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DAFTAR ISI

CLASSIC-SIMULATION ANDROID BASED GAME OF FLY AND LEARN IN ELEMENTARY SCHOOL LEVEL

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ABSTRACT

The purpose of this research is to design classic simulation game application of Fly and Learn which is a mobile gaming application based on android smartphone that aims to provide children in elementary school level to learn with ease through a game. Fly and Learn is a classic simulation game which has a specific purpose to introduce the game of the plane where the children play as a pilot by a plane ride and also to train them in answering questions quickly and accurately on the way. The method used in this research is the waterfall model. The results achieved in the form of an application that can make a learning media for elementary school level students through the medium of game based on android. The conclusion of this research is that the created application successfully attracts students' interest thus helping their learning process.

Keywords: android; classic simulation; elementary school; mobile gaming application

ABSTRAK

Tujuan dari penelitian ini adalah untuk merancang aplikasi simulasi klasik permainan Fly and Learn yang merupakan aplikasi game mobile berbasis pada smartphone android yang bertujuan untuk menyediakan anak-anak media belajar dengan mudah di tingkat sekolah dasar melalui permainan. Game simulasi klasik Fly and Learn memiliki tujuan tertentu untuk memperkenalkan permainan dari pesawat di mana anak-anak bermain sebagai pilot dengan naik pesawat dan juga untuk melatih dalam menjawab pertanyaan dengan cepat dan akurat di jalan. Metode yang digunakan dalam penelitian ini adalah metode waterfall. Hasil yang dicapai dalam bentuk sebuah aplikasi yang dapat membuat media pembelajaran bagi siswa tingkat sekolah dasar melalui media permainan berdasarkan android. Kesimpulan dari penelitian ini adalah aplikasi yang dibuat berhasil menarik minat siswa sehingga membantu proses belajar mereka.

Kata kunci: android; simulasi klasik; sekolah dasar; aplikasi game mobile

INTRODUCTION

The development of mobile technology today is very fast. Almost everyone has a mobile device such as mobile phones, smart phones, tablets, and so on (Mulyasa, 2006). This can be seen in children elementary school level through a survey that was conducted in Sukabumi Utara 05 Pagi State Primary School, where the kids wanted to have a cell phone. Education and psychology studies have used motivational construction called achievement goals to predict learning success and response to failure (Heeter, Lee, Medler and Magerko, 2011). This is a potential large initial of capital and also used as the primary realization of the ideals of adulthood. In respect thereof, kids today are on average had mobile phones and treat mobile phones as one of play partners and children's learning (Paras, 2005).

Children prefer to use Smartphone that has all the advantages that can be used as a means of children's learning process and also support creativity in achieving goals through the game. Several types of outstanding Smartphones are using operating systems such as iOS, Symbian, Blackberry OS, Android, etc. Based on the results of a survey by International Data Corporation (IDC) in 2012 on the article analyzes the results of IDC, it was shown that the Android operating system has the highest percentage of market share compared with a variety of operating systems that are being developed at this time with the total percentage of 61.0%. It shows the demand of Smartphones, especially Android.

Realizing this, the mobile phone developers compete in producing various types of applications that can support the ideals of children (Druin, 2009), thus the application or software-based Smartphone Android system will be analyzed, designed and developed by utilizing the huge potential in the Android market share. In this research, a mobile game application is developed to support student with Kurikulum Tingkat Satuan Pendidikan (KTSP). This application will help students in their learning process.

According to Vaughan (2011), multimedia is a combination of images, text, sound, animation and video into one that is distributed to a computer or other electronic media, other multimedia can also be digitally manipulated. A type of interactive multimedia is called when the end user can control the multimedia elements in it. When the multimedia connected and end users can direct it, then it is called hypermedia. Multimedia elements consist of text, images (bitmap and vector), sound, and animation.

According to Brown & Green (2006), instructional design is a discipline in which practitioners see other disciplines such as cognitive psychology, communication and others, to study and develop ways to build, carry, evaluate instruction and practice instruction. In instructional design, practitioners should consider the information to be presented by looking at the ability of learners.

According to Shneiderman & Plaisant (2010), interface design make a personal computer into a social computer because users can interact and collaborate in various ways with a computer. They describe eight golden rules in designing the interface. First, strive to be consistent: consistency is needed in various situations such as prompts, menus, and assistance. Also, consistent use of color, layout, capital letters, fonts, etc. must be considered. Second, meeting the needs of the universal: designing a universal interface means to facilitate users ranging from beginners to experts. Beginner and experts can add features and explanations assistance by adding a shortcut to riches interface and the quality of the system itself.

