OURCADE: A Game to Solve Real-World Game Accessibility Puzzles

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Abstract

Video games are becoming increasingly accessible, but there are still scant resources for gamers with disabilities to reliably discover and evaluate which games are accessible to them. To remedy this, I designed *OURCADE*: a social simulation role-playing game that utilizes player engagement to produce a wiki-based resource for game accessibility information. This design leverages existing insights around game accessibility, citizen science, and video game communities, while also exploring new questions around the potential of social video games as a medium for answering complex game accessibility questions.

CCS Concepts

• **Human-centered computing** → **Accessibility design and evaluation methods**; **Human computer interaction (HCI)**; • **Information systems** → *Users and interactive retrieval.*

Keywords

video games, accessibility, information retrieval and organization, role-playing games, social simulation games, open science, citizen science

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1 Introduction & Motivation

Video game accessibility has received increased attention in HCI research and the games industry, and there are more options for disabled gamers than ever before. However, identifying accessible games is still a challenge: the information used for determining whether a game is accessible is often spread across numerous sources and difficult to find [8].

In this paper, I present the design of *OURCADE*: a social simulation role-playing game where players participate in the development of an accessible gaming space. As they play the game, players also complete "Access Quests:" in-game missions that are completed by answering questions about real-world game accessibility. By completing Access Quests, players participate in a larger citizen science project supporting the development of the "Hackcess Wiki:" a public wiki of game accessibility information to support disabled gamers' accessibility evaluations.

2 Background & Related Work

2.1 Evaluating Game Accessibility

Prior work from the author and collaborators has explored disabled gamers' process of finding and evaluating the accessibility of games, emphasizing that despite more games having accessibility features, many disabled gamers still find it difficult to find games to play [8]. A specific challenge identified is the task of evaluating whether a game will be accessible to a particular disabled gamer: the process is often highly complicated, involving finding and cross-referencing many disparate types of media to get the 'whole picture' of a game's accessibility.

This challenge can be mitigated in part by compiling relevant game information, such as a game's accessibility features. However, not all relevant information can be standardized: prior work has also highlighted how disabled gamers often develop their own strategies and "hacks" to navigate imperfectly accessible games, such as using game mechanics in unconventional ways and making specific in-game choices to optimize for accessibility [5, 8]. These adaptations are developed over time and highly individualized, making them even more difficult to share or discover.

2.2 Citizen Science Games and Player Communities

Prior HCI research has explored the potential of games as a vehicle for "citizen science", the practice of engaging non-experts as researchers in large-scale scientific research. Studies these games and their player communities have identified various factors that motivate players, including the opportunity to participate in research, their own individual learning through the process, or simply because the game is fun and rewarding [3, 13, 14]. *OURCADE* specifically centers many of Tang et al.'s recommendations in its design, such as using story as a diegetic tool and leveraging familiar game genres and mechanics [13].

2.3 Game Design Inspirations

Much of the aesthetic and high-level design of *OURCADE* is inspired by social simulation role-playing games such as *Stardew Valley* [1] and *Animal Crossing* [9]. Games in this genre often combine "chore"

