

# Assessing the Usability of User Interfaces Game Tapel Saga Through Heuristics Evaluation

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## **Abstract**

Tapel Saga is a game that was developed by processing the Malangan mask visual, which is a work of Indonesian culture in the Malang area, East Java. This game gives a message about heroism, solidarity, community involvement and friendship so that it is hoped that through the Tapel Saga game, teenagers experience a real projection and are helped in responding to mental problems in their daily lives. This study aims to maximize the quality of the game by evaluating the usability of the game's user interface using the heuristics method. The research method was carried out using Neuroresearch which focused on the exploratory stage. In the exploratory research stage, the heuristic evaluation of the Tapel Saga game was carried out using a focus group discussion system so that there was an in-depth discussion between resource persons and game developers to find input and evaluate the ten criteria of the heuristic evaluation. The results showed that out of the ten criteria, 1 had been completed, while the others were minor fixes and still needed development. The results of the heuristic evaluation help evaluate the usability of the game interface so that it is of higher quality. Heuristic evaluation helps highlight potential usability issues early in game development.

## **Keywords**

Tapel Saga, Heuristic Evaluation, Android, Local Wisdom, and Neuroresearch.

## **1. Introduction**

One of the significant impacts of the progress of human civilization is the advancement of technology which makes unlimited information open. Including increasing the capacity of technology that can change a person's behavior and memory (Micallef and Arachchilage 2017). One study found the possibility of automatic detection of fraud and suspicious behavior that participants felt in social interactions in games (Chittaranjan and Hung 2010).

Changes in behavior as a result of playing games can be negative or positive so that currently many studies have been carried out to develop games to provide more positive education for players (Gaina et al. 2017; Toda et al. 2019). One of the games that seeks to minimize the negative impact of information disclosure is the development of Android-based games that contain Indonesian local wisdom, which is inspired by the cultural values of the mask of the archipelago. The product developed is in the form of an Android-based game application called *Tapel Saga*.

*Tapel Saga* is a game that was developed by processing the Malangan mask visual, which is a work of Indonesian culture in the Malang area, East Java. The video game tells the story of a character named Panji with the characteristics of today's teenagers. This game includes messages about heroism, solidarity, community involvement and friendship so that it is hoped that through the *Tapel Saga* game, teenagers experience a real projection and are helped in responding to mental problems in their daily lives.

It should be realized that technological developments have a significant impact on increasing adolescent interest in games. Therefore, it is necessary to develop games that have very high educational messages so that through games that take up teenagers' time, they still get valuable messages in their daily lives. This game is also expected to foster interest and pride in traditional culture, especially Malangan Mask culture.

Some guidelines from the game design fundamentals of *Tapel Saga* are game concept, game world, creative and expressive play, character development, storytelling, creating the user experience, gameplay and core mechanics, game balancing and general principles of level design. To maximize the quality of the game, it is necessary to evaluate the usability of the game user interface using the heuristics method (Beckers and Pape 2016). Heuristic evaluation is a process to measure the usability of the user interface independently (Khan and Singh 2017; Lezama et al. 2019). Issues discovered will help the design team from the very beginning of game development improve product usability (Hochleitner et al. 2015; Ramsey 2020).

The Nielsen-Molich heuristic states that a system must be able to provide accurate and immediate status information. The system must also be able to display information that is easily understood by users and assist users in controlling when there is an error in use. To minimize confusion in using the system, the system must remain consistent both in terms of icons, use of words, etc. The system also needs to have a mechanism to prevent errors so that it can warn users before making risky choices. A system also needs to be automated so that users don't work hard in relying on their memory. The system must be flexible, neater, have simple language and more concise stages (Nielsen 1995; Nielsen and Molich 1990; Vieira, SILVEIRA, and Martins 2019; Zakharov and Shirokikh 2018). By paying attention to several important heuristic aspects, this paper aims to evaluate the usability of the *Tapel Saga* android-based game user interface.