Third, provide informative feedback: the system should provide informative feedback to the user and can be adjusted with the actions taken, whether such action an important action or not, and the action that is rarely or frequently performed. For the action that is rarely done and importantly, the

system can provide a more informative feedback. Fourth, creating dialogue cover: dialogue cover is needed to cover the series consisting of beginning, middle, and end. A dialog that states the series have finished will give a sense of relief and satisfaction to the users.

Fifth, prevent errors: as much as possible, create a system where users can not create a serious mistake. If the user makes a mistake, then the system must be able to detect the error and provide assistance and guidance to overcome it. Sixth, creating a simple action returns: every action can be turned. This feature will make users explore every option without fear of making mistakes. Seventh, supports place internal control: users want interface that can respond to any action.They interfere with the input data is tedious, difficult to find the information needed, and the inability to produce the desired results. Eighth, reduce the burden of short-term memory: humans have limits for storing information; therefore, it is important to not make the interface where the user must remember information and one screen to the other screen.

According to Fullerton (2008), game is a closed formal system that involves the player in a structured conflict and resolves the conflict differently. According to Schell (2008), game is a problem-solving activity based on pleasure. Games are categorized based on its game play. Given that there is a slight similarity in each genre definitions; classifications of games are not always consistent or systematic. The following is a few examples of the genre of games. Action games are games which are more focused on hand and eye coordination than the story or strategy. Action games generally rely more on agility and reflexes. Action games, which are lively demanded by the user, is a first person perspective games with 3D. Example of action games is Crysis, released by Electronic Arts.

Game strategy focuses more on logic and reasoning. Strategy games tend to use data sources and time management that come before the quick response and the involvement of the characters in the game. In its common, the creator of this game puts an artificial condition in which the planning and decision-making capabilities are very important and are in the hands of the player. Example of game strategy is Age of Empires, released by Ensemble Studios.

Adventures games are a journey and expedition from an exploration and puzzle solving. This game usually has a linear storyline with the user as the main character or protagonist who must complete the main objective passes through the interaction of the characters and equipment. Example of adventures games is Monkey Island, released by Lucas Arts. Role Playing Games resemble the kind of adventures games, but relies on the construction and development of the characters and is usually accompanied with player statistics, conversation, and strategies to fight than solving puzzles. In this game, the vast fantasy world with NPC's (Non Playable Characters) is something that is common in RPGs, and the storyline is not always linear with side quests that some RPG games provide. Example of Role Playing Games is Final Fantasy, released by Square Enix.

Sports games stimulate both individuals and groups from a user standpoint. Reality based in the real world is the most important aspect in this game. An example for sports games is Pro Evolution Soccer (PES), released by Konami. Simulation games significantly stimulate an object or a process that is animated or not. On average, Sims put the player with 3D first person viewpoint. An example for simulation games is The Sims, released by Electronic Arts. Puzzle games or classic games are the oldest type of game. On average, puzzle games are consisted of card games, tile games, trivia, words, or board games. Examples of puzzle games are Solitaire and Checkers.

Android is the operating system used for mobile-based devices such as mobile phones or commonly called smart phones, tablet computers, net books, portable media players, and others. Android is developed under Linux and the Open Handset Alliance (OHA), which means, anyone can develop android on their hardware. The Android Open Source Project (AOSP), led by Google, has the duty to repair to the future development of android (Google, Open Source Project, 2012).

Storyboard is an illustration, like a comic book, which describes how a final product desired by a producer or director. It is a very effective way for a producer or director to communicate with the crew involved. The use of storyboard actually began originated from animation industry (Simon, 2007). In gaming industry, the most important element is animated. Therefore, the story-board is needed in the development of a game. This storyboard or flowchart serves as a binder to organize all of the multimedia structure, among others; animations, graphics, navigation, game play, are also used for cinematic. Cinematic also known as cut scenes which are used in mini-movies contained within a game.