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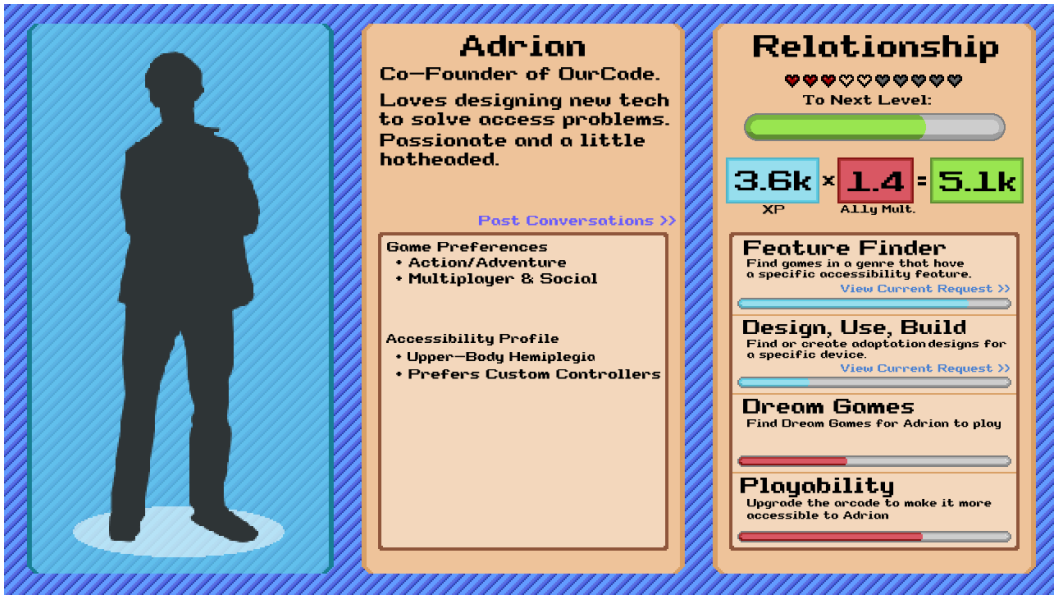

Figure 1: The Character Overview screen for an NPC. As players grow closer with an NPC, they learn more about the NPC's background, their game preferences, and their access needs (center panel). Players can also track their progress on an NPC's Access Quests and view their current XP and A11y Modifiers for this NPC (right panel).

gameplay (e.g., regularly watering plants) with progression mechanics (such as unlocking new tools) and distributed narratives that unfold through a combination of completing tasks and building relationships with NPCs. Ultimately, this structure can allow repetitive or tedious tasks to feel rewarding, as they contribute to a larger set of objectives a player wants to achieve.

Another notable element of the design is the the presence of an active developer-player relationship. In contrast to most games which are "static" at time of distribution, *OURCADE* is designed to continually evolve over time in response to collective player progress. This dynamic is inspired by games like *One Hour One Life* [11], in which new game elements were introduced based on the real-time progress of the player community. Additional inspiration is drawn from alternate reality games, where game elements are designed in specific response to player actions, as well as trends in online game communities with "live service" models (e.g., [7]).

3 Design

3.1 *OURCADE*: Game Overview

OURCADE is a social simulation role-playing game that positions the player as a member of a team of upstarts who discover a mysterious abandoned arcade and decide to renovate it into an inclusive gaming haven for people of all abilities and backgrounds to game freely and accessibly. By completing objectives and amassing resources, players can expand the arcade, renovate the facilities, install and upgrade new attractions, and more to make the arcade a more appealing and welcoming place.

3.1.1 Building Relationships with NPCs. As the arcade grows, players meet and can befriend a diverse cast of NPC arcade patrons, each with their own personalities, gaming interests, and access needs. To deepen the player's relationship with each patron, they can perform tasks for the patrons, including completing the patron's "Access Puzzles" (Section 3.1.2), which involve answering specific real-world game accessibility questions for the character. Additionally, players can improve their relationships with NPCs by making their in-game arcade more accessible to each character. Each character has their own set of access needs, which players can learn by strengthening their relationships. As players upgrade the arcade, they can choose to make various modifications to the facility and its games to improve its overall accessibility. Additionally, players can seek out an NPC's "Dream Games"– real-world games that meet the NPC's access needs and satisfy their other game preferences. By improving the accessibility of the arcade and finding an NPC's Dream Games, players can increase the "A11y Multiplier" applied to the XP they have amassed by completing access quests.

3.1.2 Access Puzzles. A core element of *OURCADE* is its "Access Puzzles," which players must solve to upgrade the arcade and grow closer to patrons. Each Access Puzzle relates to a specific question about real-world game accessibility, such as determining whether a game has certain accessibility features, compiling gameplay videos to assist player evaluation, and even designing new hacks and gameplay strategies that address known accessibility issues.