## **2. Literature Review**

The development of a game needs to pay attention to usability. Usability is an engineering science in usability engineering has defined very systematic methods. One of the problems that often arise in terms of usability is related to the interface. However, interfaces can be evaluated early in development. One way to evaluate interface design is to use usability heuristic evaluation testing. Heuristic evaluation is a method to measure the extent of the usability problem (usability) of a software in interface design. The identification of this usability problem lies in the area of human-computer interaction (Feng et al. 2017; Nguyen et al. 2017). Heuristic Evaluation method from Jacob Nielsen with ten usability criteria. The first criterion is visibility of system status. This criterion evaluates how the system must always provide updated information regarding various things that are happening. This information is provided with a good message and at the right time to make it easier for users to accept. The second criterion is the match between the system and the real world. This criterion indicates that the system must use language, sentences, icons and word choices that are easily understood by the user (Nielsen 1995; Nielsen and Molich 1990).

The third criterion is user control and freedom. This criterion indicates that the system must be able to provide freedom for users to access the system. The fourth criterion is consistency and standards. This criterion indicates that the system

must have a standard and consistent in the use of the interface on the system. The fifth criterion is error prevention. These criteria indicate that the system must be able to minimize errors that may be caused by users (Nielsen 1995; Nielsen and Molich 1990).

The sixth criterion is recognition rather than recall. This criterion indicates that the system must have an easily recognizable interface component. The goal is that users can easily use the system automatically without trying hard to remember it. The seventh criterion is flexibility and efficiency of use. This criterion indicates that the system accommodates user convenience in using the system. The eighth criterion is aesthetic and minimalist design. On this criterion, the system is expected to display information relevant to the display that appears (Nielsen 1995; Nielsen and Molich 1990).

The ninth criterion is to help users recognize, diagnose and recover from errors. This criterion shows that the system always makes it easy for users to identify, diagnose and even find solutions to errors that occur. The last criterion, the tenth criterion is help and documentation. This criterion indicates the presence of documentation features in the system (Nielsen 1995; Nielsen and Molich 1990).

### **3. Research Method**

The research method used in this research is Neuroresearch. Neuroresearch is one of the mixed methods models with a series of interrelated studies and has three important stages, namely exploratory, explanatory, and confirmatory research (Sasmoko et al. 2018).

In the exploratory research stage, the heuristic evaluation of the Tapel Saga game is carried out using a focus group discussion system so that there is an in-depth discussion between resource persons and game developers to find input and evaluate the ten criteria of the heuristic evaluation (Table 1).

Table 1. Specific Criteria of Heuristic Evaluation

No	Criteria	Item
1.	Visibility of system status	The game keeps the user informed through constructive feedback
2.	Match between the system and the real world	Information is arranged in a natural order
3.	User control and freedom	Users can move aside any time
4.	Consistency and standards	The symbols used are quite easy for users to understand because they are general symbols
5.	Error prevention	There is an error message information that appears quickly and precisely when the user makes a mistake
6.	Recognition rather than recall	Users can easily find the instructions they need at any time while playing the game
7.	Flexibility and efficiency of use	Users can make settings according to their interests and needs to make it easier to play the game
8.	Aesthetic and minimalist design	The game looks interesting to the user
9.	Help users recognize, diagnose and recover from errors	The game has features to help users provide hints when something goes wrong
10.	Help and documentation	Game helps document parts according to user needs

These ten criteria then become the basis of the discussion process to evaluate game development.

### **4. Result**

In the game Tapel Saga there are basic and stages of game development carried out, namely

#### *1. Game Concept*

Finding game ideas, collecting references and processing them in game concepts is definitely the first stage. Tapel Saga tries to transform traditional cultural elements in video game elements from gameplay, character design, UI, to stories (Wang, fsdahl, and Mørch-Storstein 2008).

## *2. Game World*

An artificial realm, an imaginary place where in-game events occur. Although not all games require an imaginary world like sport games, the majority of games have special and unique world settings, especially for fantasy games like RPGs in general. In the Tapel Saga, the Game World takes place in the Astral World or the supernatural world where spirits called Astral Creatures live.

## *3. Creative and Expressive Play*

Playing games involves an element of self-expression because the player's decisions are a reflection of his playing style. In RPG games, players play a character or group where every action is at the discretion of the player. The main character in the player-controlled Tapel Saga will be faced with a series of dialogue options that can be chosen freely according to the player's personality, although some are directed because of the story plot.

