User Interface Usability of Mamat Adventure

The Study of Usability User Interface of Mamat Adventure Edugame Based on Heuristic Evaluation

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Abstract—**Game is a form entertainment determined by a rule and conflict resolution by the player. A good game is able to display attractive visual, make the player get engaged and feel the needing pleasure. Visual is a medium that only concerns the sense of sight while the other senses like sense of hearing (sound) cannot be included in the visual use Visual in a game is a part of the user interfaces. User interface is a medium between a system and the user. The Ministry of Education and Culture of the Republic of Indonesia has released various free website-based edugames that can be accessed and played by the Indonesia especially elementary school students. Mamat Adventure is one of the edugames provided by the Indonesian Ministry of Education and Culture. This theoretical exploration has been begun with a discussion about the visual appearance related to the user interface in the edugame of Mamat Adventure. This analysis uses the Heuristic Evaluation method initiated by Jakob Nielsen and Rolf Molich to measure the effectiveness of the user interface in the game of Mamat Adventure**

Keywords—edugame, game, heuristic evaluation, user interface

I. INTRODUCTION

Game is a software application that is built with certain rules that must be followed by players. The purpose of a game is to entertain the user, players are required to be able to complete missions in the form of in-game conflicts [1]. A game can be referred to as a system that includes artificial conflicts where a player must be involved in it, the system must be determined by definite rules and can provide measurable results. additive, fun, disjointed, erratic, unproductive, governed by a set of rules, and make-believe are the main characteristics of a game [2]. An attractive visual appearance can make players feel involved in a game and can provide the pleasure that needed by the players, these are the hallmarks of a good game. Visual can be interpreted as images, whether moving (videos) or not. visual use only involves the sense of sight (eyes), other senses such as hearing (ears) will not be involved [3]. Visual in a game is a part of the user interface. The user interface is a medium between the system and the user [4]. The user interface is an important factor in running a good game. The successfully designed interactions between the game and the user can improve the user experience in excitement, gameplay, and better user engagement. In this digital era, The Ministry of Education and Culture of the Republic of Indonesia has released various free website-based games that can be accessed and played by the public in Indonesia especially elementary school students. Games that have been released are edugames type, the content contains some school and extracurricular subject matter such as math, vocabulary, and scouting material. Mamat Adventure is one of the edugames provided by the Ministry of Education and Culture of the Republic of Indonesia and is generally proposed to educate elementary school students about the understanding of Scouts in the Siaga edition. Mamat Adventure became one of the guides of Scouts for students in Indonesia, so the analysis may influence the way they learn in Indonesia.

This theoretical exploration has been begun with a discussion about the visual appearance related to the user interface in the edugame of Mamat Adventure. This analysis uses the Heuristic Evaluation method initiated by Jakob Nielsen and Rolf Molich to measure the effectiveness of the user interface in the game of Mamat Adventure whether it is already good or not. There are 10 principles in Heuristic Evaluation: Visibility of system status (feedback), Match between system and the real world (metaphor), Use control and freedom (navigation), Consistency and standard (consistency), Aesthetic and minimalist design (design), Help users recognize, dialogue, and recoveries from errors (recovery), Help and documentation (help).

II. RESEARCH METHODOLOGY

This study uses Heuristic Evaluation method a method developed by Jakob Nielsen and Rolf Molich. Heuristic evaluation is a usability inspection method widely used to find structural and/or heuristic problems from the interface review, taking into account aspects of the user [5]. This method refers to a number of methods in which a person is trained in a media user interface, e.g. an application, website, or game. According to Nielsen and Molich, there are 10 principles of the Heuristic Evaluation method, starting with Visibility of system status (feedback), a system should always keep user informed about the current state of system with understandable status and clear visual on screen. The next principle is Match between system and the real world (metaphor), the system should speak the user's language with concepts familiar to the user in the real world. Making information appears in a logical order and meeting the user expectations from the real-world conventions. The next one is Use control and freedom (navigation), where the system provides a space of freedom if the user performs action by mistake and needs the options to return, exit, or cancel to leave those unwanted states previously performed without having to go though an extended process. The next principle is Consistency and standard (consistency), where user should not have to wonder whether different words, situations, actions and different graphic elements mean the same thing or

