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Evaluating Player Experience for Fear Modeling of 2D East Java Horror Game Alas Tilas

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Abstract

Developing a 2D horror game and evaluating the reliability of the player experience are two things that are interrelated and equally important. Developers must ensure that the game can provide a satisfying and reliable gaming experience for its players. This study aims to evaluate the reliability of the player's experience in the game entitled Alas Tilas, East Java. This study used User Experience Questionnaire (UEQ) in Indonesian as survey approach method which was given to 30 teenager respondents who at least played horror games once. UEQ may provide feedback to developers on the Attractiveness, Clarity, Efficiency, Accuracy, Stimulation, and Novelty aspects of the game. From the results of the UEQ, a reliability test will be carried out using the Cronbach Alpha Technique. The results of the descriptive analysis show that these variables are Attractiveness (mean, 0.933), Clarity (mean, 1.808), Efficiency (mean, 1.508), Accuracy (mean, 0.217), Stimulation (mean, 0.667) and Novelty (mean, 0.242). Attractiveness, Clarity and Efficiency averaged positive results. While the average aspects of accuracy, stimulation and novelty of the game get neutral results. The results of the reliability test conducted on UEQ data obtained a Cronbach alpha value > 0.6 which indicates that the research data used in testing player experience is considered reliable so that it can be used to provide input for future Alas Tilas game development. To increase the average score, the researcher provides recommendations for improvement, namely adjusting the Accuracy and Novelty aspects of the horror scenario game entitled Alas Tilas East Java. So that it is expected to improve the quality of the game.

Keywords: UEQ; 2D horror game; user experience

1. Introduction

Horror games are designed to create fear and anxiety in the players [1]. Fear refers to the emotion felt when someone feels in danger [2]. The key element of this genre is the fear that arises from knowing something scary will happen [3]. This is supported by emotionally appealing audiovisual content [4]. Additionally, players must interact with terrifying and bizarre environments or characters [5], but designed to be closer to real-life visuals [5], [6].

The development of Indonesian horror games has a strong appeal for some people. The game offer intense experiences, scary characters and environments that are closely related to daily life that triggering emotions during gameplay [7]. There are not many Indonesian horror games with local themes, some of them are DreadOut, Pamali, and Go Home. These games challenge players to solve puzzles and survive hidden threats [8]. All of these elements are designed to create feelings of tension and fear in players, making them emotionally engaged [8]. However, horror experiences are personal and not the same for all players, even when exploring similar environments [9].

To obtain a good horror game playing experience, player satisfaction is evaluated. One example of a quantitative method is using surveys, such as the User Experience Questionnaire (UEQ).

The UEQ method is widely used in various fields including software, mobile applications, hardware, web development, and web services, and has proven effective in producing useful information for product developers [10]. UEQ is a widely known method for measuring subjective user experience in terms of attractiveness, clarity, efficiency, reliability, stimulation and novelty of the measured object [11].

Many studies use UEQ to measure User Experience such as Mobile Educational Applications [12], Web-Based Academic Progress Information Systems [13], Freeletics Community Information Systems in Surabaya [13], Secure Mobile Exam Application [14], DiTenun Website [15], Cloud Computing Learning-

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Based Mobile Applications [16], Village Administration Information Systems [17], E-commerce Fashion - EIRLYS Website [18], Smart Regency Services with Indonesian Adaptation [19], Traditional Tambourine and Egrang Musical Instrument Online Applications [20]. UEQ is an important concept in modern product development and is considered an essential tool that helps developers improve the user experience of their products [21]. Usability Evaluation Sistem Informasi Akademik Dosen Using User Experience Questionnaire and Heuristic Walkthrough [22].

In this study, the 2D horror game scenario Alas Tilas, East Java, was used. This game was developed because the design has a dynamic fear model with fear level settings within it. The evaluated data is the fear model data resulting from players' gameplay [23]. Because in previous studies, few have applied UEQ as an evaluation form in horror games, this focus is further explored in this research. The obtained evaluation will be used as input for developers to utilize fear models in the future development of horror games.

2. Research Methods

The researchers collected data in game design by distributing questionnaires to obtain data and primary information from respondents as the research sample [24]. Quantitative data analysis was used to describe and test pre-determined hypotheses. In general, the stages of this research will be explained in Figure 1.