## *4. Character Development*

Characters play a big role in entertaining players, connecting players with the game world, establishing connections with the story. A well-designed character can foster awareness of the player and make him enjoy the game more. The main character in Tapel Saga is a representative of the target audience who has mental problems but in its development it gets better as the story progresses.

## *5. Storytelling*

Stories are arranged to increase entertainment, players are directly involved in conversation, sometimes players play an active role in determining some dialogues that can affect the story for interactive and non-linear storytelling types. Tapel Saga tells the story of a character's journey towards self-realization, although the story is linear, the player can determine the fate of the characters he meets.

## *6. Creating the User Experience*

Designing the game experience through the User Interface is one of the important tasks of the designer. Ease of access is the most important, what players feel about the game is also directly influenced by how they interact with the game elements. In My Tapel, UI uses a flat design style that is easily accessible due to its simplicity and incorporates elements of traditional culture that are relevant to the Malangan mask concept or the Panji story.

## *7. Gameplay and Core Mechanics*

In every game there must be gameplay, a series of challenges and actions that players must face, gameplay is usually distinguished in several genres. Tapel Saga combines several genres such as RPG, idle, and visual novel. Core Mechanic which is the mainstay is in battle mode, the main character will attack automatically, but players need to choose skills (ability) to be faster and not lose against the enemy. Players also need to catch colorful balls that have many benefits, there is also a feature calling for help from Astral beings and spirits. Bosses or strong enemies have different unique habits that will provide a varied experience.

## *8. Balancing Games*

In order to be interesting, a game must be balanced, neither too easy nor too difficult, it must also be fair. So that the game feels fair and challenging is not an easy matter, in Tapel Saga provides a challenge by presenting a variety of enemies with a level of strength that continues to grow as players progress. To be able to defeat a stronger enemy, players must collect points to upgrade the main character and his equipment, sometimes players have to repeat the stage to collect enough points.

## *9. General Principles of Level Design*

The design level is closely related to the gameplay and story so that it can provide a suitable rhythm and make players feel at home playing and also interested in the world in the game. Tapel Saga is divided into stages and has a continuous level of difficulty. Whereas in the conversation mode, it is arranged in several parts with a growing complexity that can be felt from the conflict in the conversation (Figure 1).



Figure 1. Homepage Tapel Saga

The results of the heuristic evaluation from resource persons and experts involved in the focus group discussion found that there were several criteria that had met and some had not (Table 2).

Table 2. Result

No	Criteria	Result
1.	Visibility of system status	Done
2.	Match between the system and the real world	Minor fixes
3.	User control and freedom	Minor fixes
4.	Consistency and standards	Minor fixes
5.	Error prevention	Need improvement
6.	Recognition rather than recall	Minor fixes
7.	Flexibility and efficiency of use	Minor fixes
8.	Aesthetic and minimalist design	Minor fixes
9.	Help users recognize, diagnose and recover from errors	Need improvement
10.	Help and documentation	Need improvement

Based on the results of the heuristic evaluation, several improvements were made to the game features by taking several examples for several criteria. These improvements include the following.

To meet the second criterion, namely match between the system and the real world, there is one function in the game that is used when the main character needs to attack the opponent. Improvements are made with the following algorithm (Figure 2):

```
14 references
protected override IEnumerator AnieTimer(float sec)
{
    yield return new WaitForSeconds(sec);
    int atkType = Random.Range(0, 100);
    if(atkType > 88)
    {
        type = 2;
        animator.SetBool("IsAttack1", true);
    }
    else if(atkType > 80)
    {
        type = 3;
        animator.SetBool("IsAttack2", true);
    }
    else
    {
        type = 1;
        animator.SetBool("IsAttack1", true);
    }
}
}
```

This function are used as timer to activated the attack state

Countdown timer

To randomized the attack type of the boss for variation

Figure 2. Algorithm to Activated the Attack State

From the algorithm changes made, three types of main characters appear in the game Tapel Saga with the following picture (Figure 3).