3.1.3 Progressing the Game. By growing closer with the NPCs, players unlock new arcade upgrades and progress through a narrative filled with secrets about each character and unravel the mystery behind the arcade. However, there is a limit to how far players can progress the game: when the game is first released, certain game elements are locked for all players. In order to unlock these game elements, the full player community must reach certain milestones

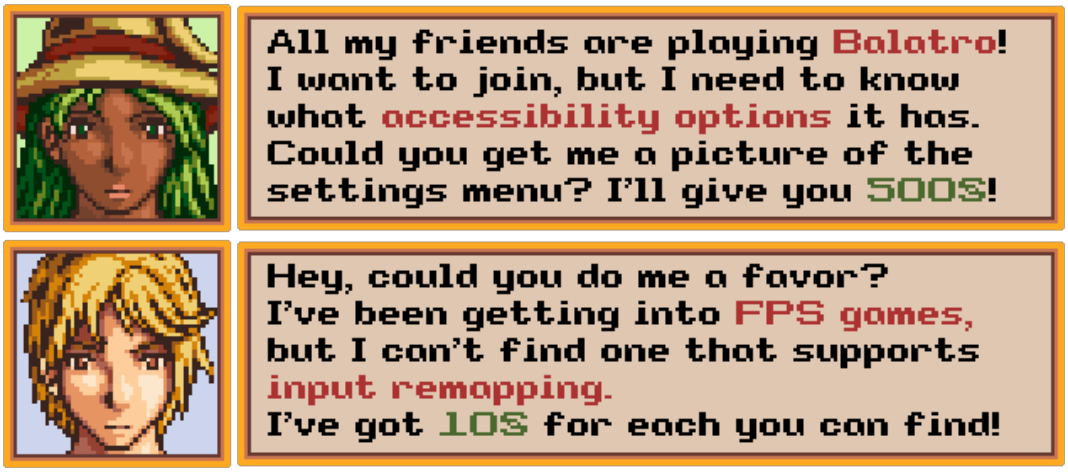

Figure 2: Two NPCs presenting Access Quests to a player. Each NPC presents different types of quests, including compiling resources (top) and identifying games that meet certain genre and accessibility criteria (bottom). By changing the specific details (emphasized in red), many different quests can be generated. By changing the reward (emphasized in green), players can be incentivized to complete Quests that are deemed higher priority by the community.

through their collective play, completion of Access Quests, and overall contribution to the larger *OURCADE* Project.

3.2 The Hackcess Wiki and the *OURCADE* Project

Though *OURCADE* can be played as a standalone game, it is actually just one component of a larger community project: as players complete Access Quests and improve the in-game state of game accessibility, they simultaneously improve the real-world state of game accessibility by populating the "Hackcess Wiki," a public game accessibility resource.

3.2.1 Access Puzzles & Populating the Hackcess Wiki. The Access Puzzles presented to players are procedurally generated based on the state of the Hackcess Wiki and its associated database. Using criteria surfaced in prior game accessibility work (namely [8, 10]) and a preliminary database of video game information (drawn from IGDB [6]), a large number of unique access puzzles can be dynamically generated, which can then be prioritized based on factors such as a game's popularity or the amount of existing data already collected in a segment of the database.

Determining whether a game is accessible depends significantly on an individual player's preference [8]. To avoid asking non-expert players to make accessibility judgments on someone else's behalf, the Access Quests focus specifically on compiling and processing the information disabled gamers might seek out for their own evaluation. This also works to structure the collective effort to build out the Hackcess Wiki: similar to personalized task suggestion approaches for the development of information systems (e.g., [2, 4]), players are given a range of possible tasks that gives specific objectives while preserving agency in choosing which task to perform. Tasks of differing complexity can also be rewarded differently, further directing players' focuses in the collaborative development of the wiki.

3.2.2 Ensuring Correct Information. A fundamental challenge present in the design of Access Puzzles is that, by definition, the accessibility questions posed are ones that do not have easy-to-confirm answers. Though this project is most successful if all players act in good faith and care about producing high-quality answers much of *OURCADE*'s data collection methodology is designed with redundancy and data validation in mind.

