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# Evaluating the Perceived Effectiveness of Serious Games in Promoting Social Responsibility

– The case of RiverHaven



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## Evaluating the Perceived Effectiveness of Serious Games in Promoting Social Responsibility

- The case of RiverHaven

Since the early 2000s serious games have gained popularity as interactive and experimental learning tools, providing a safe environment where players can make mistakes and learn from their actions through gameplay and storytelling. The aim of this study was to evaluate whether the game RiverHaven successfully delivers the core principles of social responsibility, volunteering, civic participation, and community development.

A mixed method data collection was conducted, using a survey that includes Likert scale questions to gather quantitative data and open ended questions to obtain qualitative feedback. The results were positive in all categories, especially about community change and core values. However, participants expressed a lack of information about real world volunteer driven social organizations, and suggested future improvements.

RiverHaven is perceived as an effective educational tool for teaching core values of social responsibilities and volunteering. This game was successful due to its narrative and interactive gameplay that encourages self-reflection and engagement. This study supports the potential of serious games as effective learning tools.

Keywords:

Serious games, social responsibility, game-based learning, educational games, volunteering, informal education.

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# 1 Introduction

In the improving area of education and community participation, serious games became innovative tools that serve more than just entertainment. They are also able to deal with difficult societal issues (Michael & Chen, 2006). These games are specifically designed to educate or teach social objectives, aim to influence the knowledge, attitude and behaviour of the players (Michael & Chen, 2006). Among youth and young adults, games offer a compelling platform to foster awareness, empathy, and responsibility as they have grown up with digital technology from a young age, and spend more and more time engaging with media that allows for interaction (Gee, 2003).

The increasing number of global issues such as climate change, inequality, and social segregation has increased the necessity for effective tools to promote social responsibility, volunteering, and community engagement (United Nations, 2015). Volunteering and community participation are recognized as critical elements to strengthen societal bonds and build more inclusive communities (Dekker & Halman, 2003). Given the latest technology advancements and ever-growing popularity of video games, today's education methods can be improved by successfully integrating an interactive and educative games that promote these values. Serious games, with their interesting stories and interactions, provide us a chance to practice real world dynamics, reflect, and help us learn through experience (Gee, 2003; Wouters et al., 2013).

This thesis explores the perceived effectiveness of the serious game RiverHaven in teaching core concepts of social responsibility and volunteering. RiverHaven is a narrative driven game, where the role of the player is to bring the community spirit and the values of social responsibility to a newly moved fictional town by completing interactive quests and character dialogues. The study examines whether participants respond well to the game's pedagogical intent. Through a survey that includes both qualitative and quantitative components, a total of 13 regular players, researchers, and developers played

the game and then gave their opinions on the topic and shared their experiences.

The study evaluates to which extent RiverHaven successfully delivers the values of community building, volunteering and social responsibilities. This study also aims to bring more conversation about how games could help people learn to be more responsible in society. The questions guiding the study are:

- How well do players think RiverHaven teaches them about being socially responsible?
- What parts of the game interest players and teach them the most?
- How can RiverHaven be improved to serve these values better?

By answering these questions, this thesis aims to provide solutions into the design and impact of educational games in the field of social engagement and offer recommendations to improve the use of serious games in learning.

Chapter 2 of this thesis discusses literature about serious games and reviews various social aspects. Chapter 3 then describes the research design and methodology followed by Chapter 4, where the results are analysed with thematic and visual data. Chapter 5 discusses the results and compares them with existing research while suggesting improvements. Chapter 6 concludes the thesis by summarizing all other sections and suggesting recommendations for future efforts that apply serious games as educational tools.