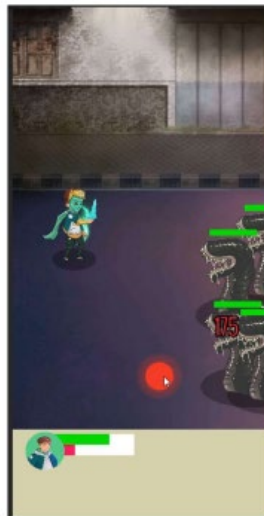


Figure 3. Three types of Main Character Attack  
Page

Improvements to the third criterion, namely User control and freedom, are carried out so that users can change cards to choose the character to be played. Changes are made with the following algorithm (Figure 4):

```
2 references
void Clicked(EventParam eventParam)
{
    Debug.Log("Click Button read");
    if(ID == 5)
    {
        return;
    }

    if (eventParam.ID == 5)
    {
        AllowMove = true;
        StayAlive = false;
        TargetPos = startPos;
    }
    else
    {
        if(hidePos==null)
        {
            return;
        }
        TargetPos = hidePos.transform.position;
        AllowMove = true;
        StayAlive = true;
        pressedID = eventParam.ID;
    }
}

0 references
public void CharaClicked()
{
    EventParam eventParam = new EventParam();
    eventParam.ID = ID;
    EventManager.TriggerEvent("ButtonClick", eventParam);
}

0 references
public void BackButton()
{
    EventParam eventParam = new EventParam();
    eventParam.ID = ID;
    if (eventParam.ID == 5)
    {
        for (int i = 0; i < cards.Length; i++)
        {
            cards[i].SetActive(true);
        }
        for (int i=0; i < skillCards.Length; i++)
        {
            skillCards[i].SetActive(false);
        }
    }
    EventManager.TriggerEvent("ButtonClick", eventParam);
}
```

Function used when the heroes's card was pressed

Function used when the back was pressed

Figure 4. Function Trigger the Buttons to Move Aside

Based on the algorithm, changes in card selection can be seen with the following display (Figure 5):

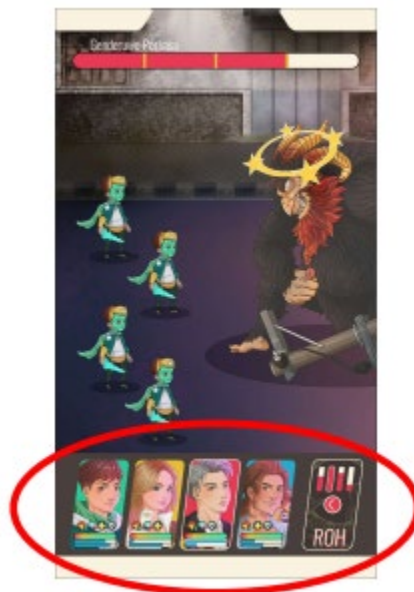


Figure 5. Card Display

Game improvements based on heuristic evaluations also keep in mind the original problem elements of the game itself. Because there is one limitation in heuristic evaluation is when there is a false alarm from the evaluation process itself. Therefore, in each subsequent development stage, continuous evaluation will be carried out so that the game can provide maximum results and quality and achieve game goals as set.

## **5. Discussion**

Game Tapel Saga is a game where players will use and collect Malangan masks to fight enemies. The story in the game tries to indirectly encourage players to become better people through character development. As well as growing interest and pride in the masks of the archipelago, especially Malangan.

Tapel Saga appears in the form of a side scrolling 2D RPG, the story is conveyed through conversation using pictures of characters and text boxes. The game mechanism is in the form of idle or clicker where the game progress will run automatically, the characters in the game attack the enemy automatically. But players also need to attack by choosing attacks or moves, leveling up, strengthening equipment, and more.

The visual style uses an anime approach that is popular with the target audience but still has a distinctive face shape. The character's clothing is carefully considered, especially the main character who represents the symbol of the Panji figure.

The User Interface (UI) will use a flat design style that matches the visual style of the character and is indeed in accordance with design trends, simple and easy to understand, namely: (a) Collecting data about the Malangan mask and the message of goodness to be conveyed, (b) Building the structure of the inner world. the game, (c) Designing the characters and assets needed, and (d) Designing the game system.

With the heuristic evaluation, the usability evaluation of the game interface will help improve the quality of the game (Mendes et al. 2016; Tondello et al. 2016). Heuristic evaluations can help highlight potential usability issues early in game development (Parsapour et al. 2015; Yang et al. 2018). In addition, this method is the most practical and efficient method before involving players directly so that various errors can be anticipated that may arise.

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