners to play.

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Figure 2. Benchmarking 2 "Metal Slug Image"

B. *Survey Result*

We conducted a survey to determine the feasibility of development of the Action School game. The main questions of survey centered on "preferred game type," "typical game play time," and "games that you want developed." Figure 3 and 4 show the survey result graphs. For the preferred game types, the highest percentage (58%) of respondents selected "action shooting game," followed by "RPG" and "strategic simulation." For the "typical game play time," the highest largest percentage (41%) of respondents answered 41%. To the question "What games do you want developed?," various opinions were presented, including "shooting game," "action shooting game," "light game," "growing game with minimal charges."

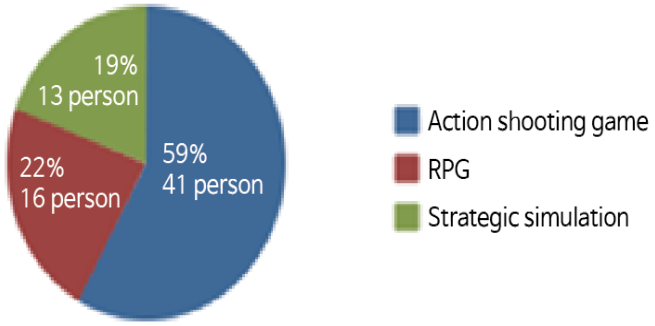

Figure 3. Survey result 1 ("What kind of games do you prefer?")

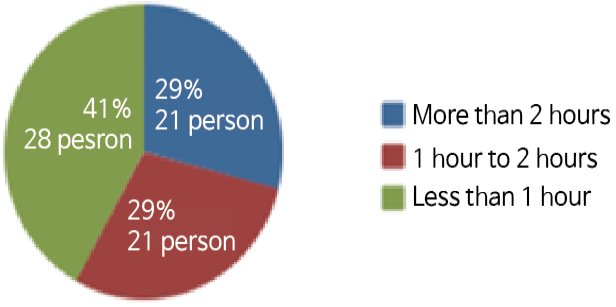

Figure 4. Survey result 2 ("How often do you play games?")

III. Design

A. *Structure Design*

The Action School game consists of five screens: Log-in, Main, Game, Store, and Results. Figure 5 shows the system structure of "Action School."

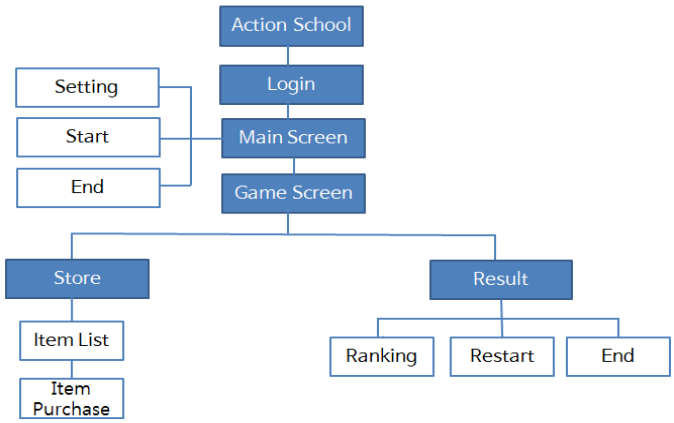

Figure 5. System structure

In "Action School" developed in this study, the user information is received on the Log-in screen and then the Main screen appears. The Main screen consists of accessible settings, start, and finish. On the Game screen, users play the game, and the features of Store and Results are also provided. On the "Store" screen, users can see and buy items. On the "Results" screen, users can see their ranking and restart or finish the game.

Figure 6 shows the flowchart of the game using this system structure.

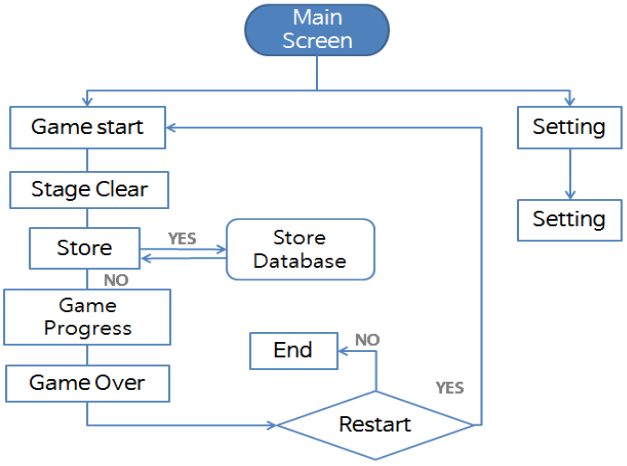

Figure 6. Flow chart

The Action School game developed in this study is largely divided into "Start" and "Settings". "Start" shows the typical game play procedure. Users can decide whether or not to play again the game through "Restart" and request and receive information through DB.

