Project Report Document

ENSE 405

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Project Info

I am Nicolas Ansell, I am the sole member of my group, and my project is called Idle Recycle

Project sponsor & course facilitator

Dr. Tim Maciag (ENSE 405 professor)

Business need/opportunity

Idle games are known for their simple and fun mechanics, this presents an opportunity to merge these games with the educational aspects of recycling. There's a growing appetite for entertainment, and our project promises to fulfill this by helping educate players on how recycling effects our environment

Reflections on Project Planning

UN Sustainable Development Goals (SDGs) Selection

- Selected SDGs: The project "IdleRecycle" focused on the UN's SDG 12 - Responsible Consumption and Production.
- Reason for Selection: This goal was chosen as it aligns with the core mission of the game - to educate and motivate players on recycling and sustainable practices. Aswell as the importance of understanding all the impacts of recycling (good and bad) and instilling responsible habits among people, especially the younger generation.

Community Research and Requirements Gathering

- Key Findings: The target community is diverse in terms of technological savviness and gaming experience, ranging from beginners to advanced players. This necessitated a game design that was simple enough for newbies yet engaging for experienced players.
- Professional Opinion on Project Planning Processes: The processes, such as the Technology Configuration Inventory and Community Characteristics Orientation, were beneficial in understanding the community's needs and technological context, but in my opinion I found it rather difficult to apply some of them, like the ‘Drafting an Emerging Picture’ document. The process of the document felt like it didn’t really lend itself well to a project that was a game, and

many of the activities seemed like they were hard to fit the idea of a game into as there aren't really existing solutions to the problem as we I was just attempting to provide entertainment and education through a game.

North Star Customer

- Definition: The 'North Star' for IdleRecycle was identified as individuals with aninterest in learning about recycling. This was targeted due to their inherent motivation to engage with content that educates about sustainable practices.
- Importance in Project Context: These individuals represent a large segment of the game's targeted audience. They are not just players but active learners who are likely to appreciate the educational aspects of the game, making them more engaged and loyal users.
- Role in Game Development: This group influenced key design decisions, ensuring the game's content was not only informative but also accurate and relevant. Efforts were made to make the recycling processes depicted in the game as realistic as possible, including facts and information revolving around the negative information around recycling
- Engagement Strategies: Special features, such as in-depth recycling facts and real-world impact stats, were incorporated to cater to this group's thirst for knowledge. These elements were designed to reinforce the learning objectives while keeping the gameplay engaging.

Carryover Customers

- Definition: Carryover customers were identified as enthusiasts of idle games. This group's preferences and gaming habits were crucial in shaping the game's mechanics and user experience.
- Significance to the Project: These players bring essential initial traction and credibility to "IdleRecycle". Their early adoption and feedback would be beneficial in refining the gameplay loop and ensuring wider acceptance.
- Contribution to the Golden Circle: They form the core of the 'Golden Circle' due to their influence in the gaming community and their potential to act as ambassadors for the game. Their engagement and satisfaction with the game could lead to word-of-mouth promotion, an invaluable asset for new game launches.
- Customization for Engagement: Understanding that idle game players value continuous progress and minimalistic interaction, the game was designed to be easy to pick up but with layers of complexity and upgrades to maintain interest. The balance between an idle gaming experience and the incorporation of educational elements was designed to appeal to this audience.
- Feedback Integration: Regular updates and improvements would be planned based on the feedback from this group. As experienced gamers, their insights would particularly valuable in fine-tuning the mechanics within the game.

Assumptions

- Device Usage: The primary assumption was that the majority of players would access the game via mobile devices. This influenced many aspects of design and development, from the user interface to the control mechanisms.
- Gaming Familiarity: It was also assumed that players would have varying degrees of gaming experience. This ranged from beginners, who might be new to idle games, to advanced players familiar with more complex gaming mechanics. This assumption was taken into account in designing a game that was accessible and enjoyable for all skill levels.
- Technological Accessibility: Another assumption was that players would have access to a basic level of internet connectivity for downloading the game, though it wouldn't be required for continuous gameplay. This was important for ensuring the game's accessibility to a wider audience.
- Educational Interest: Additionally, it was presumed that players would have some interest in the theme of recycling. This assumption guided the integration of educational content in a way that would be appealing and not overwhelming for players.

