

**Levelling Up for Conservation: An Examination of Player Decision-Making
in a 3D Adventure Game with Environmental Protection Objectives**

Abstract

1.Introduction

Background and Context

1. Overview of 3D adventure games with conservation themes
2. The significance of incorporating thematic environmental elements

Research Objectives

Assessing the learning outcomes and engagement factors related to the game and understanding the implications of thematic elements in games.

Related Work

Methodology

To evaluate the usability of the project the heuristic evaluation established by Jakob Nielson has been used as a metric based on which participants can make their assessment. Akula (2021), outlined that the flaws in the interface can be identified and prioritized based on heuristics. This usability evaluation involves participants examining the project and judging its compliance with recognized usability principles. As identified by Khairat et al. (2022) heuristics evaluation tests the usability by evaluating the ten usability aspects which allows to assess of the magnitude of the issues identified. Performing this evaluation aims to gain actionable feedback that can aid in identifying the problems and come up with efficient solutions.

To perform user evaluation three participants were selected with varying demographics and varying levels of gaming knowledge. These participants were informed about the purpose of this evaluation and were provided with little to no information on how to play the game. After the game is played they participants are provided a list of heuristics based on which the participant will be providing comments. Additionally, the users will also be rating the applicability of these heuristics in comparison to the game, where a score of 0 indicates that there are no changes required and 5 indicates that it should be highly prioritized when implementing changes. Based on the evaluation and

the heuristics evaluation form filled as shown in Appendix A the data from their evaluation was analysed to identify the usability issues. The issues were then categorized and prioritized based on their severity and a report of the problems and possible solutions or recommendations for each issue was created.

A Project Write-Up

Evaluation

Decision

Conclusion & Future Work

Bibliography

- Akula, S. P. (2021). A critical evaluation on SRK STORE APP by using the Heuristic Principles of Usability. *Faculty of Computing, Blekinge Institute of Technology, 371 79 Karlskrona, Sweden*. diva2:1573586
- Khairat, M.I., Priyadi, Y., & Adrian, M. (2022). Usability Measurement in User Interface Design Using Heuristic Evaluation & Severity Rating (Case Study: Mobile TA Application based on MVVM). *2022 IEEE 12th Annual Computing and Communication Workshop and Conference (CCWC)*, 0974-0979. DOI: 10.1109/CCWC54503.2022.9720876

Appendix A

User 1

Table 1: Heuristic Evaluation by User 1

Nielsen's Heuristic	Aspects to Evaluate in Game Development	User Input	Issue (0-5)
1. Visibility of System Status	<ul style="list-style-type: none">- Game provides feedback in response to player actions.- Status indicators for health, score, level, etc., are clear and easily understood.	No health indicator not there for monster and player but shows the prize collected and unclear status indicators in some case	3
2. Match Between the System and the Real World	<ul style="list-style-type: none">- Game uses familiar terms and icons.- Real-world conventions are followed where applicable, enhancing immersion and understanding.	Uses candies to represent the prize collected. Unclear what the difference is between using F key and knife icon	1
3. User Control and Freedom	<ul style="list-style-type: none">- Players have control over actions, with options to undo/redo.- Flexibility in gameplay choices and paths.	Good gameplay choices and paths and there is flexibility. Once outside the map cant enter again	1

4. Consistency and Standards	<ul style="list-style-type: none"> - Consistent use of controls and terminology - Game mechanics and interface elements are uniform throughout. 	<p>Good controls.</p> <p>Terminology problem 'boots' and 'knife'; no description. If the description box is available when hovering it is helpful</p>	3
5. Error Prevention	<ul style="list-style-type: none"> - Design minimizes the chance of player errors. - Clear instructions and feedback to prevent user mistakes. 	<p>No instruction of feedback. I went outside the map and there was no restriction but I couldn't enter.</p>	2
6. Recognition Rather than Recall	<ul style="list-style-type: none"> - Objects, actions, and options are visible. - Minimal memory load on players by keeping information accessible. 	<p>No issues at all</p>	0
7. Flexibility and Efficient of Use	<ul style="list-style-type: none"> - Game accommodates both novice and expert players. - Customizable controls and interfaces for different player preferences. 	<p>Yes. But the game is mostly for beginners as it doesn't have the complexity expert players want.</p>	0
8. Aesthetic Minimalist Design	<ul style="list-style-type: none"> - Visual design is not cluttered; focuses on relevant information. - Game aesthetics enhance the play experience without overwhelming the player. 	<p>Good aesthetic however, there are object that have no use such as the vase.</p>	2

9. Help Users Recognize, Diagnose and Recover From Errors	<p>Clear error messages and guidance for recovery.</p> <ul style="list-style-type: none"> - Feedback on incorrect actions or puzzles. 	No guidance for recovery. No understandability due to the error message being in Chinese.	4
10. Help and Documentation	<ul style="list-style-type: none"> - Accessible tutorials and help features. - Documentation (in-game or external) supports player understanding and progression. 	No help guidance or documentation.	4

