Game Character Design as a Mirror of Student Perceptions

A Creative Method for Reflection and Assessment in Educational Settings

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Abstract

Exploring the potential of game character design as a constructionist, reflective method and evaluative tool in educational settings, this study investigates how students create characters based on the game "Fall of Porcupine" in school-based participatory design workshops. A thematic analysis of character descriptions provides insights into students' views on the healthcare system, social inequalities, and working conditions. The findings suggest that character creation serves as a medium for students to engage with complex topics, express personal viewpoints, and develop critical perspectives. This approach contributes to innovative assessment methods in constructionist learning environments by making students' viewpoints, reflection and knowledge visible to teachers and/or researchers.

Keywords and Phrases: Game-based learning, Reflection in Education, Character Design, Student-Centered Learning

1. Introduction

In educational contexts, fostering reflection is essential for deep learning and critical engagement. Reflection allows students to make sense of their experiences, transforming implicit knowledge into explicit understanding through active interpretation, questioning, and exploration [15]. Previous research has emphasized its role in promoting deeper comprehension and meaningful learning [2], [14]. Constructionist approaches, which emphasize learning by doing, may offer a promising pathway to fostering aspects of meaningful learning. By promoting an active engagement with complex concepts, these concepts become more tangible. In this context, game design emerges as a particularly effective approach, as it combines creative expression with problem-solving and critical thinking [4], [9], [17], allowing students to construct knowledge through interactive and immersive experiences.

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Game character design promises an accessible entry point into game design while supporting reflection on learning content. As narrative games are often experienced through their characters, these avatars serve as means bringing the game world and its storytelling to life. Students learn and reflect on the topic and express their ideas, views and perspectives through designing new game characters.

In this context, this study seeks to answer the following research question: What potential does the design of game characters have as a tool for reflection and evaluation to make students' perceptions of societal challenges visible?

By exploring how students engage with character design as a method in participatory workshops, we aim to explore its didactic potential for researchers and educators. This method promises a low-threshold approach to introducing complex topics while simultaneously fostering personal and critical perspectives in the classroom.

2. Background

Literature on reflection in relation to digital games has primarily focused on players' reflection during gameplay so far [13], [16]. Mekler et al. [10], for instance, found that while reflection is a frequent part of the player experience, critical reflection was largely missing. Yet it is this critical reflection that has an influence on attitudes to ethical and social issues.

In the context of participatory game design in educational settings, the focus of previous research has often been on promoting design thinking, problem-solving, and creativity of students [4], [17], as well as motivational aspects [9]. However, rather than viewing games as vehicles for delivering content, enabling students to design their own games or game elements fosters deeper engagement and critical thinking [9]. Game design requires students to think critically about complex systems, whether related to mechanics, narrative structures, or social contexts. But game design can also be considered an "other-oriented activity" [7] by making it possible to adopt other perspectives when making a game. Particularly storytelling seems to be a promising approach to integrate the students' individual sense-making. The ability to express themselves through narratives enables the reinterpretation of events, the empathizing and understanding of experiences, and learning from discussions that introduce alternative perspectives, imaginative possibilities, and critical questions [1]. By developing new narratives, the games become objects-to-think-with as defined by Papert [12]. Objects-to-think-with foster an immersive approach to complex subjects by enabling students to observe, explore and manipulate these artifacts. Thus, the artifacts act as a link between the students' experiences and abstract concepts [8].

Salen [13] emphasizes that game design is a multifaceted process involving logic, storytelling, and iterative problem-solving. Reflection is integral to this process. It should not be considered a separate activity but rather a fundamental aspect of the design experience itself [14]. By designing game elements, students engage in a deeper level of analysis, fostering both creative expression and critical engagement with broader societal themes.

Figure 1: Screenshot from the gameplay, via BUNTSPECHT.GAMES. (https://porcupine.game/presskit/).

3. Welcome to Porcupine: About the Project and the game

The Serious Game Changer project uses digital games to encourage secondary school students in creating educational materials aligned with selected UNESCO's Sustainable Development Goals, enabling new spaces for action and engagement. As part of the project a workshop was conducted in art education classes with 15 students (ages 13–14). The workshop aimed to raise awareness of healthcare challenges in relation to Sustainable Development Goal (SDG) 8, "Decent Work and Economic Growth", while fostering self-expression through creative methods that connect these issues to participants' personal experiences. In line with the topics addressed in this SDG, students chose the game "Fall of Porcupine" [5] as a starting point for reflective and analytical engagement with the present healthcare system from their lifeworld perspective.