Constraints

- Development Time: A significant constraint was the limited time window available for developing the game. This necessitated a streamlined development process and prioritization of features, focusing on core mechanics that could be executed effectively within the time frame.
- Simplicity vs. Engagement: Balancing the simplicity of the game with the need to make it fun and engaging was a challenging constraint. The game had to be straightforward enough for easy pickup and play, but also needed enough depth to retain player interest over time.
- Educational Content Integration: Incorporating educational elements about recycling without compromising the entertainment value of the game posed another constraint. The educational content had to be woven into the gameplay in a way that still informed the user but wasn’t disrupting the gaming experience.

Initial Technology Stack Selection

The project was designed around the core technology stack in the Godot game engine, this was for its robustness and suitability for creating mobile games but also because it was being used for my capstone project and this proved a good opportunity to get ahead in learning it. The initial MVP focused on establishing basic recycling collection mechanics, where players interact by clicking or tapping to collect recyclable items, where later MVPs focused on fulfilling the educational goals and more complex upgrade systems to keep the game engaging.

Drafted Prototypes

Designing The Initial MVP

The first prototype, as reported in the initial project status, included several key features:

- A basic menu system.
- Main level screen development.
- Implementation of a primary building for recycling collectors.
- System to spawn collectors and random generation of recyclables.
- Pathfinding for collectors to gather recyclables.

These components laid the groundwork for the gameplay loop, demonstrating the core mechanics of the game.

Evolution to Later MVPs

As the project progressed into its second sprint cycle, new features and improvements were added. The focus shifted towards enhancing user interface components, refining the upgrade system, and introducing educational elements. This included:

- Development of a shop UI window for upgrades.
- Dynamic systems for implementing new upgrades.
- Dialog boxes for worker instructions and gameplay guidance.
- Integration of a fact-display system to educate players on recycling.

The evolution of the technology stack was guided by the need to balance educational content with engaging gameplay, adhering to the project's aim under SDG 12

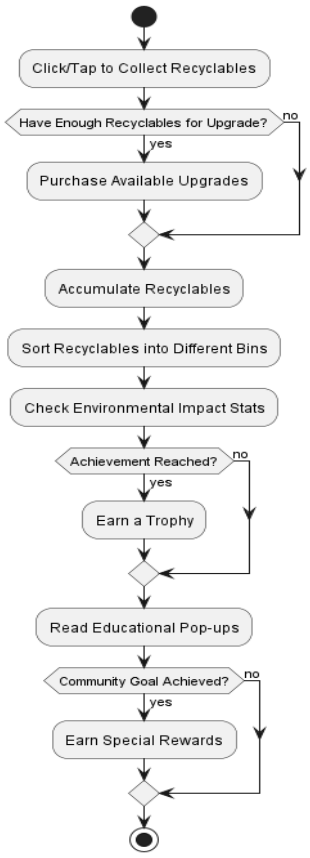
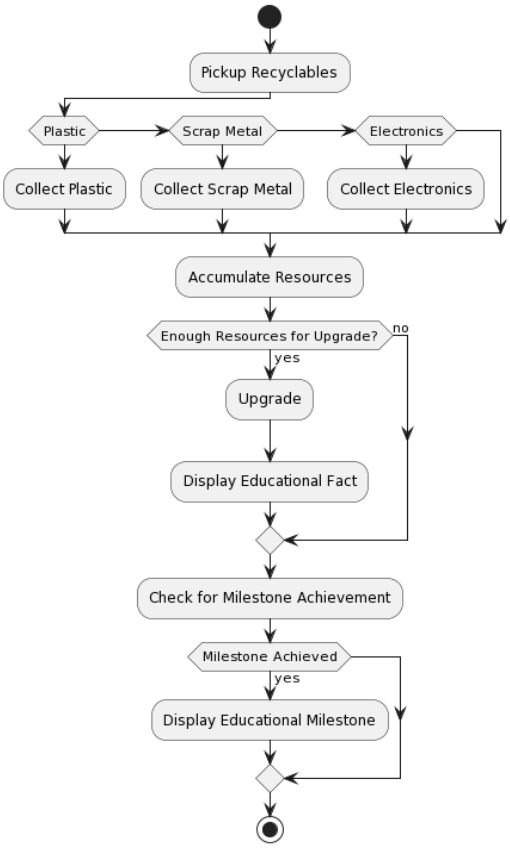
Initial MVPs

The MVPs evolved significantly over the project's course. The initial MVP focused on basic recycling collection and simple upgrades. The game allowed players to collect items serving as a currency for in-game upgrades, like increasing recyclables collected per click or setting automatic collection intervals.