User 2

Table 2: Heuristic Evaluation by User 2

Nielsen's Heuristic	Aspects to Evaluate in Game Development	User Input	Rank (0-5)
1. Visibility of System Status	<ul style="list-style-type: none"> - Game provides feedback in response to player actions. - Status indicators for health, score, level, etc., are clear and easily understood. 	<p>Only one status indicator is efficient.</p> <p>Unclear about all statuses and not easily understandable.</p>	3

2. Match Between the System and the Real World	<ul style="list-style-type: none"> - Game uses familiar terms and icons. - Real-world conventions are followed where applicable, enhancing immersion and understanding. 	<p>I can enter trees rather than becoming obstacles however I can go through them.</p> <p>Unclear about why I can go through a bush and also a tree. When a user fires into the bush it should light up on fire</p>	2
3. User Control and Freedom	<ul style="list-style-type: none"> - Players have control over actions, with options to undo/redo. - Flexibility in gameplay choices and paths. 	<p>Flexible and joystick option is there however, no option to jump.</p>	2
4. Consistency and Standards	<ul style="list-style-type: none"> - Consistent use of controls and terminology - Game mechanics and interface elements are uniform throughout. 	<p>Game interface elements are consistent. No consistency in prizes different prizes and both prizes give same point. Enemies in different levels have the same strength</p>	2
5. Error Prevention	<ul style="list-style-type: none"> - Design minimizes the chance of player errors. - Clear instructions and feedback to prevent user mistakes. 	<p>No error prevention or instructions.</p> <p>Game ended once prizes was collected and one time I reached another level.</p>	4

6. Recognition Rather than Recall	<ul style="list-style-type: none"> - Objects, actions, and options are visible. - Minimal memory load on players by keeping information accessible. 	Minimal memory load. Just need to remember how many power ups I have.	2
7. Flexibility and Efficient of Use	<ul style="list-style-type: none"> - Game accommodates both novice and expert players. - Customizable controls and interfaces for different player preferences. 	Yes easy to play suitable for both but too easy for expert players.	1
8. Aesthetic Minimalist Design	<ul style="list-style-type: none"> - Visual design is not cluttered; focuses on relevant information. - Game aesthetics enhance the play experience without overwhelming the player. 	No purpose of some items. Colour remains the same after changing the levels and only the colour of the enemy changes. However, the design was minimal and aesthetic.	3
9. Help Users Recognize, Diagnose and Recover From Errors	<p>Clear error messages and guidance for recovery.</p> <ul style="list-style-type: none"> - Feedback on incorrect actions or puzzles. 	Language barrier couldn't understand the error message. I couldn't go to the next level.	5
10. Help and Documentation	<ul style="list-style-type: none"> - Accessible tutorials and help features. - Documentation (in-game or external) supports player understanding and progression. 	No tutorial or help and had to learn on my own.	4

User 3

Table 3: Heuristic Evaluation by User 3

Nielsen's Heuristic	Aspects to Evaluate in Game Development	User Input	Rank (0-5)
1. Visibility of System Status	<ul style="list-style-type: none">- Game provides feedback in response to player actions.- Status indicators for health, score, level, etc., are clear and easily understood.	Unclear and not understandable	3
2. Match Between the System and the Real World	<ul style="list-style-type: none">- Game uses familiar terms and icons.- Real-world conventions are followed where applicable, enhancing immersion and understanding.	Some matches between the system and real world.	2
3. User Control and Freedom	<ul style="list-style-type: none">- Players have control over actions, with options to undo/redo.- Flexibility in gameplay choices and paths.	Room for improvement, hindered movement	3
4. Consistency and Standards	<ul style="list-style-type: none">- Consistent use of controls and terminology- Game mechanics and interface elements are uniform throughout.	All good	1
5. Error Prevention	<ul style="list-style-type: none">- Design minimizes the chance of player errors.- Clear instructions and feedback to prevent user mistakes.	No proper timing of error messages and it is in chinese	4

6. Recognition Rather than Recall	<ul style="list-style-type: none"> - Objects, actions, and options are visible. - Minimal memory load on players by keeping information accessible. 	Minimal memory load	0
7. Flexibility and Efficient of Use	<ul style="list-style-type: none"> - Game accommodates both novice and expert players. - Customizable controls and interfaces for different player preferences. 	It accommodated both profession and beginner. . Professional may be bored with initial levels	1
8. Aesthetic Minimalist Design	<ul style="list-style-type: none"> - Visual design is not cluttered; focuses on relevant information. - Game aesthetics enhance the play experience without overwhelming the player. 	Medium aesthetics. Would be nice to customize the character.	3
9. Help Users Recognize, Diagnose and Recover From Errors	<p>Clear error messages and guidance for recovery.</p> <ul style="list-style-type: none"> - Feedback on incorrect actions or puzzles. 	I am chinese so I could understand the error message however others may fail to. (Target user is chinese player)	3
10. Help and Documentation	<ul style="list-style-type: none"> - Accessible tutorials and help features. - Documentation (in-game or external) supports player understanding and progression. 	No tutorial however I learned it after testing a few things.	2