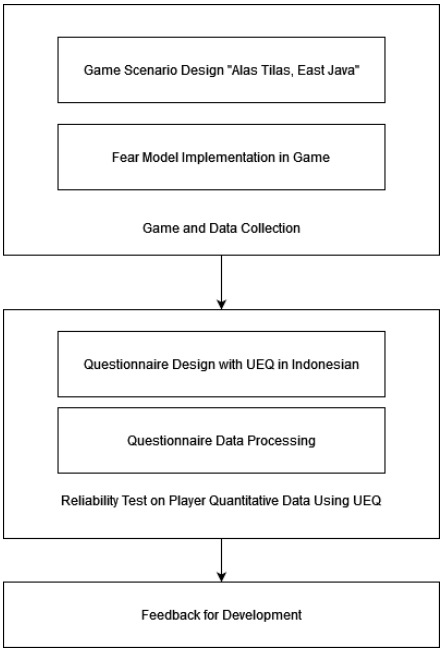

Figure 1. Methodology Diagram

2.1. Game and Data Collection

In game design architecture, it starts with collecting data in scenario design. The game scenario uses a basic board obtained from a mystery news source. This research takes a regional story because they are familiar with everyday life and expected to provide an excessive manifestation effect on the players later. In this research, the game is used as a tool that will be utilized for evaluating players responses to the placement of fear model elements within the horror game, in line with the objective of the horror game, which is to scare the players and provide a thrilling experience that triggers the players' adrenaline.

Gunung Lali Jiwo Arjuno trail, East Java, was reported to have mystical elements where incidents of missing hikers occurred and the search and rescue team only found their bones. The scenario tells the story of a hiker who gets separated from the crowd and gets trapped in the middle of the forest, depicted as Alas Tilas location in East Java [25]. While searching for a way out, the hiker experiences a horror atmosphere starting from vague sightings of apparitions, horrifying sounds, unidentified noises, and an increasingly dark environment [26], [27]. Eventually, a clear apparition appears in front of them, leading to the hiker's disappearance. The game's story is depicted in Figure 2.

Figure 2. Story of The Game

After designing the story, the next step is to create the system wireframe as storyboard. Storyboard used because it effectively help during development by visualizing ideas and refining the ideas. The storyboard in figure 3 shows how the system planned to work.

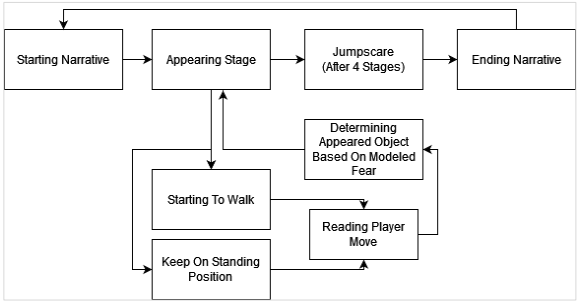

Figure 3. Wireframe of The Gameplay

Starting by showing the starting narrative to build horror situation. Then the next intended stage will appear, which contain low fear parameter. Player forced to choose between start to walk or standing still which will affect the appeared object and which fear parameter will increase on the next level. After 4 stages has been

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successfully passed, the fear parameter will be at peak and the jump scare will appear as indicator the game will finish. Lastly, the player shown ending narrative after finishing the stage.

The appeared object on the next stage determined by fear model system. Wireframe are used as illustration how fear model system will work in this game as in figure 4.

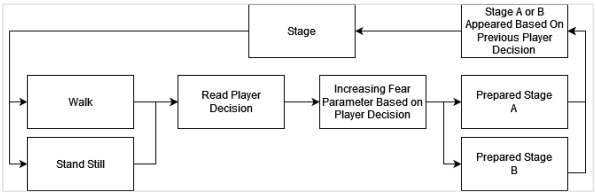

Figure 4. Wireframe of Fear Model System

The system started after the first stage appeared, there will be player choice to either walk or stand still. Player is forced to choose a choice to proceed to the next stage. Fear parameter is increased by combining player decision and fear parameter on the previous stage. Then prepared stage will appear as the next stage based on similarity of the counted fear parameter.

