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Paddyville: Learning Paddy Cultivation through Role-Playing Game

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Abstract— **Paddy cultivation process is a step-by-step routine that should be followed when planting the paddy plants. Paddy is important in Malaysia as it is the staple food for most Malaysia. To cultivate this important grain of rice, it needs a lot of passion and care. There are a lot of preparations and maintenance in the cultivation process. However, as important as it is, people are prompted to forget about farming when the country is developing so much every year. Buildings are built and houses occupied most of the lands. Younger people nowadays have become ignorant to the cultivation process of the rice they eat every day. Therefore, the objectives of this project are to design an informative game on the agriculture sector, that focuses on the process of paddy cultivation called PADDYVILLE, to develop a role-playing two-dimensional (2D) game application as a learning method on paddy cultivation process and to evaluate the user acceptance of this game. The game used Extreme Programming (XP) for its methodology because of how flexible it is towards changes. It also used Attention, Relevance, Confidence and Satisfaction (ARCS) Motivational model to evaluate the user acceptance while playing the game. The overall findings showed that the game manages to accomplish all the objectives. However, the prototype showed that there are plenty of rooms for improvement. Recommendations can be referred to improve the game, such as by adding a money system to expand the game that allows user to buy and sell items.**

Keywords—learning, paddy, cultivation process, role-playing game, 2D-game

I. INTRODUCTION

Nowadays, people are no longer interested to know the hard work behind the cultivation process and not inclined to know about it. Younger generations are more ignorant to the cultivation process of the rice that their ancestors once make their living of [1]. Because of how convenient the world has become, the process of cultivating the paddy is no longer a part of their life and some may not even have the chance to see the paddy with their eyes and hold them in their hands. This project is intended to pass down the knowledge of paddy cultivation to the younger generations using the most popular icon among them, games.

According to [2], role playing games (RPG) create interesting characters that allow players to experience and connect with varying points of view and personalities. So, by using RPG, this project allows the player to act as a farmer and go through a process to cultivate paddy fields for grains of rice. It is an interesting and engaging method that helps younger generation to learn about the paddy cultivation process. Additionally, youngsters are more likely to learn when games are involved in the learning process, because of how they love to play games more than reading books. By incorporating learning process into gameplay, youngsters will be more interested and gain enjoyment from it. This is due to the ability that promotes fun and motivating learning environment while allowing more flexible ways of communicating than in normal settings. This may lead to keeping the attention and focus of the players on the knowledge in the game [3]. Role-playing is fitting to be used for the experience that will be gained when playing it. As the name implies, role-playing allows the player to play as the character of the game by controlling the actions of the character. The player will act according to the set of rules that are already

predetermined such as walking and holding within a certain scenario [4]. As a result, the player can gain the experience as a farmer who tends to his rice field from ploughing the field to harvesting.

There are also no competitions in the game because the goal for role-playing games is to have a rewarding experience for the player as in this case will be the experiences or knowledge gained as a paddy farmer [5]. Therefore, by applying the RPG concept in the learning process of rice cultivation, the player will be able to absorb the knowledge much better and understand much easier. The engaging element can help the player focus while still gain enjoyment and accomplishment. This project is designed for the PC platform where users can play it on their computer without having to buy additional game consoles.

II. MATERIALS

A. Paddy Cultivation Process

Information on paddy cultivation process were carried out using interviews and studies from valid resources. Paddy cultivation is usually done in warm places, because paddy prefers to grow in a not too cold and not too hot environment. Malaysia's weather is very suitable for paddy cultivation, as it is warm all year round and the rain distribution are perfect for cultivating paddy. Paddy cultivation process is quite complex and distinctive. Fig. 1 shows the processes that involves in the paddy cultivation. Basically, the process of cultivating paddy plant consists of seeding, land preparation, plant establishment, water management, nutrient management, and pest management.

