



RAISE: Rasing environmental knowledge & awareness through an innovative virtual environment



Del-04-PR4: The Learning Environment

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Contents

Executive Summary.....	6
List of abbreviations.....	8
List of figures.....	9
1. Introduction.....	12
1.1 Current state of the Learning Environment.....	13
2. Game Mechanics Guideline.....	15
2.1 Interaction between Non-player characters and players.....	16
2.2 NPCs responses.....	16
2.3 Limitations of NPCs responses.....	17
2.4 Interaction between the player and the virtual environment.....	18
2.5 Environment responses.....	18
2.6 Trophy Room.....	18
2.7 Language selection room.....	19
2.8 Scenario selection room.....	20
2.8 A few more things to consider when writing a scenario.....	21
3. Alpha Version.....	22
3.1 Tutorial Room.....	23
3.2 Scenario 1 – Green Champions.....	25
3.3 Scenario 2 – Walk in the forest.....	27
3.4 Scenario 3 – Lost in Waste.....	32
3.5 Scenario 4 – Polluting Factory.....	38
3.6 Scenario 5 – Carbon Champions.....	43
3.7 Scenario 6 – Visiting Green Town.....	49
3.8 Scenario 7 – Eco-Farm explorer.....	54
3.9 Scenario 8 – Wind Turbine Challenge.....	58
3.10 Scenario 9 – Water treasure.....	63
3.11 Scenario 10 – House-Eco Explorer.....	65
4. Beta Version.....	70





4.1 Version Changes.....	70
4.2 Tutorial Room.....	71
4.3 Scenario 1.....	71
4.4 Scenario 2.....	71
4.5 Scenario 3.....	71
4.5 Scenario 4.....	72
4.6 Scenario 5.....	72
4.7 Scenario 6.....	72
4.8 Scenario 7.....	72
4.9 Scenario 8.....	73
4.10 Scenario 9.....	73
4.11 Scenario 10.....	73
5. Final Version.....	74
5.1 Detailed Description of the Changes.....	75
6. Appendix 1 – Feedback Forms.....	83
6.1 Scenario 1.....	83
6.2 Scenario 2.....	86
6.3 Scenario 3.....	88
6.4 Scenario 4.....	92
6.5 Scenario 5.....	96
6.6 Scenario 6.....	100
6.7 Scenario 7.....	102
6.8 Scenario 8.....	105
6.9 Scenario 9.....	109
6.10 Scenario 10.....	112





Executive Summary

Deliverable 4 involves the design and development of a customizable 3D Virtual World Learning Environment (VWLE). An iterative development is used, with 3 important milestones: Delivery of the Alpha Version (M11), the Beta Version (M17) and the Final Version (M22). Development is done by UPatras, guided by ISMAI (incorporation of content regarding raising environmental awareness and promoting sustainability), and monitored by all the partners that supported the scenario development (AEDAS, Arsakeio and Manin). UPatras leads the functional testing of the environment.

Versions of the document and explanation for the changes:

- Version 0.1 created on 28/04/2023. This is an initial version of the design of the learning environment based on the proposal and the discussion that took place at the kick-off meeting.
- Version 0.2 created on 22/06/2023. This version incorporates the initial versions of scenarios 1 and 2. Version v0.2 was reviewed by all partners.
- Version 0.3 created on 23/06/2023. This version suggestions made by the partners on version v0.2 and includes the final version of scenario 1 and the tutorial room.
- Version 0.4 created on 14/07/2023. This version was created for the added scenarios 3 and 4.
- Version 0.5 created on 26/07/2023. This version was created for the added scenarios 5 and 6.
- Version 0.6 created on 03/08/2023. This version was created after Marta Mora peer review assessment.
- Version 0.7 created on 11/08/2023. This version was created for the added scenarios 7 and 8.
- Version 0.8 created on 23/08/2023. This version was created for the added scenario 9.
- Version 0.9 created on 01/09/2023. This version was created for the added scenario 10.
- Version 0.10 created on 29/09/2023. This version was created after the revision made by partners during the TPM event held in Porto, Portugal and the peer review by Nikos Giannakopoulos.
- Version 0.11 created on 30/10/2023. This version incorporates suggestions made by the partners and includes the initial version of all 10 scenarios and the tutorial room.
- Version 1.0 created on 29/11/2023. This version incorporates the feedback on the alpha version.





- Version 1.1 created on 05/04/2024. This version incorporates all changes and suggestions made by partners and the UPatras evaluation team during the alpha version testing and resulted in the beta version finalization.
- Version 1.2 created on 01/10/2024. This version incorporates all changes and suggestion made by partners during the best version implementation phase, which was the first time the virtual world was tested extensively with 227 students in total.

The 3D VWLE will be continuously updated until the final version on M22.





List of abbreviations

3DVWLE	3-Dimensional Virtual World Learning Environment
UPAT	University of Patras
ISMAI	University of Maia
UPatras	University of Patras (Greece)
AEDAS	Agrupamento de Escolas D. Afonso Sanches (Portugal)
Manin	Liceo Gimnasio Statale Daniele Manin
PR	Project Results
PM	Project Management