Storyboard refers as sequential comics which are read every day. At any time, there are three or four panels that show the development of story information. It takes time to create a structure with the writing and designing shows sequential images with the camera and the scene, the camera viewpoint, lighting, action, special effects, and how an object moves from beginning to end (Vaughan, 2011). Curriculum is a plan that is structured to expedite the learning process under the supervision and responsibility of the school or educational institution and its faculty (Nasution, 2008). National curriculum is structured as below:

Table 1 Curriculum Structure

No	Components
A	Subject
1	Religious Education
2	Citizenship Education
3	Bahasa Indonesia
4	Mathematics
5	Sciences
6	Social sciences
7	Arts Culture and Skills
8	Physical Education, Sports & Health
B	Local contents
C	Self-development

National Standards (Article 1, paragraph 15) stated that the Kurikulum Tingkat Satuan Pendidikan (KTSP) is the operational curriculum developed and implemented by each educational unit. KTSP is a new paradigm for curriculum developments that give greater autonomy at any educational institution, and involve the community in order to streamline the learning process in schools. Autonomy is given to each unit of education and schools that have flexibility in managing resources, sources of funding. Education and schools also allocate learning resources based on the priorities and local needs (Mulyasa, 2006). KTSP is intended to create an intelligent graduate who is competent in developing cultural identity and nation. This curriculum can provide basic knowledge, skills, experience learning, developing social integrity and cultivate the national character. Also, principles of lifelong learning refer to the four pillars of UNESCO (Susilo, 2006).

AndEngine is a 2D OpenGL game engine for Android is open-source 2D game development on Android. This engine was developed by Nicolas Gramlich which is now working on a gaming company Zynga. AndEngine is a form of additional libraries with the extension jar that can be installed into the Android project on Eclipse. AndEngine also has some additional extensions, such as Multiplayer, Augmented-Reality, Multi Touch, Physics, Live-Wallpaper, SVG Texture Region, and Texture Packer (Gramlich, 2010).

METHOD

The Waterfall models, referred as classic lifecycle, is a systematic and sequential approach to software development that begins with the specification of the customer needs (Communication) and lasted through the Planning, Modeling, Construction, and Deployment, until the software is completed (Presmman, 2010).
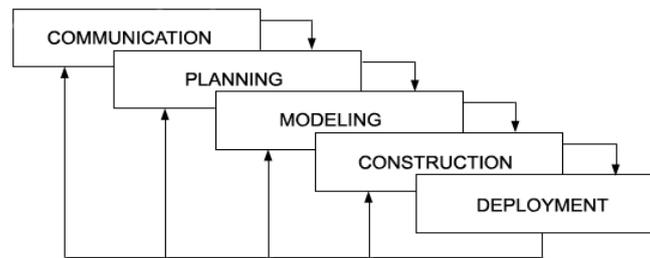

Figure 1 Waterfall Model

The first stage is Communication. The technical work for the creation of the system starts, you should first communicate with customers and other stakeholders. This matter is very important to know what system will be created and also to assist in collecting information related to the development or the manufacturing system. The next stage is planning. This stage is useful to manage the performance of the software engineer, to know what risk to be faced, what resources are needed, what will be produced, and also, the most important thing is to set schedule-making software.

At the Modeling stage, a model will be made to understand software or a similar system will be generated. As well as with modeling stage, a software engineer can also be more aware of design software or system such as what order to solve the ongoing problem. The next stage is Construction. It combines in creating a code for coding (it can be manual or automatic) and testing which is needed to determine the error that is contained in the system or software. The last stage is Deployment, at this stage, the device software that has been completed will be marketed to customers as well as collect criticism and suggestions from the customers.

RESULTS AND DISCUSSION

Figure 2 Main Menu Screen

Main menu screen will be displayed after the display screen is completed. On this screen, there is the title of the game: Fly and Learn, as well as five menus that can be accessed by the user, i.e. play! tutorial, the highest score, sound settings, exit. Play! button will bring the user to start the game, the highest scores will display four user listings. The tutorial button will show display screens that describe the user interface in the game. Sound settings button is to turn on and turn off the sound in the game. The function of exit button is to exit from the game as it can be seen in the figure 2.

Figure 3 Highest Score Screen

In figure 3, the screen will display the high score of five highest score ever achieved by the users during play in this game. Users will see their names on the right side. Users will be asked to input their names when they reach the new highest score in each level.
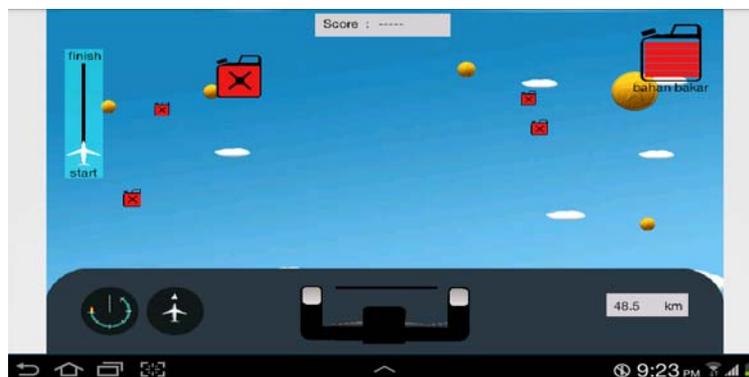