## 2 Literature Review

Serious Games are designed for more than just pure entertainment, they usually serve a purpose such as education, and training or address an issue such as climate change or health problems (Deterding et al., 2011; Michael & Chen, 2006). The term 'Serious Game' was first used by Clark Abt in 1970 in his book called 'Serious Games', however, the term gained its popularity in the early 2000s as researchers and developers started exploring the engaging nature of a game and how it could be used in education or other fields (Djaouti et al., 2011). Unlike fun-oriented games, serious games serve educational purposes or compelling objectives, implementing learning into gameplay without erasing the fun factor and player engagement (Annetta, 2010). What separates serious games from other tools is their ability to provide learning through interactive engagement, dialogues and role play. They allow a player to make mistakes in a virtual environment and learn through experience, make decisions and see the outcomes safely without affecting anyone or anything, these values make a game engaging and a valuable learning tool at the same time

### 2.1 Game-Based Learning and Pedagogical Value

Game-based learning (GBL) is a term that describes the use of game elements and features to support educational purposes, mixing teaching content with engaging gameplay. The thinking behind such work is based on the constructivist learning theory, which directs learning through actively experiencing, contemplating, and solving problems. That is, instead of simply reading or listening to learn, game-based learning allows a more interactive pedagogical approach (Piaget, 1972; Kolb, 1984). Games can provide instant feedback and adaptive challenges that promote a deeper learning motivation (Gee, 2003).

Numerous years of research show the pedagogical benefits of game based learning. In 2013, a group of researchers from the Netherlands conducted a

meta analysis on the effectiveness of serious games and found out that educational games taught better than traditional teaching methods by nurturing curiosity and emotional engagement (Wouters et al., 2013).

## 2.2 Promoting Social Responsibility Through Games

Thus far, serious games have been used to promote solutions or teach social, political, and humanitarian values by creating gameplays that makes the player empathise and think ethically on these issues (Bogost, 2007). Some examples include PeaceMaker, a serious game that addresses the Israeli Palestinian conflict, or Spent, a serious game about poverty and homelessness. These games place the player in difficult roles forcing them to reflect on their decision-making and actions while teaching social values or issues. Experts argue that serious games must have an intention of using ethical narratives and community-focused goals in order to teach players about values and how to be good citizens (Squire, 2011; Ruggiero, 2015). By allowing players to take action as activists, impoverished individuals and volunteers, these games can provoke action beyond games (Ruggiero, 2015).

## 2.3 Volunteering and Community Building in Educational Context

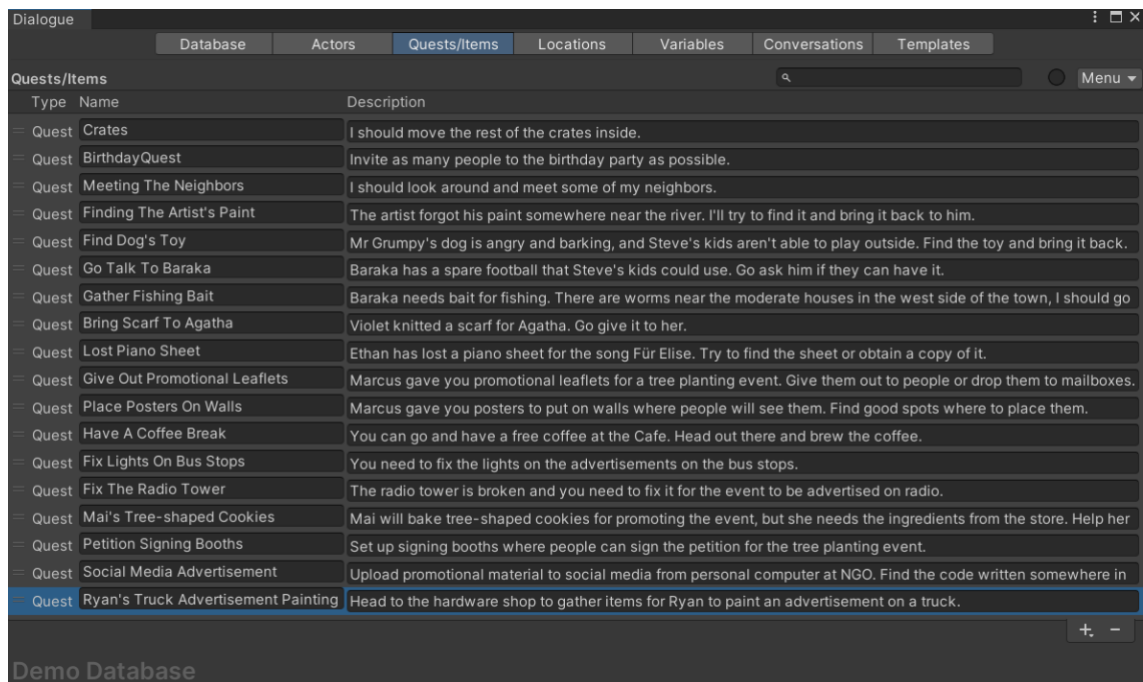
Volunteering has many benefits for an individual and for the community. It is a means for a person to experience real action and see the consequences of collective work (Astin & Sax, 1998). Nowadays, volunteering is recognized as a key part for encouraging social, civic and individual engagement. In an educational context, volunteer activities can improve a student's sense of empathy and purpose to prepare them for real life issues (Astin & Sax, 1998). Education facilities that have implemented volunteer work into their curriculum have seen better educational outcomes and stronger identity awareness (Eyler & Giles, 1999).