"Fall of Porcupine" (see Figure 1) is a 2D side-scrolling adventure developed by BUNTSPECHT.GAMES and released in 2023 [5]. The game is set in the small town of Porcupine and focuses on its local hospital, where anthropomorphic animals navigate daily life and its challenges. The gameplay blends exploration of the town and hospital environments, dialogue-heavy interactions with a diverse cast of characters, and simple mini-games representing medical tasks or daily routines. The story follows Finley, a young pigeon medical intern, who faces stress, long hours, challenges, and conflicts with the chief physician. Serious themes such as crumbling healthcare systems, coping with death and grief, and the rise of populist ideologies are woven into the gameplay, especially through conversations with detailed characters that are based on interviews with actual hospital staff [6].

We chose the game for the project workshop based on the well written character-centric narrative availability of a free demo version and the thematic relevance: as the game reflects the current systemic pressures within healthcare and the lived experiences of medical staff [6].

4. Methodology

This project workshop used a qualitative, art and design-based research approach that focused on designing game characters as a creative method to identify and understand students' perceptions of the challenges in healthcare and the working conditions that emerge within it. The game "Fall of Porcupine" is used as a catalyst to enable them to visualize their own individual experiences and beliefs.

4.1 Embodying Perspectives: Designing Game Characters after Gameplay

First, students played the demo for one hour in pairs and were encouraged to take notes, capturing elements that resonated with them. The core of the methodology was the character design task. Students were asked to create their own character authentic to the game's world. The students were free to create their own designs and set their own personal key aspects. But this task is much more than just an artistic design assignment: Rather, this task functions as a projective technique in which students integrate their observations and interpretations of the game's themes and aesthetics, translate abstract thoughts and feelings about healthcare and argue for their own characters as to why they fit into the game world.

This being the first time for all students to design a game character, optional scaffolding was offered to the students in form of an information sheet with questions and examples to guide reflection towards relevant themes. This sheet included questions about the characters' appearance, their connection to the healthcare system or their worries and fears. The students also had the option of working digitally or analog. Although a few students experimented with the online resources provided, the final figures were all drawn on paper. The aim was generally to give the students as much freedom as possible within the assignment.

4.2 Facilitating Understanding through Dialogue and Group Discussion

Throughout the design process, researchers engaged in individual, informal conversations with the students. On the one hand, these conversations served the researchers to learn more about the characters and the students' thought processes to unpack specific meanings in their design choices; on the other hand, they encouraged students to come up with new or more in-depth ideas that were integrated into their characters. The workshop concluded with a group discussion to reflect on the process, outcomes, and real-world connections, serving as a space for collective meaning-making and final reflection. In this plenary discussion, the students' characters were presented and discussed on a voluntary basis. Classmates as well as the teachers and researchers who were present were able to ask questions about the characters or express their personal impressions. In this discussion, we tried as a group to build links between the students' artifacts, the game "Fall of Porcupine" and real-world experiences and conditions.

5. Findings

For the analysis, 15 character descriptions (Figure 2) of the students based on the game "Fall of Porcupine" were included. Using a reflexive thematic analysis (rTA) by Braun and Clarke [3], the following six themes were created that reflect students' perspectives on the healthcare system, social inequalities, and working conditions. The themes were developed through an iterative, inductive-deductive coding process by the three authors:

1. **Character description:** This theme encompasses all traits, both physical and personality-related, ranging from name, age, and species to descriptions of appearance and character. The students consistently created likeable and engaging characters that players would be eager to interact with. These characters were described using a diverse range of attributes, such as "helpful and cheerful, yet unpunctual," "an outsider," "strong and muscular," "the cutest being in the hospital," "good-looking," "peaceful," "cheerful but sometimes exhausting and forgetful," and "very messy but always very helpful". Many students tried to incorporate both positive and negative traits in their character descriptions. None of the characters are depicted as omnipotent superheroes; instead, they grapple with everyday challenges, making them more relatable and multidimensional for us as recipients.
   A striking pattern is the alignment between the chosen animal species and the characters' defining traits. For instance, a bat doctor is portrayed as constantly tired due to working during the day, despite being naturally nocturnal. Similarly, a dedicated snail janitor unintentionally dirties the freshly cleaned floors with its trail of slime.

2. **Relationships:** This theme includes all interpersonal relationships of the characters, both work-related and personal. Sub-themes further differentiate relationships with existing characters, such as Finley or his boss, and other new characters created by students. For example, one newly created character is not only friends with Finley's boss but also adopt the orphaned child character designed by another classmate. Another newly created character enters a romantic relationship with Finley while also working as a nurse, caring for one of the newly developed patients in the hospital.

