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Kusoke Adventures: Recycling Interactive Game

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Abstract—Recycling activities play a crucial role in the society as these activities have impacts on various aspects such as production, health and environment. Although recycling activities have impacts on the environment, the level of awareness among youth and children regarding recycling is still low. To address this issue, this project aims to develop a 2D interactive game. The game will educate the youth and children about recycling, sorting recyclable materials, and teaching them about the importance of safeguarding the environment. Unlike the conventional text-based approaches such as printed flyers, brochures and books, the interactive elements of the 2D game will engage the target audience when playing the game, which eventually foster their understanding and interest in recycling. The game will also include assessment tools to measure the users' knowledge about recycling. The game is developed using Unity engine and C# programming language, and the assets are created using Adobe Illustrator and Aseprite.

Keywords—*recycling, 2D game, interactive game*

I. INTRODUCTION

In the field of education traditional methods of sharing information through static websites have proven to be inadequate. Most recycling platforms lack interactivity. Heavily rely on text, which leads to inefficiencies. This lack of engagement decreases users interest undermining the purpose of these applications. To tackle this problem our project aims to introduce a game as a unique way to teach recycling concepts. By using a gaming framework, we aim to present information in an engaging and indirect manner going beyond the limitations of traditional text-based methods. Additionally, our initiative acknowledges the need for mechanisms to assess users' knowledge about recycling in existing applications and emphasizes the importance of interactive education.

The primary goals of our project involve designing and developing a game that not only imparts knowledge about recycling but also ensures a smooth user experience through thorough evaluation. The game's content will cover recycling topics and will cater to a wide audience range including children aged 6-17 and young adults aged 18- 24. Since personal computers are prevalent in household, we have optimized the game, for desktop platforms to enhance accessibility. By utilizing tools like Unity for game development and design software such as Aseprite, Adobe Photoshop and Adobe Illustrator to create game assets our project aims to transform the way recycling education is approached by providing an interactive learning experience.

II. MATERIALS

A. *Selecting a Template.*

In addition to the overarching goals, our project involves meticulous steps to ensure its success. Firstly, the process begins with the crucial task of selecting an appropriate template. This choice sets the foundation for the game's structure and visual elements, aligning with our objective of creating an engaging and effective educational tool. The template selection process is integral to establishing the overall design and user interface, with careful consideration given to the preferences and cognitive abilities of our target audience.

B. *Maintaining the Integrity of the Specifications*

maintaining the integrity of the specifications throughout the development phase is paramount. Adherence to the predefined specifications guarantees that the game aligns with our educational objectives and user experience goals. Regular evaluations and adjustments will be implemented to ensure that the final product not only meets but exceeds the expectations outlined in the project's scope. This commitment to maintaining the integrity of specifications underscores our dedication to delivering a high-quality and impactful interactive learning experience. proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your abstract as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

III. METHODS

A. *Development Approach*

The development approach, for our recycling game follows a process divided into three main stages. In the phase we lay the groundwork for the game by identifying and developing the character (Kosuke) and designing challenging levels that align with our educational goals. In the stage we focus on implementing the game design using the Unity engine creating character animations and developing game mechanics such as interactive elements, a save/load system and a controller for character movement. To ensure appealing 2D game assets we utilize design software, like Adobe Illustrator and Aseprite. Finally in the stage we prioritize testing and quality assurance to provide players with an enjoyable gaming experience. This includes conducting testing sessions addressing bugs based on feedback received from users and making adjustments based on user acceptance testing.

B. Story Structure

The game's story takes us on a journey, with Kosuke as he travels the world encountering a forest and its distressed animal inhabitants. When Kosuke arrives at a village nestled within the forest he becomes aware of the damage caused by city dwellers who thoughtlessly discard waste in this natural haven. Driven by a desire to restore the forest's beauty, Kosuke joins forces with the villagers. Is entrusted with the Book of Knowledge. This captivating plot sets the stage for players to embark on a hero's quest tasked with cleansing a world through an engaging puzzle game. The goal is to collect and properly recycle items found throughout levels of the game. By recycling items, players make progress, towards their mission while discovering recyclable items that unlock special abilities or power-ups along the way. As players advance through levels they contribute to creating a cleaner and healthier planet.

C. Methods

The development process follows an approach starting with tasks such as, as designing characters and levels. It then moves on to the production phase, where Unity and design software are used for implementation. After that, postproduction involves testing, quality assurance and making improvements based on user feedback and testing sessions. The storyline serves as a blueprint for creating a puzzle game in which players take on the role of heroes who combat pollution by recycling items, in various challenging levels.

D. Testing

Ensuring the high-quality development of our project involves a thorough testing phase with both internal Alpha Testers and external Beta Testers. Alpha Testers, comprising core team members, focused on gameplay mechanics and functionality, providing crucial feedback. Beta Testers, drawn from our target audience, offered perspectives on playability, graphics, and educational components.

The testing process included Guided Gameplay, Feedback Collection through various mediums, and Bug Identification and Resolution. Iterative improvements were made based on recommendations, addressing concerns like boredom and level variety. Positive feedback on technical aspects was received, prompting adjustments for an enhanced user experience. Repeated iterations with tester-suggested changes have been instrumental in building a game that meets community needs and provides an invaluable gaming experience.

IV. RESULTS AND FINDINGS

The testing phase yielded valuable results and findings, providing insights into the performance and reception of our interactive recycling game.

A. Positive Technical Feedback

All testers expressed positive feedback regarding the game's technical aspects, particularly in terms of direction and fluidity of player movement. This indicates a successful implementation of the game engine and mechanics, contributing to a seamless gaming experience.

B. Player Engagement Challenges

While the technical aspects received praise, some players noted a potential challenge related to player engagement. A subset of testers reported feelings of boredom, suggesting a need for more diverse storylines within the gameplay to maintain interest throughout different levels.

C. Educational Component Evaluation

Testers from the target audience, especially students, provided positive feedback on the educational components integrated into the game. They found the recycling concepts and environmental awareness aspects to be informative and engaging.

V. CONCLUSIONS

The project's core objective is to address the significance of recycling and sustainable development through the creation of an interactive game. The identified problem stemmed from the static nature of existing recycling websites, prompting the development of an engaging game as a solution to effectively educate users about recycling practices.

The project's dual objectives involve the design and development of an interactive game for a better understanding of recycling concepts, coupled with an evaluation process to ensure a seamless user experience. The project scope encompasses topics such as the benefits of recycling and the steps involved in recycling materials. The intended audience comprises children aged 6 to 17 and adults aged 18 to 24 who are familiar with computer usage.

Desktop computers were selected as the specific platform for the game due to their widespread availability among students and households. The development will leverage Unity as the game engine, with programming in

C#, and various software tools, including Aseprite, Adobe Photoshop, and Adobe Illustrator, will be utilized to craft visually appealing game assets.

The project faces constraints, including the prerequisite for a good understanding of Unity and C#, potential glitches arising from limited development skills, and the effort required to create visually pleasing game assets. Limited access to paid software poses an additional challenge to the development process.

In essence, by creating an interactive game designed to effectively educate users about recycling, this project aspires to elevate awareness and advocate sustainable practices among students, children, and adults alike.

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