## 2.4 Design Considerations in Serious Games

Designing a serious game demands considerable thought and effort in order to deliver the outcomes it sets out to deliver. Not every serious game succeeds in teaching due to their poor design. Some components such as narrative, player engagement, feedback, and gameplay are essential to see how players interact with the game's content (Kiili, 2005). A deeply planned story line can improve immersion and make it easier to deliver educational goals. Dialogue systems in a serious game can imitate real life scenarios, encouraging players to think about different ethical dilemmas (Barab et al., 2009). Therefore, developing gameplay mechanics with learning objectives is difficult but essential to increase the impact of games such as RiverHaven.

### 3 RiverHaven game description

RiverHaven is a 3D story-driven role-playing game designed to promote social responsibility, volunteering, and community building. The player takes the role of a character that has recently moved out of a metropolitan area to a significantly smaller town. The objective for the player character is to restore the community spirit by helping the town residents, completing quests, and having meaningful dialogues with the non-player characters. Quests in the game are designed to reflect real values and scenarios that evoke empathy, solidarity, and ethical decision making. Figure 1 shows a log of the in-game quests that the player should try to achieve.



Type	Name	Description
Quest	Crates	I should move the rest of the crates inside.
Quest	BirthdayQuest	Invite as many people to the birthday party as possible.
Quest	Meeting The Neighbors	I should look around and meet some of my neighbors.
Quest	Finding The Artist's Paint	The artist forgot his paint somewhere near the river. I'll try to find it and bring it back to him.
Quest	Find Dog's Toy	Mr Grumpy's dog is angry and barking, and Steve's kids aren't able to play outside. Find the toy and bring it back.
Quest	Go Talk To Baraka	Baraka has a spare football that Steve's kids could use. Go ask him if they can have it.
Quest	Gather Fishing Bait	Baraka needs bait for fishing. There are worms near the moderate houses in the west side of the town, I should go
Quest	Bring Scarf To Agatha	Violet knitted a scarf for Agatha. Go give it to her.
Quest	Lost Piano Sheet	Ethan has lost a piano sheet for the song Für Elise. Try to find the sheet or obtain a copy of it.
Quest	Give Out Promotional Leaflets	Marcus gave you promotional leaflets for a tree planting event. Give them out to people or drop them to mailboxes.
Quest	Place Posters On Walls	Marcus gave you posters to put on walls where people will see them. Find good spots where to place them.
Quest	Have A Coffee Break	You can go and have a free coffee at the Cafe. Head out there and brew the coffee.
Quest	Fix Lights On Bus Stops	You need to fix the lights on the advertisements on the bus stops.
Quest	Fix The Radio Tower	The radio tower is broken and you need to fix it for the event to be advertised on radio.
Quest	Mai's Tree-shaped Cookies	Mai will bake tree-shaped cookies for promoting the event, but she needs the ingredients from the store. Help her
Quest	Petition Signing Booths	Set up signing booths where people can sign the petition for the tree planting event.
Quest	Social Media Advertisement	Upload promotional material to social media from personal computer at NGO. Find the code written somewhere in
Quest	Ryan's Truck Advertisement Painting	Head to the hardware shop to gather items for Ryan to paint an advertisement on a truck.