As the project progressed, the MVP expanded to include:

- More sophisticated upgrade systems.
- Enhanced UI for better player engagement.
- Educational milestones that informed the user of what their collected recyclables could turn into in the real world
- More complex types of recycling and collector upgrades.

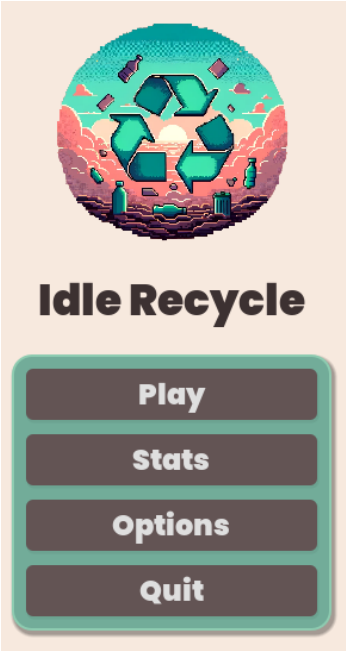
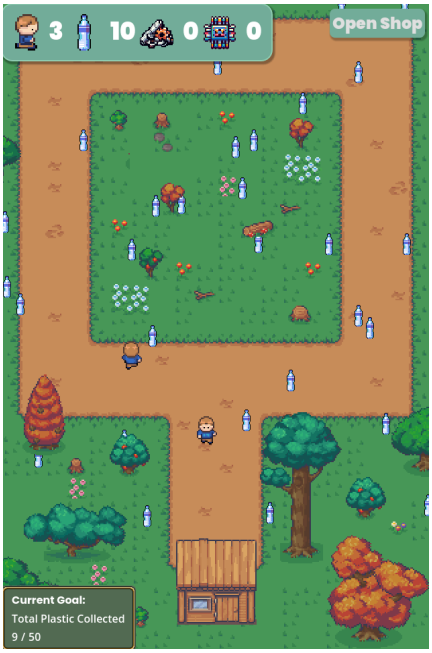
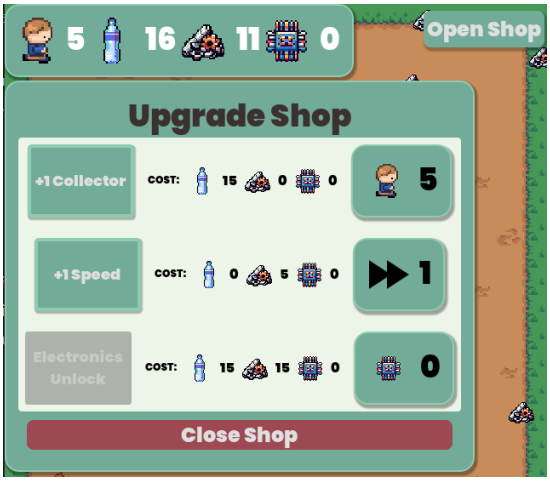
These MVPs demonstrated the project's growth from simple click-and-collect mechanics to a slightly more complex gaming experience that educates players about recycling processes and environmental impacts.

Initial Gameplay Loop Design (Redesigned)	Finalized Gameplay Loop
	

Reflections on Project Results

What Was Created

Throughout the project's development I create a simple mobile idle game called "Idle Recycle", focusing on the theme of recycling and environmental awareness. The game's core functionality allowed players to collect different types of recyclables, such as plastics, scrap metal, and electronics, which could be used to upgrade various aspects of the game's mechanics.

Main Menu Screen	Gameplay Screen
	
Upgrade Shop	**Educational Popups**
	

Initial Vision vs. Realized Product

Comparing the initial “Planning and initialization” video with the final product, there were several iterations and adaptations. Originally, the concept involved multiple types of buildings, sorting mechanics and a more complex statistics and stacking system. Over time, this evolved into a more streamlined gameplay loop focused on simple mechanics and non-intrusive educational facts sprinkled in. The game was designed to incorporate gamification and addressed information and disinformation design strategies from class lectures.

Software Design Activities and Findings

Design activities included user interface development, creating an upgrade system, and integrating educational content. The software design linked back to class lectures, notably the discussions on gamification, the importance of accurate information dissemination, and user engagement strategies. The game's educational component aligned with the concept of "Content Orientation" discussed in class, providing players with verified facts about recycling.

Upgrade System

Creating the upgrade system was a design activity that was needed to maintain game balance and progression, it was developed to provide players with a sense of achievement and growth, rewarding them for their engagement with both tangible in-game benefits and educational facts. This aimed to encourage players to learn about recycling while enjoying the game's progression mechanics, embodying the "learn through play" philosophy.