Figure 4 Gameplay Screen

The design of the user interface in the game play screen for each stage in the game is in the same position. It can be seen in figure 4, the position of the steering wheel which is always in the middle, the position of distance, fuel, scores, and mileage information is always consistent. Consistency can also be seen at the beginning of the game screen in the placement of the "skip", located consistently been in the lower right corner. This application can meet the needs of the universal. Presence of the "skip" within the game's intro screen is a shortcut for users who have never played this game to skip the intro and go straight to the screen for the final state game play. This application can also provide informative feedback. On the screen, at the top of the dialog, provide information to users. On the play screen, if the user had the fuel is low, the system will give a short notice and if the player runs out of fuel, the system will also give a short notice.
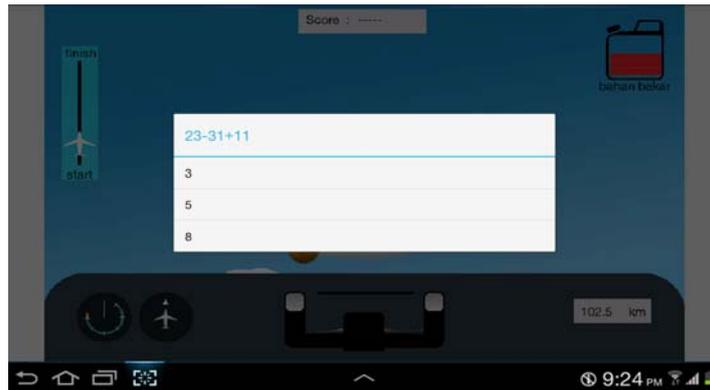
Figure 5 Case-Gameplay Screen

In figure 5, the user will see the coins and fuel appeared among the clouds along the way. Users are required to answer questions that will arise after the user take coins or fuel before taking into scores for coins or fuel to provide additional power until the aircraft reaches the destination airport. An incorrect answer will disappear from the answer choices, so the user is directed to the correct answer choice.

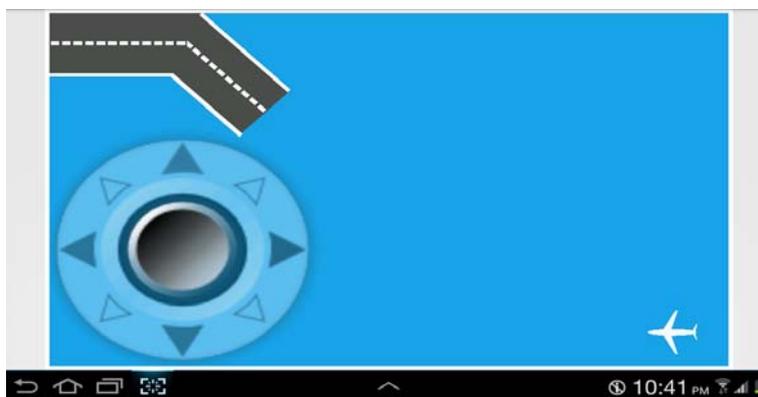Figure 6 Initiation Landing Screen

Figure 7 Landing Navigation Screen

The screen above is the display screen before entering into landing mode. During the arrival time of landing, the system will provide notification to the user and if the user successfully lands the aircraft, the system also gives notice to the user that success and showed obtained scores.

Figure 8 Landing Navigation Screen

In this application, end dialog is created. When the user has completed the level, it will display a notification as shown in the screen above. Score shown is the final score which is obtained based on the number of scores that have been collected from the beginning of the game to start. Prevent Error can be shown when a location yet to be played, it will display a dialog box that tells that the previous level must be completed prior to play this level. This application can make returns easy action. The use of the back button is provided by the user to use their smart phones that have supported it. A repeater is also provided when the pause button is pressed or when the user lost the game. This application supports internal control points. The user has to choose the level of control that is to be played. Reducing the burden of short-term memory the use of user interface that does not change helps the user to be able to recognize and remember the functions of the existing game play screen.

CONCLUSIONS

Based on the analysis and evaluation of the research that have been done, there are some several conclusions: (1) The majority of respondents understand the lesson through this game. Respondents also argue that if there will be the next version, the display images need to be improved. (2) This game was designed and created with a relatively easy difficulty level so that respondents feel this game was easy to play.

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