Figure 1. Quest System Log.

The game was built using the Unity game engine with C# as its primary programming language. Some of the technical aspects are quest systems, dialogue trees, and player progression. The dialogue system was implemented with the help of the 'Dialogue System for Unity' asset from the Unity Asset Store that allows developers to easily write and modify the dialogues for the game. Figure 2 shows a condensed overview of how dialogues between the player character and non-player characters can branch.

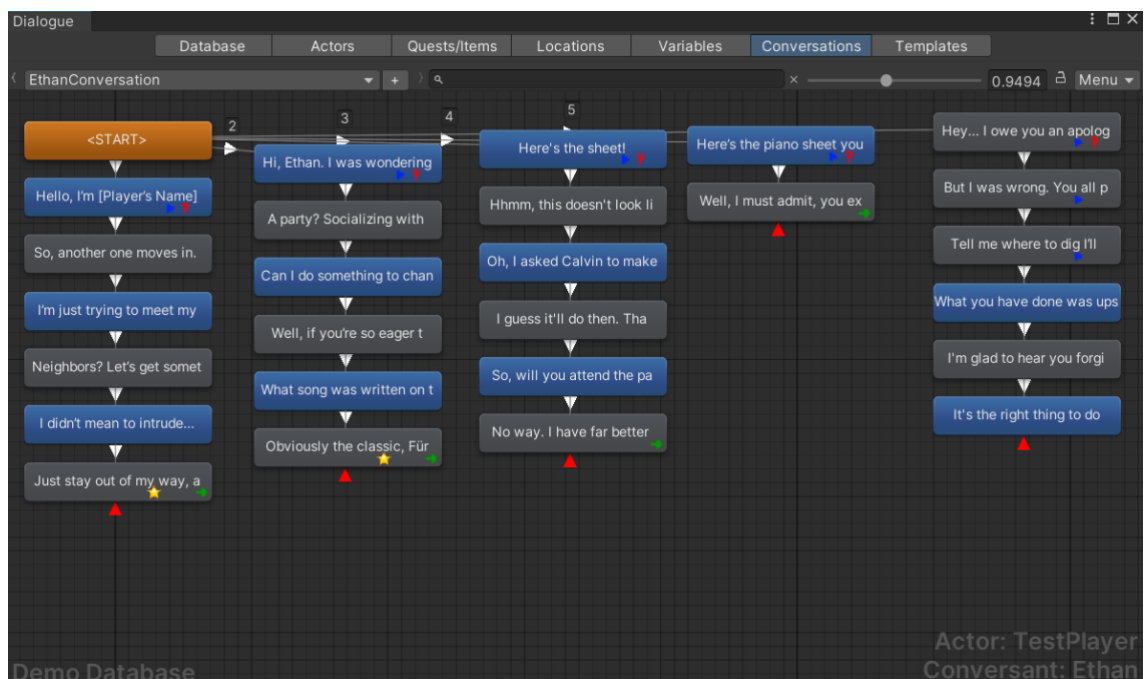


Figure 2. Dialogue Branching in RiverHaven.

RiverHaven uses low-poly art style and an isometric view to offer an aesthetic design. Players roam around the town, interact with other game characters, and receive feedback through visuals and sounds. Figure 3 shows a screen capture of the player meeting one of the town's non-player characters.

A reputation system was implemented to track the player's decisions and influence future character interactions. This could, however, not be used effectively so it was disabled. Main reason behind why it was not used is the fact that the reputation system required a load of conditions and extra dialogues for each condition which makes it not difficult to do but needs much more time to create, also crating new interactions with non-playable characters was necessary to fulfill this purpose, which we did not have the enough time for.

The game story had 3 acts, and all the acts were designed to follow a sequence. Act 1 had the most character interactions and dialogues to introduce the game to the player and fewer objectives so the player does not become frustrated from the beginning. Act 2 was more quest focused, there were around 10 quests in act 2 that the player could complete in order to continue with the story. Act 3 was the end-phase of the game with the shortest play time. It concludes all other acts and summarizes what the player has been trying to achieve.



Figure 3. RiverHaven non-player character interactions.