Integration of Educational Content

The integration of educational content was a cornerstone of the project, aligning closely with the UN's Sustainable Development Goal 12 (Responsible Consumption and Production). Information about recycling was built into the gameplay loop through facts displayed during the upgrade process and milestones achieved by the players. This approach was designed to provide players with bite-sized, digestible information, enhancing their learning experience without overwhelming them.

Link to Class Lectures

The design activities were deeply influenced by topics covered in class lectures. Gamification principles discussed by Dr. Jane McGonigal were particularly influential, underscoring the importance of fostering optimism and motivation through gameplay. This was evident in the game’s design, which aimed to inspire players to approach recycling with a sense of possibility and empowerment, rather than obligation. Also the class lectures on Content and Information/Disinformation Design & Strategy also informed the game's educational strategy. The game sought to combat misinformation by providing

players with accurate, researched facts about recycling. The current implementation is a preliminary one but further research would be done upon releasing this game to ensure the game's content was not only informative but also truthful, reflecting the lectures' emphasis on the quality and reliability of information in a digital age.

Findings

The design process revealed several insights:

- The effectiveness of gamification as a tool for education and engagement.
- The necessity of balancing educational content with gameplay to avoid player fatigue.
- The importance of UI clarity and simplicity for player retention and satisfaction.
- The verification of information in educational games to maintain credibility.

These findings have significant implications for the future development of educational games. They suggest that while games are an effective medium for learning, their design must be carefully calibrated to ensure educational objectives are met without compromising on entertainment value. The project's alignment with class discussions on gamification and information design in my mind shows a successful application of the class topics to the project.

Personal Experience with the Project

Likes:

- The challenge of integrating educational content with interactive gameplay.
- Learning and utilizing the Godot engine, which was a new technology stack.
- The iterative design process that allowed for continuous improvement of the MVP.

Dislikes:

- The time constraints which limited the depth of features that could be developed.
- Initial difficulties in balancing the educational and entertainment aspects of the game.
- Having capstone prep at the same time made me want to focus less on this project.

What Went Well:

- Successfully creating a fun and educational game that aligns with SDG 12.
- Developing a functioning upgrade system and integrating educational pop-ups.
- Integrating a milestone system to provide a second medium for delivering education

What Did Not Go Well:

- Encountering setbacks in the implementation process due to lack of knowledge of the Godot engine.
- The game's lack of depth, meaning the game will get boring after all the upgrades are completed

For Future Projects:

- Maintain the agile development approach to allow for flexibility and iteration.
- Invest more time in the initial planning phase but also plan over a better time frame if its my own project so I have just as much planning time as I do development time.

Would Do Differently:

- Expand the scope of recycling topics to include more diverse educational content.
- Explore more advanced features that could cater to different player skill levels.
- Add another delivery method of education other than facts, maybe different recycling methods that reflect real world recycling methods (as suggested by Eric in project presentation feedback)

Opportunities and Design Ideas for Future Work

Future work could include integrating a broader range of recyclable materials and expanding the educational aspects to cover more Sustainable Development Goals. There's an opportunity to develop community features such as leaderboards and collective challenges to enhance player engagement. Additionally, considering player feedback, there could be more personalized educational pathways and more detailed progress tracking to illustrate individual impact on the environment. There is a lot of room for complexity to be added within the upgrade system which could essentially be infinitely expanded upon to retain players for longer.

General Reflections on the Class & Project Experience

Awareness of the UN SDGs

Before taking ENSE 405, were you aware of the UN SDGs?

No, I wasn't directly aware with the UN SDGs I knew that the UN had something to this effect but no knowledge the details or what specific things it promised to fulfill

Engineering Software Solutions and UN SDGs

Typically, before taking this class, when you engineered software solutions, were you concerned with areas encompassing the UN SDGs?

No, I wasn't specifically aware of the UN SDGs before doing this so I hadn't brought them into my design process but one project that could have taken into consideration some of SDGs was my TeaStir project where i created a system to recommend teas to people based off of their interests gathered through a survey, I think i could have also Implemented SDG 12 to this project by instead shifting the focus from predicting the users likes and interests and instead fiding sustainably sources alternatives for flavours of teas they like, so you can search for an ethically sources tea alternative as a lot of the current practices for tea farming are unethical.

Understanding the Role and Responsibility as an Engineer

Did learning about the UN SDG(s) help you understand better your role and responsibility as an engineer to society?