After designing the storyboard, the next step is to create the interface for each menu. There are three menu displays: the initial display, the gameplay display, and the final display. The game interaction is achieved through button navigation. In the gameplay display, player interaction is kept simple with the aim of facilitating the presentation of horror sensation adjustments in the placement of the next fear modeling elements, leading up to the end of the game. The ending part of this horror game aims to surprise players with jump scares that trigger their adrenaline. The game concludes by providing the final story based on the Alas Tilas scenario in East Java. The initial game layout can be seen in Figure 5.

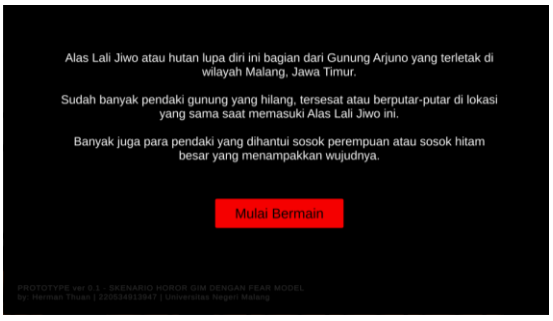

Figure 5. The Initial Display of the Game

There are four horror situations presented at each level of the game. The horror situations are delivered in the form of narrations read by the player. The player is asked to interact with the game using two provided buttons: the "pause for a moment" button and the "keep walking" button. Each choice made by the player adjusts the level of fear provided and prompts a new narration to engage the player further. When the horror situation reaches its conclusion, the game ends. Figure 6 shows the visual output of the game during one of the presented horror situation choices.

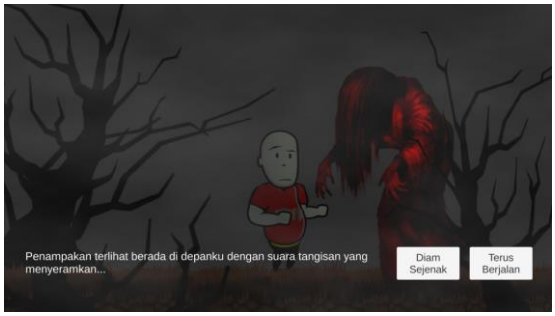

Figure 6. Game View

2.2. Reliability Test on Player Quantitative Data Using UEQ

The UEQ used in this study is the Indonesian-language UEQ which is used to measure the results of the horror game based on 6 UEQ scales. The 6 UEQ scales obtained by the UEQ team after extracting and analyzing dataset from 80 items of the raw version of questionnaire by an expert evaluation that answered by 153 participants [26]. Table 1 shows the scales and descriptions used.

Table 1. Reliability Test Result

No	Scale	Description
1	Attractiveness	Measures how visually appealing and aesthetically pleasing the interface of the game being evaluated is to the user.
2	Clarity	Measures how clear and easily understandable the information conveyed through the user interface is, including icons, text, and other features.
3	Efficiency	Measures how quickly and efficiently the user can complete tasks using the evaluated game.
4	Accuracy	Measures how accurate and reliable the information or actions performed by the user through the evaluated game are.
5	Stimulation	Measures how exciting or engaging the evaluated game is to the user, including the level of excitement and involvement of the user in interacting with the game.
6	Novelty	Measures how new or innovative the evaluated game is to the user, including the level of novelty or creativity in features and design.

The success indicator of this stage is to obtain User Experience measurement results with an alpha value on the Cronbach Alpha reliability test above 0.6 on each UEQ scale. Then the results are processed as feedback for game developers so that the game created is meet the developers standard.

2.3. Feedback for Development

This research focuses solely on evaluating the player experience on the game design produced using the fear model to improve player experience. In this stage, the processed results of the questionnaire data will be provided to the developers for further development of the horror game.

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3. Results and Discussions

This research involves an online game published using WebGL, which will be played by 30 respondents aged between 18 to 31 years old, who have played horror games at least once before. The respondents will take turns playing the game in an isolated room for 5-10 minutes, and then they will be asked to fill out a user experience questionnaire with a duration of 10-15 minutes. The questionnaire conducted online through Google Forms. The results of each questionnaire will be given a scale value of 1 to 7, which will then be converted into positive and negative values ranging from -3 to +3.