vice versa. For example, the icon representing one category or concept may not be allowed to represent other different concept when used on different screen. And there should be Error prevention (prevention) principle, it's better to design carefully to prevent problem from occurring than good error message since the user does not favor the states which require detecting and fixing problems. The next principle is Recognition rather than recall (memory), minimizing the user's memory load by making elements, actions, and options visible. The user should not have to remember information from each page. The instructions on the Euris should be clear and easy to use. The next one is Flexibility and efficient of use (efficiency), the system should be able to cater both experienced and inexperienced users. There should be alternative options for "special" users from the ordinary ones (physically, culturally, linguistically, etc). The next principle is Aesthetic and minimalist design (design), the system should contain relevant information and only the components required by the current task or action. The next one is Help users recognize, dialogue, and recoveries from errors (recovery), the system should be able to inform occuring error, explain in simple and understandable language, indicate the problem, and suggest a solution. The last principle is Help and documentation (help), the system should provide help and documentation about the information of using the system.

III. RESEARCH DATA

The edugame Mamat Adventure provided by the Ministry of Education and Culture of the Republic of Indonesia through the website of Belajar.kemendikbud.go.id/edugame is an educational game to accommodate the basic learning of Scouts values and challenges. The contents are about the concepts of Scouts in Siaga edition presented in "Learning" menu, there are some information about the complete version of Scouts uniforms with different attribute names for men and women as well as Flag Semaphore, Trail Signs, Codes, and Objects. All contents in "Learning" menu are presented in a quite attractive visual display with entertaining audio as well as the interactive buttons that run well.

Fig. 1. The visuals of Mamat Adventure Edugame

IV. DISCUSSION (DATA ANALYSIS)

The Heuristic Evaluation method is tested out by the evaluator who is required to play the edugame of Mamat Adventure in freedom, means without specific goal. And the following is the discussion of the Heuristic Evaluation method. Visibility of system status (feedback). The game should always keep user informed about the current state through feedback at the right time. In the edugame of Mamat Adventure, the feedback is shown when the evaluator presses "Play" button, then the system displays the page of the 1st

level of game and there is an instruction how to play the game. On that page, there is a continue button and when it's pressed, the system shows the page of game challenge, and the other feedback is showed when the evaluator presses "Learn" button. The system displays the main menu page where there are options for Symbols, Flag Semaphore, Trail Signs, Codes, and Objects. For each option in the menu, there is "OK" button and when it is pressed, the system immediately shows the page of Scouts learning material.

Fig. 2. Main menu display of Mamat Adventure (left center), "Belajar " menu display, and "Bermain" menu display

Match between system and the real world (metaphor). The game should speak the user's languange that is easily understandable to the player, for example, the suitable use of language for the player. The edugame of Mamat Adventure uses standard Indonesian which is easy to understand considering the school students as the users. The standard Indonesian is used on each page of the game and the learning page. The icon terms such as "Putra" "Putri" and "Lanjut" in the game also use standard Indonesian and are consistent on each page.

Fig. 3. The use of standard Indonesian on each available icon terms and page in game

Use control and freedom (navigation). This evaluation enables the player to easily navigate a system. In Mamat Adventure, this principle does not look fully perfect because it does not have buttons to return on each playing page to the previous page or menu page, stop or continue the game, and exit. Due to these aspects, the user should return to the main page of the Ministry of Education and Culture's website and the game will automatically stop and the current played game level can not be saved and the user should restart the game from the beginning. Meanwhile on "Learn" menu, there is a