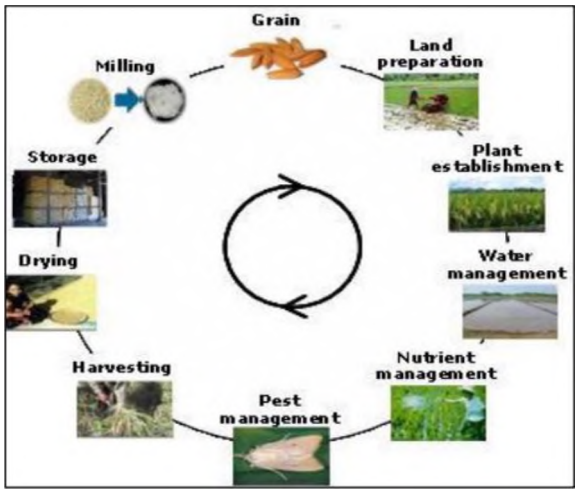

Fig. 1. Paddy cultivation process

B. Two-Dimensional Role-Playing Game

The game is designed in a 2D environment suitable for desktop platform. The pixelate graphic that portrays the Malaysia atmosphere is the unique characteristic of the game. PADDYVILLE is an offline role-playing simulation game that focuses on the paddy cultivation process. The game can be played on the computer without the internet connection. All multimedia elements are included, and English is used as its main language.

III. METHODS

The development of PADDYVILLE is based on the flow of Extreme Programming methodology, which consists of five stages such as planning, designing, coding, testing, and listening stages. XP is very suitable for developing game because it enables developer or programmer to inflict changes at any moment, and helps developer manages task and time better. As it is an educational game, ARCS model is used in making sure that the educational contents of the game are useful and effective to the players that play the game. By following all four components of ARCS model, the developer are able to develop a proper video games with an educational content. Fig. 2 shows example of interfaces of the game.

a. "Planting Guide" Book Panel

b. Fill Water Action in Nursery and Paddy Field

c. Planting Seeds and Seedling

d. Harvesting Process

Fig. 2. User Interfaces of the Game

IV. RESULTS AND FINDINGS

The testing stage happens as the progress of project development is on-going. To render the testing procedure more precise and efficient, a test case is used to run the functionality analysis. Based on the testing, it was showed that all the functions are run correctly and passed. Then, the prototype was tested for user acceptance, based on components of ARCS Motivation Model.

The total mean depicts the level of agreement of respondents to the factors imposed. After all data of all components have been analysed, all four total means are summed and calculated again to provide the value of overall total means. Table 1 below shows the list of all total means and overall total means. the game projects managed to grab the attention of the players when playing the game. With a total mean of 4.49, the respondents agreed with the Paddyville to be entertaining and engaging. The total mean of relevance is 4.26, shows that respondents agreed with knowledge gained by playing Paddyville, is relevant to the real-world knowledge. With a total mean of 4.41, Table 1 also shows that the respondents agreed with Paddyville in introducing confidence to the players. The game gives clear and easy to follow instructions, and they feel a sense of success and accomplishment when completing the in-game tasks. With the total mean of 4.24, the respondents agreed that the game gives a sense of realness as compared to real experience. The game managed to give players an experience as a paddy farmer in real life, and to feel contented with the outcome of playing this game. Based on the total average means, which is 4.35, the value shows the level of agreement of the respondents. Overall percentage shows that the respondents experience about 87% of acceptance value towards this game. It can be said that Paddyville manages to accomplish all the objectives by evaluating the user acceptance.

Table 1. Total average of mean value

Components	Total Mean Average
Attention	4.49
Relevance	4.26
Confidence	4.41
Satisfaction	4.24
Total Average Mean	4.35
Overall Percentage	87%

V. CONCLUSIONS

An innovation of this project is originally developed as an informative game, to provide the knowledge of agriculture that shows the process to cultivate paddy, which in turn can attract interest of the players (especially youngsters) towards cultivation. It is agreeable to say that developing a paddy cultivation game can help educating young people about the cultivation process of paddy plants. With this game, the players can learn while playing. According to [6], many researchers agree that educational video games can offer motivational values and increase players' concentration on learning and promote their thought of higher order. By playing this game, the players can gain enjoyment during the learning time which helps them to focus much better. Apart from that, the game also promotes the local culture of Malaysia. This helps to expose the local culture in agriculture to the players. The uniqueness setting of the game is based on Malaysian living culture, such as wooden high beam house and fashion of the Malaysian farmers. With improvements, this prototype can turn into a better educational material for school and

community. The prototype is in a process to get an intellectual property (IP) right, in order to turn this idea into profit-making assets.

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