Overall, development of this game was planned to serve its purpose as well as possible and as a result of it the game mechanics and system worked together with the storyline and the narrative of the game. The purpose of this thesis is to determine whether the design intentions bring a good quality player experience and effectively teach community engagement.

### 3.1 Project Team Composition and Individual / Author's Contribution

RiverHaven was developed with five game design students that studies 'Game Design and Interactive Technologies' at Turku University of Applied Sciences, to have an equal load of work, tasks were divided according to the developers' skill sets. In the group of five we had one game/level designer, two programmers, one artist/storywriter and one project manager/storywriter. The author was the project manager and one of the two storywriters. Author's responsibilities included creating a project plan, distributing tasks, following up on the to-do list and making sure everything goes in line with the project plan and what the project owners requested. Additionally, author spent most of his time writing the game story and creating a narrative that can easily deliver the educational aspects of the game. Writing a story was a difficult task that took unexpectedly long time and effort to finish, but with two people we were able to accomplish this task.

## 4 Methodology

In this research a mixed method approach was used to evaluate the perceived effectiveness of the serious game *RiverHaven* in teaching volunteering and social responsibility. The aim of the research was to discover how players engaged with the game *RiverHaven* and whether they thought it could be an effective tool to teach the values it promises to teach. A survey was used to collect both qualitative and quantitative data from participants after they played the game.

Participants were invited from a wide variety of areas. To gather the most homogenous mix of testers, an invitation was distributed to the students of Turku university of applied sciences, researchers in the game development field, high school students, lecturers, youth workers and everyday volunteers. The diversity of backgrounds allowed for a wider view on the game's impact. Participation was voluntary and anonymous. A total of 13 participants took part in the study.

### 4.1 Survey Design and data collection

The data was collected via a paper-based questionnaire that consisted of two sections:

1. A Likert scale question (1-10) comprising of 8 items that were aimed to measure the participant's understanding of social responsibility, volunteering concepts and values.
2. Four open ended non mandatory questions that gave participants the opportunity to provide feedback on what they enjoyed most and least about the game, asking for any improvements and additions to enhance gameplay and the educational aspect.

The Likert question read as follows:

I feel the RiverHaven game teaches me:

- 1- Key principles of social responsibility.
- 2- Various forms of volunteering.
- 3- Impact that volunteering can have on community development.
- 4- Way to identify organizations that promote social responsibility.
- 5- Benefits of volunteering for individuals.
- 6- Benefits of volunteering for society.
- 7- Ethical considerations in social responsibility.
- 8- Way of volunteering contributes to social change.

The Likert question was followed by these four open-ended questions:

- 1- Do you have any suggestions about how RiverHaven could better teach any of the above social responsibility and volunteering aspects?
- 2- Please list what you enjoyed most about the RiverHaven game.
- 3- Please list what you enjoyed least about the RiverHaven game.
- 4- Please propose any changes you could recommend for the RiverHaven game.

The survey was distributed after the players completed playing the full game. Participants filled out a paper form, from which the results were transferred to an Excel sheet for analysing. The data had both numerical and open-ended text responses. The quantitative data was used to analyze perceived learning outcomes of the game's educational purposes and the qualitative data was mainly to receive feedback on the game's design aspects, as well as to learn more about the individual experiences of the players.

The research followed ethical guidelines suitable for user studies and was conducted totally anonymously and no personally identifiable information was collected. The data was stored securely and used only for the research purposes.

## 5 Results

To evaluate the learning outcomes of the game, participants responded to an eight question likert scale questionnaire, the rating for the items was from 1 (strongly disagree) to 10 (strongly agree). The questions were addressed mainly to find out their understanding of social responsibility and volunteering. Overall, the results (Figure 4.) were positive, with a range of 7.0 to 9.6.