Figure 7 shows the DFD (Data Flow Diagram) of the game.

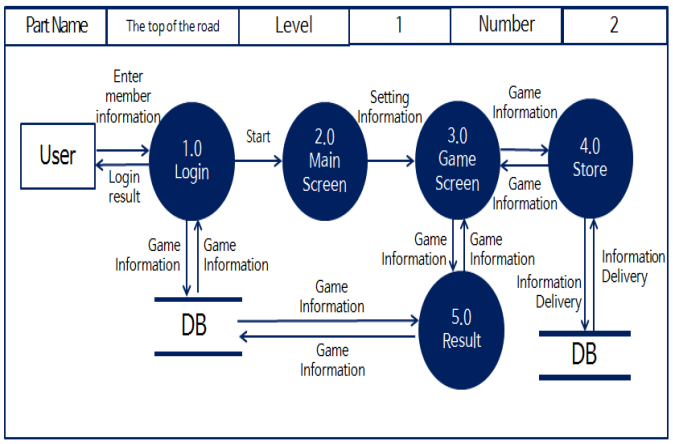

Figure 7. DFD

The name, nickname, score, and settings of the user are stored in the database, which is the data storage. The store information such as item types, user name, item price, and effect value are also stored in the database and users can load and use them as needed. The process and data flow are shown on the basis of the system structure and flowchart design.

B. *User Interface*

In this study, the UI design was simplified as much as possible for user convenience. Familiar items and background images that are common in schools were used to match the theme of the game, school. Figures 8 and 9 show the stage and store screens of the game.

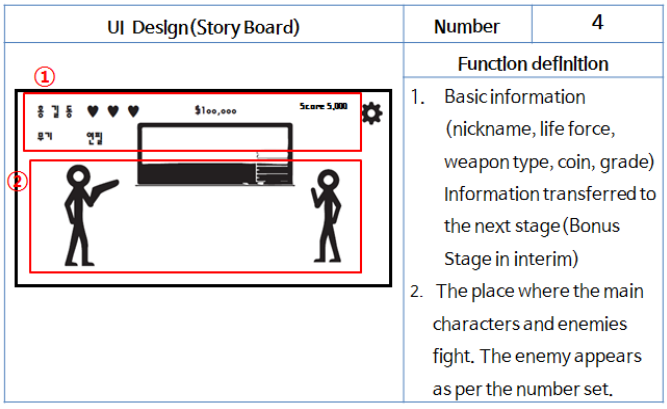

Figure 8. The game screen UI

Figure 8 shows the nickname, life force, weapon types, coins, and score, which are required for game play. The displayed information is designed to be changed by stage. The decreasing "life" will be indicated by specific icons and the weapon type can changed by user. Users earn coins and scores whenever they clear a stage. Coins are money to buy weapons and clothes at the store and the scores are accumulated until the end of the game. When the game is finished, the player's name and score can be listed in the ranking.

Figure 9 shows the UI design for the store screen. When a stage finishes, the store screen appears as shown in Figure 9. On the Store, the items, which consist of weapons and clothes, are classified into categories to make them easier to see by users. Users can scroll the screen to see more items. They can check their coins and buy items with the right price easily using the coins.

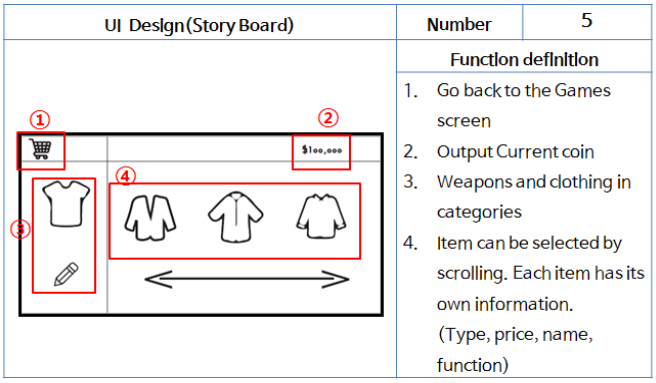

Figure 9. The store screen UI

IV. Conclusion

In this study, a 2D action game "Action School" was designed to give the sense of achievement and fun to users. A game that can be enjoyed easily by anyone was planned through various maps, designs, simple operations, and diverse weapons based on market research and benchmarking. This study was a design stage of the "Action School" game, which will be implemented based the design proposed in this paper. This game will be developed through Unity and designed with Illustrator.

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