Due to the dynamic nature of Access Quest generation, multiple players can be asked the same questions, the answers to which can then be compared to identify potential conflicts. If a conflict is identified, the arcade's mysterious janitor, Bugs, may offer players a "bounty" for helping him resolve the conflict. Unlike other quests, these cleanup quests require other community members to confirm that revised information is correct before a player is granted their reward. If the incorrect answer appears to be the product of trolling or otherwise inappropriate behavior, players will have the option to indicate that when voting on the bounty. This effectively functions as both a community-regulated "bug bounty" and content moderation system: players are rewarded for correcting mistakes, while also being deterred from malicious play due to the high potential for their behavior to be reported and punished.

4 Critical Analysis

4.1 Player Experience: "But Is It *Fun*?"

Given that *OURCADE* is a game built on a crowdsourced data collection task, there is a delicate balance to strike to ensure the game feels rewarding rather than tedious. Taking guidance from past citizen science game research, *OURCADE* attempts to provide a complete game that surrounds and complements the scientific task without requiring players to engage in components they are not interested in. The diversity of Quest types can sustain players who are not motivated by the citizen science aspect, and those uninterested in the game can directly edit the Hackcess Wiki without

playing the game at all. In contrast to many other citizen science projects, *OURCADE* also positions the player closer to "co-designer", rather than "employee". Because players' work directly populates a public wiki, they can more meaningfully understand the progress of the project and even see their own contributions first-hand. This co-designer role is also supported by the game's unique player-developer relationship: because the game evolves in response to player actions, players can feel a stronger sense of agency in how the overall project progresses. By providing the players with a dedicated space to collaborate, the developer can also more easily stay up-to-date on how players would like to see the game evolve, such as by seeing what quests the players struggle with or particularly enjoy.

OURCADE and the Hackcess Wiki also take inspiration from the practice of wiki-building in game communities [12]. In many game communities, players create extensive wikis and documentation as part of their gameplay; *OURCADE* aims to explicitly encourage these players by rewarding wiki-building in-game.

Ultimately, no game can appeal to everyone. However, *OURCADE* positions itself as a citizen science game that can appeal to players with varied interests and enables participation in accessibility research regardless of expertise.

4.2 Disability Justice: Who Performs Access Labor?

A core principle of disability justice is that disabled people should not be expected to do all the work of repairing inaccessibility– some, if not all, of that onus should be on the corporations and institutions that created the inaccessibility in the first place. Though *OURCADE* presents a means for a community larger than *just* disabled people to work towards repairing inaccessibility, this approach does inadvertently take the onus off the game companies to provide accessibility information for their games, as that might become a task they might expect players to perform for free. There are certainly ethical concerns here– that unpaid gamers, many of whom are likely disabled themselves or simply passionate about game accessibility, would be the ones to compile this resource rather than the developers that made the game feels "unfair". Furthermore, by making it easier to determine that a game is accessible, disabled gamers may be more likely to purchase the game, resulting in developers profiting off the unpaid labor of the player community.

However, the reality is that game developers and distributors have not put this resource together, despite presumably being aware of the value this information provides for disabled gamers. Ultimately, a game accessibility database is a valuable resource, and with no indication that developers and distributors will produce this tool, providing an enjoyable means of collaboratively creating it feels like a justifiable alternative.

5 Towards Fully Deploying the *OURCADE* Project

In its current state, *OURCADE* is effectively still a prototype– it has not been fully deployed, and the player community has not yet been opened to the public. Though the design of the game itself is complete, several logistical obstacles preventing it from being fully deployed. Namely, as a live, networked citizen science research project, *OURCADE* needs an active moderation team to monitor the project as it unfolds and guide its evolution in response to player actions. This includes adjusting Access Quest content and priorities in response to what data is collected on the wiki, tracking and responding to collective progress, moderating the player community, and ensuring all players are able to engage with the game in the capacity they want. Additionally, given the impact aesthetic of a citizen science game can have on players' desire to contribute to the project [13], hiring a more experienced visual artist to redesign certain game components would be a worthwhile investment before the game is deployed in full.

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