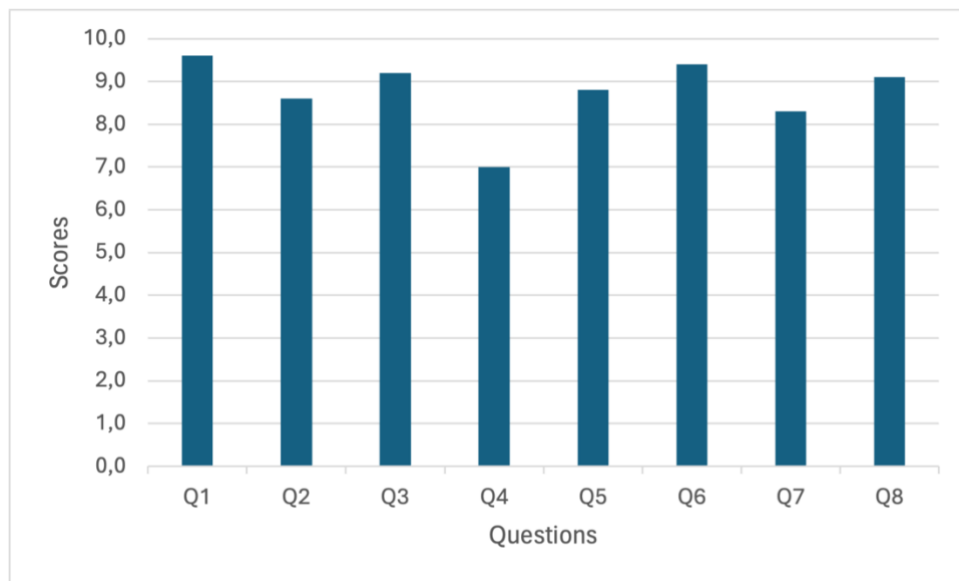


Figure 4. Average score for each item.

The two highest rated areas were:

- Item 1: Key principals of social responsibility
- Item 6: Benefits of volunteering for society

The lowest scoring question was:

- Item 4: Way to identify organizations that promote social responsibility

This shows that while the game teaches values and social impact, it can still be improved in terms of delivering concrete information on organizations that support social change.

### 5.1 Response Distribution

Visualizing how responses were distributed (Figure 5) helps us see the divergence among players. For most of the questions, the majority of responses were between 8 and 10 points, showing strong agreement. However, some questions such as Item 4 and Item 5 showed more spread, indicating that these questions were not as similarly experienced as the others.

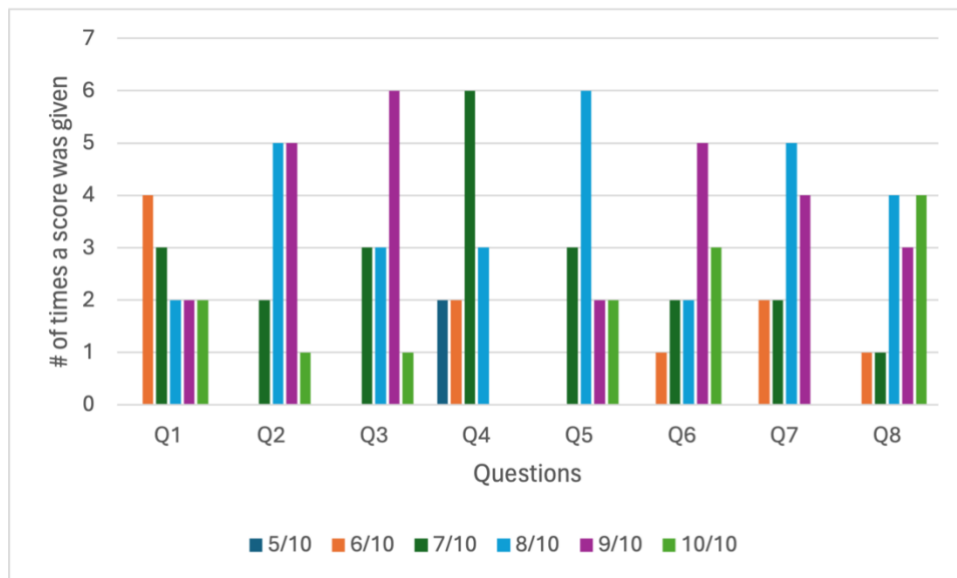


Figure 5. Response distribution chart.