The questionnaire will be mapped into six evaluation aspects: attractiveness, clarity, efficiency, accuracy, stimulation, and novelty aspects of the game Alas Tilas, Jawa Timur. The "confidence interval" will be used to measure the accuracy of the average estimation of each scale. The smaller the "confidence interval" used, the higher the level of accuracy and reliability of the obtained data. A 5% confidence interval will be used in the measurement of the average of each scale and the average of each item studied. The distribution of answers for each questionnaire item shows polarization in each given question (many negative and positive answers, not too many neutral/0 points). This polarization can provide a more in-depth view of the six aspects of the game Alas Tilas, Jawa Timur, where player experiences tend to be positive or negative.

Reliability test will be used to measure the consistency of each obtained questionnaire, which will be used as an indicator of data reliability for each existing variable. The reliability test will be conducted by looking at the Cronbach's alpha results obtained for each scale variable. By using the reliability test, we hope to obtain reliable UEQ feedback from each user.

Firstly, to calculate the Cronbach's alpha, we need to obtain the mean of each scale using the formula 1.

$$A = \frac{1}{n \sum_{i=1}^{n} ai} \quad (1)$$

A is the arithmetic mean, n is the number of values, and ai is the value of the data set.

After obtaining the mean data on the scale calculated using the formula above, a Cronbach's alpha test is conducted. The Cronbach's alpha test allows us to detect whether the data from the questionnaire is reliable or not by comparing it. If the calculated scale obtains an alpha value above 0.60, it can be said that the questionnaire data is reliable.

The results of the reliability test on each scale variable in the UEQ conducted are shown in Table 2. From Table 2, it was found that the results of all UEQ variables obtained can be considered reliable. The next step is to process the UEQ data by calculating the mean, variance, and standard deviation of each given question.

Table 2. Reliability Test Result

No	Scale	Cronbach Alpha
1	Attractiveness	0.78
2	Clarity	0.70
3	Efficiency	0.60
4	Accuracy	0.61
5	Stimulation	0.80
6	Novelty	0.74

The calculation steps below must be carried out in sequence. First, by converting the obtained data values from each questionnaire into a range of -3 to +3. Then, calculate the mean of each converted value from each question using formula 2.

$$m = \frac{sum\ of\ the\ terms}{number\ of\ terms} \quad (2)$$

With *m* being the mean calculated by dividing the sum of all terms by the number of terms used. Then proceed to the next step which is to calculate the variance of each question using the previously calculated mean, using the formula 3.

$$S^2 = \sqrt{\frac{\sum(Xi - \bar{x})^2}{\text{n - 1}}} \quad (3)$$

S^2 is sample variance, Xi is the value of one observation, x is the mean value of all observations, and n is the number of observations. Finally, calculate the standard deviation of each answer to the given question using the formula 4.

$$\sigma = \sqrt{\frac{\sum(Xi - \mu)^2}{N}} \quad (4)$$

σ is the population standard deviation, N is the population size, Xi is each value form the population, μ is the population mean.

Using the formula above, the next step is to arrange the questions according to the UEQ scale standard. Table 3 is list of the questions created.

Table 3. Reliability Test Result

No	Question	Item
1	How fun is the game that is being played?	Q1
2	How easy is the narrative to be understand?	Q2
3	How creative is the presented game concept?	Q3
4	How easy is the game to learn?	Q4
5	How useful is the game that is being played?	Q5
6	How exciting is the game that is being played?	Q6
7	How interesting is the game to play?	Q7
8	How easy it is to predict what will happen next in the game being played?	Q8
9	How quickly does the game finish playing?	Q9
10	How conventional are the games made?	Q10
11	How supportive is the game if it is used as a medium to discover someone's fear factor?	Q11
12	How good is the graphic design of the game being played?	Q12
13	How simple is the game to complete?	Q13
14	How much do you enjoy playing this horror game?	Q14
15	How prevalent is the concept raised by this game?	Q15
16	How comfortable do you feel while completing this horror game?	Q16

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No	Question	Item
17	How safe do you feel while completing this horror game?	Q17
18	How motivated are you to finish this horror game?	Q18
19	How well has this game met your expectations?	Q19
20	How efficient is this game at scaring you?	Q20
21	How clear is the story in this game for you to understand?	Q21
22	How practical is the game to play?	Q22
23	How organized are the stages from unlocking to successfully completing the game?	Q23
24	How attractive is this game to play?	Q24
25	How user-friendly is this game to play?	Q25
26	How innovative is the game concept?	Q26

From Table 3, the complete calculation of UEQ data was obtained by using the scale range in the left and right columns shown such as on Table 4, where the scale grouping indicates the 6 scales in Table 2. Table 4 shows the results of the calculations that have been performed.