3. **Narrative:** This theme includes the backstories of the characters, explaining why they are the way they are or why they are connected to the hospital, as well as potential outcomes for the character within the game. The theme captured emotional storytelling, with many characters' backgrounds shaped by tragic losses or accidents. These experiences were used to justify their personalities and actions, offering insight into the underlying reasons for their behaviors and actions.

4. **Game mechanics:** Some students developed additional game mechanics related to their characters beyond the given tasks, incorporating features that reflected the unique traits of the new characters. These include for example multiplayer modes, new quests/mini-games, enemy fights for Finley, and an energy bar. These extensions suggest a deeper understanding of the original game mechanics, as well as the abstraction from other games and their impact on the original game.

5. **Working World and Healthcare System:** A theme that often, though not always, intersects with others is the connection to the healthcare system, including both employees and patients. Within this theme, students demonstrate a notably critical and reflective engagement, portraying injustices and tragic narratives. Particularly noteworthy is the pronounced diversity in the backgrounds of the characters and their connections to the hospital setting. Newly designed patients arrive at the Porcupine clinic with both physical and mental health issues and undergo rehabilitation through part-time jobs or social interventions. Hospital staff

created by the students include not only doctors but also nurses, social workers, cafeteria employees, administrative staff, and cleaning personnel, all of whom are represented with respect and careful consideration.

6. **Challenges:** This theme also frequently intersected with other themes. It encompassed both challenges in the characters' personal lives and professional issues, such as Examples that have often been mentioned here include family commitments, extreme workload, overwork, failure to respond to individual needs, hierarchy conflicts and bullying.

6. Discussion

The findings indicate that character design can function as an innovative tool for assessing students' perceptions of real-world issues. By externalizing implicit knowledge, students engaged critically with the healthcare system, reflecting on personal and societal dimensions. Work ethic-related issues were raised through the design of the characters and their challenges, such as the need for childcare, freedom of career choice, work-life balance, bullying/conflict in the workplace, dealing with unemployment, mental illness, and death. Personal traits were described as either advantageous or disadvantageous for interpersonal relationships and workplace tasks. This suggests that students reflected on how individual personality traits influence challenges in professional life. This process also enabled students to draw on their own experiences, allowing them to adopt different perspectives and create more empathetic and authentic character portrayals. Through this perspective-taking, students could implicitly explore intersectional positions, considering how combinations of traits and circumstances might lead to unique vulnerabilities or strengths within the game's narrative.

According to Salen [13] designing a game requires students to reflect on the necessary meta-structures, such as game mechanics, content, and interactions. Based on the students' drawings, we were able to identify similar themes – "Game Mechanics", "Narrative", and "Relationships" – which also suggest the application of existing, versatile knowledge and skills.

The creative process supported constructionist learning by bridging conceptual understanding with expressive design. Additionally, the workshop facilitated a shift from a consumerist approach to an active, participatory engagement with game design. The study explores the potential of character creation as a means of in-depth evaluation by offering a way to capture students' reflections and perspectives through narrative design.

The students' interest in linking the backstories of the characters they have created emphasizes the importance of collaborative exchange in the creative process. This aligns with Kafai's "making is connecting" [9], which emphasizes that individual involvement takes place in a social context. The design of games or game elements allows personal knowledge to become visible and facilitates collaborative reflections and discussions. Accordingly, the resulting design artifacts are not only "objects-to-think-with", but also "objects-to-share-with" [9].

Based on these findings, we recommend a stronger focus on collaborative exchanges during and after the design process. This includes encouraging more structured discussions among students and fostering closer interactions between students, teachers

and researchers. Increasing the opportunities for sharing – not only during the design phase, but also later in the presentation and reflection phase – could promote greater critical reflection.

While this study offers promising insights, several limitations should be noted. At this point in time, the analysis focused solely on textual character descriptions, excluding a further focus on visual elements and limiting insights into how design choices contribute. As part of an artifact analysis, attention could be given to visual storytelling, visual character development, and symbolism in representation. Additionally, audio recordings of student discussions were not incorporated, making data triangulation not possible. Lastly, the findings are based on a small sample within a specific educational context, necessitating further research to explore the generalizability of this approach across different age groups and learning environments.

7. Conclusion

This study demonstrates how game character design allows students to articulate their understanding of societal issues creatively as a reflective and evaluative method within educational contexts. By externalizing students' implicit perspectives, it provides insights into their perceptions of societal challenges, particularly within the healthcare system in this case. The thematic analysis of character descriptions shows that students engage critically with issues such as work-life balance, hierarchical structures, and emotional overload in professional life. This highlights that character creation is not only a creative task but also a means of fostering deeper reflection and critical thinking. Offering a foundation for further methodological exploration in constructionist learning environments, this approach emphasizes creativity, engagement, and deeper critical inquiry in classroom settings.

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