button to return to the previous page that enables the user to get back if he wants to read or review the presented information.
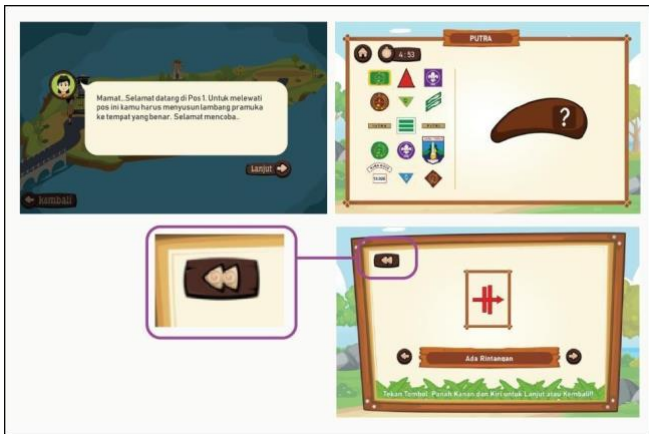

Fig. 4. The use of standard Indonesian on each available icon terms and page in game

Consistency and standard (consistency). The game should be consistent with terms of writing sentences, fonts, etc. In the edugame of Mamat Adventure, the consistency aspect exists in the writing of titles, subtitles, and sentences written in standard Indonesian and it also displays the same layout on each page. And then, the selection of fonts for titles, subtitles, and paragraphs on each page is also consistent.

Fig. 5. The use of fonts and layouts in the game of Mamat Adventure

The error prevention (prevention). The game system should prevent the player to make mistake during game. In Mamat Adventure, this aspect should be improved because it does not have buttons to pause, return to the previous level, or continue the game so that the player should always repeat from the first level if he wants to replay only one particular level. This case can be seen in the following figures:

Fig. 6. Playing page of Mamat Adventure Edugame

Recognition rather than recall (memory). The user should not have to remember information from one part to another. In this case, the game instructions are clear and can be predicted very easily by the player.

Flexibility and efficient of use (efficiency). The system should be able to cater expert and novice users. In the edugame of Mamat Adventure test, it is well noted that this game has good flexibility and efficiency because the

experienced player can play directly at the levels provided, and the player only needs to press "Play" button on the main menu page. As for the inexperienced player, Mamat Adventure provides "Learn" menu which contains basic learning of Scouts so that the player can understand the basic first to prepare for the game.

Fig. 7. Option menu "Bermain" dan "Belajar"

Aesthetic and minimalist design (design). The game should consist of four principles in visual/visual design, i.e. contrast, repetition, alignment and proximity. In this case, the user interface design of Mamat Adventure already looks quite good and practical to use. And moreover, the concept of using realistic visual Scouts-characters may draw attention to the users who are still in school because they feel relatable to the characters.

Fig. 8. Menu display and the game display of Mamat Adventure

Help users recognize, dialogue, and recoveries from errors (recovery). The Error messages should be directly informed in user's language to indicate the problem and suggest a solution. In this case, Mamat Adventure has met the criteria because it does not have any error or occruring error while the game is running.

Help and Documentation (help). The game should provide help action or help menu as a troubleshoot when the player has problem or difficulty while playing the game. In this case, the game of Mamat Adventure does not have any help action and only has a button to return to the main menu so that the player also only has one choice if there is occuring problem or difficulty during the game, namely returning to the main menu and the game will automatically close and the game can not be saved.

CONCLUSION

After performing the usability testing on the edugame of Mamat Adventure user interface using the Heuristic Evaluation method, it can be concluded that the user interface of this game is good because only three out of ten aspects of Heuristic Evaluation that have not meet the criteria, namely Use control and freedom (navigation) because it does not have buttons to return to the previous page or menu page on each

playing page, stop or continue the game, and exit. The other unmet criteria is Error prevention (prevention) and this aspect should be fixed because it does not have buttons to pause, return to the previous level, or continue the game, so the player should always repeat from the beginning if he wants to replay only one level. And the last unmet criteria is the Help and documentation (help) because the edugame of Mamat Adventure does not have help action to provide a troubleshoot for the player if there is occuring problem or difficulty during the game.

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