Table 4. Results UEQ (Mean, Variance, and Standard Deviation)

Item	Mean	Variance	Std. Dev	Left	Right	Scale
Q1	⇧ 1,1	1,3	1,1	Annoying	Enjoyable	1
Q2	⇧ 2,1	1,1	1,1	Not understand	Understandab	2
Q3	⇨ 0,3	3,7	1,9	Creative	Dull	6
Q4	⇧ 1,1	5,4	2,3	Easy to lea	Difficult to le	2
Q5	⇨ 0,1	2,8	1,7	Valuable	Inferior	5
Q6	⇧ 0,9	2,9	1,7	Boring	Exciting	5
Q7	⇧ 1,0	2,7	1,7	Not interes	Interesting	5
Q8	⇧ 0,9	2,8	1,7	unpredictal	Predictable	4
Q9	⇧ 1,7	1,9	1,4	Fast	Slow	3
Q10	⇨ 0,1	2,5	1,6	Inventive	Conventional	6
Q11	⇨ 0,5	1,6	1,3	Obstructive	Supportive	4
Q12	⇨ 0,5	3,4	1,9	Good	Bad	1
Q13	⇧ 2,3	0,9	1,0	Complicate	Easy	2
Q14	⇨ 0,8	2,9	1,7	Unlikable	Pleasing	1
Q15	⇨ 0,1	2,3	1,5	Usual	Leading edge	6
Q16	⇧ 1.0	2,0	1,4	Unpleasant	Pleasant	1
Q17	⇨ 0,5	2,8	1,7	Secure	Not secure	4
Q18	⇨ 0,7	2,1	1,4	Motivating	Demotivating	5
Q19	⇨ 0,1	2,4	1,6	Meets expectatior	Does not mee expectations	4
Q20	⇨ 0,6	3,3	1,8	Inefficient	Efficient	3
Q21	⇧ 1,7	2,4	1,6	Clear	Confusing	2
Q22	⇧ 2,1	1,2	1,1	Impractical	Practical	3
Q23	⇧ 1,6	2,0	1,4	Organized	Cluttered	3
Q24	⇧ 0,8	2,6	1,6	Attractive	Unattractive	1
Q25	⇧ 1,5	1,7	1,3	Friendly	Unfriendly	1
Q26	⇨ 0,7	2,3	1,5	Conservati	Innovative	6

The respondents' answers were calculated for the mean, variance and standard deviation based on the 26 questions in the UEQ. The numbers in the scale column represent the name of the scale type from Table 1. A mean value >0.8 indicates a positive evaluation (upward arrow), while a mean value <-0.8 indicates a negative evaluation (downward arrow) and if the mean value falls between positive and negative values, it will be marked with a rightward arrow.

Then, the player's UEQ scales were averaged and grouped. The average scale results obtained from players using UEQ are presented in Table 4. Table 5 shows the average value of all questions based on their arrangement. The averages of attractiveness, perspicuity, and efficiency aspects show positive results, while the averages of the accuracy, stimulation, and novelty aspects get neutral results.

Table 5. Mean and Variance of UEQ Scale

UEQ Scales	Mean	Variance
Attractiveness	⇧ 0.933	1.12
Clarity	⇧ 1.808	1.26
Efficiency	⇧ 1.508	0.91
Accuracy	⇨ 0.217	1.11
Stimulation	⇨ 0.667	1.61
Novelty Aspect	⇨ 0.242	1.48

Figure 7 shows the results of the UEQ test indicating that all 6 aspects have positive values. This is because the results of all 6 aspects tested received values above 0, while an aspect is said to have negative values if the obtained value is below 0.