Yes, I think a class like this greatly helps change my perspective on what it means to be an engineer, but I don't think that everything needs to encompass these goals. What I will say is that when I design something in the future they will be something that I look at after the early initialization and planning session to see if the general idea of what I want to create can be expanded upon to better incorporate one of the UN SDGs as I think its a great thing to look at as these goals were made 'by the people, for the people' and are essential to fostering the creation of a digital habitat.

Experience in Engineering Software Solutions

What was your experience(s) in engineering your specific software solution to address the UN SDG(s) selected?

I think my experience was decent although my perspective I feel is slightly tainted by the timing I am taking this class, I forced my project idea to be a game because I felt the necessity to take this class as an opportunity to learn godot for my Capstone. This lead to sometimes what felt like forcing a square peg into a round hole, this doesn't mean I didn't enjoy making the game and I still feel like the end product

fulfilled what the class set out to teach. In the future I think something other than a game might have been a better option if I didn't have this personal constraint though.

Perspectives on the UN SDGs

As a future engineer, what are your thoughts on the UN SDGs as a whole? Do you think they can help or hinder our work as software engineers?

I feel asthough they helped, these are goals that were made in collaboration with everyone, they are universal goals that people feel we should strive for and if we design software that pushes to achieve these goals then I don't see why that could ever be a bad thing. This doesn't necessitate that we always use UN SDGs as the base constraint and goal of our projects but it is always something that should be considered and we should atleast evaluate if we can integrate them into our design.

Guidance of UN SDGs vs. Customer Requests

Should we use the UN SDGs to guide our work or is our work dependent on customer requests, regardless of the UN SDGs?

We should let the SDGs guide our work if its applicable unless it contradicts directly with what the customer wants (unless of course the customers request are unethical), we shouldn't always attempt to force these goals but I think the mindset they invoke is can often be beneficial to creating better software, so if a solution we suggest can incorporate what the customer wants and also benefit the UN SDGs then I don't see why we shouldn't

Future Application of UN SDGs in Engineering

Will you use your understanding of the UN SDGs in engineering solutions in the future?

Like I said, if the solution calls for something that can be slightly expanded to incorporate these solutions without degrading the quality of the solution, then we should strive to complete these goals, and I think I will definitely use my understanding of them in the future if the project calls for that.

Influence of UN SDGs on Career Path Decisions

Will your experience learning about the UN SDGs inform your career path decisions in the future?

I don't think I will pick a job specifically because it is solving a particular SDG but I think it could be a contributing factor for sure if im deciding between two places, that being said I think if a company is going against the goals and creating something that is harmful to its users then I most definitely would not work there. I think my education from this class has expanded what I might research when considering ethical and unethical practices of a company I am applying to work at.

Additional Comments on the Project

I think that the content of this class is great and what it's trying to accomplish is very important to the education of a successful software engineer. What I don't necessarily agree with is the structure of the content.

I think this class would be much better suited to be merged with one of your other classes and then split into two. How I imagine it is you have the first class "People Centered Learning, Design, and Collaboration." This class purely focuses on the content aspects. We have learning activities and assignments where we use the initialization documents and techniques taught in the lectures in fictitious scenarios or come up with ideas.

The KEY here is that we don't have an actual project but we spend the whole semester learning and cementing the key concepts and ideas that are taught to us through the vlog style exams and maybe blog style assignments that fulfill these scenarios.

Now for the second class "Implementation People Centered Learning, Design, and Collaboration," where the main focus of the class is the implementation. We start right away with our idea and have scrums every 2nd week — basically this class, but we cut out the lecture content and instead, we have more sessions planning and doing development work on our projects. We get more time for personal feedback from you and maybe we could even split it up so we have more personal 30-minute sessions where we get feedback with you 1 on 1 (maybe this could be a 2 person project) and let us pick our groups for the projects.

You always say in industry you can't pick who you work with, but I very much beg to differ in this regard. When I interview for a company, I get to talk to the people I'm working for and after the first couple of weeks or months, if I dislike the people and how they operate, then I am not staying in a miserable position. I would talk to my friends and people I know who work at other companies and find a work environment that is healthy and enjoyable, where my coworkers are people I respect and trust to get their work done.

Overall, I enjoyed the class Tim. I respect what you do for the University as a professor and the way you are pushing forward a new method of education into a very outdated system. I wish I could've taken this class in a semester where I wasn't so burnt out and tired of school, but next semester is a lot more relaxed and I'm excited to push forward on capstone and create something awesome!