## 5.2 Thematic Analysis of Learning Outcomes

For a more clear analysis on the effectiveness of RiverHaven in teaching social responsibility and volunteering, the likert scale questions were grouped into three different categories: (a) understanding social responsibility; (b) personal development by volunteering; and (c) community impact. This kind of grouping allows us to see how the game communicates on different layers of social learning.

### **Understanding Social Responsibility**

Likert items 1, 4, and 7 were mainly to assess the players on their understanding of the principles, and their ability to identify organizations involved in social good.

- Likert item 1 (Key principles of social responsibility) received the highest score overall (average 9.6), this shows the strong recognition of the core values implemented in the gameplay.
- Item 7 (Ethical considerations in social responsibility) showed that while players faced ethical decisions, their impact usually varied.
- Item 4 (Way to identify organizations that promote social responsibility), the lowest scoring question (average 7.0), was about real life organizations and their recognition by the player as they played the game, and the data shows that some players had a hard time navigating themselves in this aspect probably due to poor game design and script.

### **Volunteering and Personal Development**

Likert items 2 (Various forms of volunteering) and 5 (Benefits of volunteering for individuals) explored the game's ability to showcase the range of volunteering opportunities and the benefits they offer.

- The data of Likert item 2 (average 8.6) show us that majority of the players learned different types of volunteering opportunities that are represented in the game for helping individuals and the community.
- While, from item five we can clearly say that the game successfully instilled how volunteering can contribute to personal growth and recognition.

### **Community Impact and Social Change**

Likert items three (Impact that volunteering can have on community development), six (Benefits of volunteering for society) and eight (Way of volunteering contributes to social change) tested how RiverHaven showcased the societal impacts of volunteering and collective action in a bigger perspective. All three items scored 9,1; 9,3; and 9,1 respectively. This shows that the game effectively addresses how small actions can make a bigger and long-lasting impact

#### **5.3 Analysis of the Qualitative Data**

The open-ended questions show us that participants experienced appreciation for the game's topic. Helping others and community building ideas were taken positively. The feedback highlighted the relaxing atmosphere of the game and how players felt completing quests, interacting with other in-game characters, and exploring the game world. There were two views on how the narrative and the storyline affected the missions of the game when it comes to effectively teaching social values. Some players thought the educational aspect was implemented successfully, while others thought it requires further development.

The main areas of improvements noted by the players were technical problems such as minor in-game bugs that make it hard for the player to proceed and take their focus away from the main gameplay and the story. Several players mentioned the game was repetitive, pointing out the fact that some tasks appear visually different, but are quite similar mechanically. These comments

tell us that the game successfully delivered the main idea but still needs further development and fixing in order to strengthen its overall gameplay.

## 6 Discussion

The results section shows us that RiverHaven is an effective tool in promoting social responsibility and volunteering. Out of 13 participants to play test and fill the survey, most gave positive feedback and rated each of the eight questions highly. The highest rated questions were about understanding core values and observing the impact of collective work, which aligns well with previous research done on serious games. When developed on principles of experience-based learning, these games can both improve cognitive and emotional engagement (Wouters et al., 2013; Gee, 2003).

The qualitative analysis displays a clear strength in how the game addresses community change on a larger scale. High scores of questions number three, six and, eight proposes that players understood the relation between individual action and societal impact. A town environment that transforms on the actions taken by the player with immersive mechanics are supported by literature. Role-play and simulation games enhance civic learning (Squire, 2011).

Players enjoyed the game assets and the art style as well as the community centered story. However, there was criticism about the limited dialogue choices and some lacking mechanics. Research also suggests that making one's own decisions and seeing different outcomes has an important role on deep learning in serious games (Barab et al., 2009; Sicart, 2009).

## 7 Conclusion

The goal of this thesis was to evaluate the perceived effectiveness of the serious game RiverHaven in promoting social principles like volunteering, community building and social responsibility. The results show that players believed the game could teach these values and tell how volunteering contributes to a bigger impact.

Carefully aligning RiverHaven's design with theories of game-based education and pedagogy gave RiverHaven the storytelling, roleplay, and decision-making aspects to support its function as a learning tool. With more development and dedication similar games could be used in formal and informal learning spaces to inspire positive change in our communities.

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