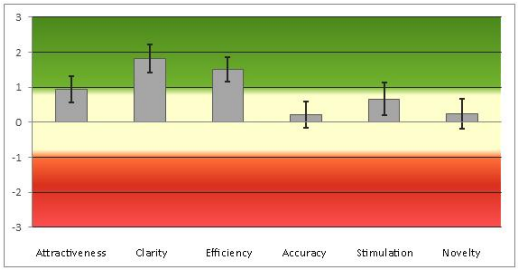

Figure 7. Test Result From 6 Aspects of UEQ

In Figure 8, the limits of the UEQ Benchmark Comparison state that it would be too perfect if the averages are > 1.86, good if the averages are > 1.6 above average, okay if the averages are > 1.19 below average, bad if the averages are > 0.7 and very bad if the averages are < 0.7.

Table 6 shows that the game obtained an average score below the benchmark comparison in UEQ among 468 products in the UEQ database.

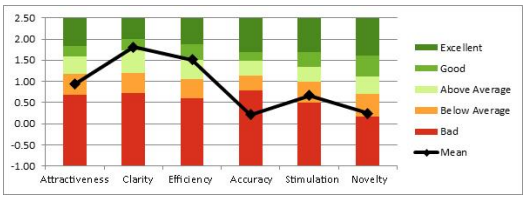

Figure 8. Derived Benchmark Graph

Collecting quantitative data from user experiences using questionnaires such as UEQ is quite efficient. However, this efficiency has some drawbacks, one of which is that some questions about which product features need to be improved to enhance user experience cannot be answered directly. Nonetheless, it is possible to guess the likely areas for improvement

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that will have the greatest impact on improving user experience in the next version of the game.

Table 6. Comparison with Other Applications in The Benchmark

Scale	Mean	Comparison to benchmark	Interpretation
Attractiveness	0.93	Below Average	50% of results better, 25% of results worse
Clarity	1.81	Good	10% of results better, 75% of results worse
Efficiency	1.51	Good	10% of results better, 75% of results worse
Accuracy	0.22	Bad	In the range of the 25% worst results
Stimulation	0.67	Below Average	50% of result better, 25% of result worse
Novelty	0.24	Below Average	50% of result better, 25% of result worse

Compared to the UEQ benchmark, the game's average results are "below average" which includes "good" results in the aspects of clarity and efficiency, three "below average" results in attractiveness, stimulation and novelty and one "poor" result in accuracy. Looking at the data above, it is quite clear that developers need to focus on improving pragmatic quality, especially efficiency.

From the aspect of Attractiveness (mean 0.933) of the overall user impression of the prototype, most users indicate that the graphics provided by the game developer are quite adequate, which can be improved by using clearer or high-definition assets or by changing them to be more realistic. From the aspect of Clarity (mean 1.808), most users easily understand the game's objectives. From the aspect of Efficiency (mean 1.508), the theme raised in this prototype is quite successful. From the aspect of Accuracy (mean 0.217), most users indicate that they feel the game's goal of using a fear model to adjust the level of difficulty is less successful, which can be improved by further research on fear models or by creating more complex level adjustment algorithms so that desired results can be achieved. From the aspect of Stimulation (mean 0.667), some users feel that the prototype fails to meet their expectations of making them scared of the main horror elements, which may be due to the arrangement of appearing horror elements. This can possibly be improved by conducting further research on fear and adjusting the appearing elements. Lastly, from the aspect of Novelty (mean 0.242), some users feel that the prototype does not bring unique elements or successfully differentiate it from other horror games, which may be due to the lack of fear model implementation in the game.

4. Conclusion

Using UEQ to measure user experience in games can assist game developers in improving their games from a user experience perspective. This is evident from the results of reliability testing using the Cronbach's alpha reliability measure, which yielded alphas above 0.6 on each scale.

In this study, the evaluation of the game resulted in an average score. For the aspects of attractiveness, clarity, and efficiency showed positive results by getting evaluation mean above 0.8. Meanwhile, the average score for the aspects of accuracy, stimulation and novelty of the game obtained neutral results by getting evaluation mean above 0 and below 0.8.

The fear model used could be said poorly optimized for the game itself. This could be seen from the UEQ benchmark which obtained below average score on novelty that indicating the game failed to be different from another horror game by implementing fear model and bad score on stimulation which happen because the fear model failed to be effectively implemented into the game, that the game fail to determine precisely which fear are affecting the player.

The local theme of Alas Tilas, East Java, which was raised in this game, was successful in providing a typical horror atmosphere and creating a frightening atmosphere for players, as seen in the UEQ results on the theme efficiency scale tested on players.

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