List of figures

Figure 1: Overview of the final version of the RAISE virtual world.....	13
Figure 2: Another view of the current state of the RAISE 3D Virtual World.....	13
Figure 3: The player initiates a dialogue with an NPC, on the top right we can see the dialogue options.....	16
Figure 4: The player is reading a notecard with selecting language instructions.....	18
Figure 5: Trophy room where user can see which scenarios he has completed.....	19
Figure 6: Language Selection Room.....	20
Figure 7: Overview of Scenario Selection Room.....	21
Figure 8: Tutorial Scenario building.....	23
Figure 9: Tutorial contains information about basic functionalities of the RAISE Virtual World...	23
Figure 10: Notecard if you click a tutorial panel.....	24
Figure 11: Green Champions scenario overview.....	25
Figure 12: User interacts with the Teacher.....	26
Figure 13: User corresponds the trash to the recycling hoops.....	26
Figure 14: The trash is showing up at the hoops if aligned correctly.....	27
Figure 15: Congratulations message.....	27
Figure 16: Overview of Walk in the Forest scenario.....	28
Figure 17: Initial view of the scenario.....	29
Figure 18: The player is interacting with the NPC progressing the narrative of the scenario.....	29
Figure 19: After the dialogue with the NPC the user should proceed completing the image correspondence minigame.....	30
Figure 20: The user receives educational material pictures.....	30
Figure 21: The user proceeds to the narrative by talking to the shepherd.....	31
Figure 22: Overview of Lost in Waste.....	33
Figure 23: Initial view of the scenario when the user is entering the scenario.....	33
Figure 24: The user is interacting with the technical manager by solving a quiz.....	34
Figure 25: Educational material about the dumping of trash.....	34
Figure 26: Minigame depending the sorting ways.....	35
Figure 27: Educational material concerning the waste composting.....	35
Figure 28: Educational material throughout the scenario narrative concerning the dumping of waste into the ocean.....	36
Figure 29: Minigame on the sorting of waste into composting compounds.....	36
Figure 30: End game scenario where the engineer talks with manager.....	37
Figure 31: Polluting Factory overview.....	39
Figure 32: Initial view of the Polluting Factory.....	39
Figure 33: Educational material concerning the environmental polluting from the factory.....	40
Figure 34: The user is interacting with the Factory Worker.....	40





Figure 35: The user has entered the Factory Owner room to discuss with him the environmental impact of his factory.....	41
Figure 36: Police Officer has arrived to settle the discussion.....	41
Figure 37: Educational material concerning the environmental pollution.....	42
Figure 38: The user has to solve the minigame to give instructions to the factory owner.....	42
Figure 39: Carbon Champions Overview.....	44
Figure 40: The user is interacting with the NPC to proceed to the narrative of the scenario.....	44
Figure 41: The user selects which breakfast item he usually have.....	45
Figure 42: The user gets instructions on how to play the breakfast minigame.....	45
Figure 43: The user has selected the breakfast items and he can see the carbon footprint of those items.....	46
Figure 44: After the end of this minigame the board remains to signalize the carbon footprint of user everyday actions.....	46
Figure 45: The user selects a way to cool down and see his/her carbon footprint by choosing this way.....	47
Figure 46: The user selects a way to get harmer and sees his/her carbon footprint by choosing this way.....	47
Figure 47: At the end of the scenario the user gets an educational material.....	48
Figure 48: Visiting Green Town Overview.....	50
Figure 49: The user initiates the dialog with the NPC.....	50
Figure 50: The user gets educational material about the solar panel electricity system.....	51
Figure 51: The user solves a quiz to progress to the scenario narrative.....	51
Figure 52: The user solves another quiz concerning the prons and cons of electric buses.....	52
Figure 53: The user solves a word filling mingame about cycle parks.....	52
Figure 54: The user corresponds the tree images to the tree words.....	53
Figure 55: The user earns a trophy for completing the scenario.....	53
Figure 56: Overview of the Eco-Farm Explorer.....	54
Figure 57: Initial conversation with NPC.....	55
Figure 58: Minigame quiz after the conversation with the NPC.....	55
Figure 59: Minigame identifying the different species of bees.....	56
Figure 60: Educational material concerning the Biogas Plant.....	56
Figure 61: Quiz for the animal farm.....	57
Figure 62: Wind Turbine Station Overview.....	59
Figure 63: Wind Farm Overview.....	59
Figure 64: Overview of the Wind Farm Station Control Room.....	60
Figure 65: Snip of the Wind Farm Manager of the Wind Farm Station.....	61
Figure 66: Quiz canvas of the Wind Farm Scenario.....	62
Figure 67: Overview of the wind farm.....	62
Figure 68: Initiation of dialogue at Water treasure scenario.....	63





Figure 69: Overview of the Water Treasure scenario.....	64
Figure 70: Overview of the Water Treasure scenario.....	64
Figure 71: House-Eco Explorer Overview.....	65
Figure 72: Educational Material from the House Eco Explorer Scenario.....	66
Figure 73: Reset Game button for House Eco Explorer Scenario.....	66
Figure 74: Snip of the House Eco Explorer scenery.....	67
Figure 75: Yard of House Eco-Explorer House.....	67
Figure 76: Inside House Eco-Explorer House inside you can locate educational material.....	68
Figure 77: Overview of the inside house of House Eco-Explorer.....	68
Figure 78: Overview of the House Eco-Explorer.....	69
Figure 79: Addition of decoration object in the RAISE virtual world learning environment.....	76
Figure 80: Addition of decoration object in the RAISE virtual world learning environment.....	77
Figure 81: Addition of information box when someone clicks it then he get a fun fact about the environment.....	78
Figure 82: Overview of the RAISE virtual world after the changes proposed in the beta version.	78
Figure 83: Correction of Anaerobic description.....	79
Figure 84: Addition of a fun fact with option is clicked in the bee minigame of Eco-Farm explorer minigame.....	80
Figure 85: Addition of a fun fact with option is clicked in the bee minigame of Eco-Farm explorer minigame.....	80
Figure 86: Correction of quiz at Water treasure minigame.....	81
Figure 87: Correction of bug when user clicks the Italian language as his preferred language....	81
Figure 88: Correction of bug when user clicks the Italian language as his preferred language....	82
Figure 89: Correction of Green SuperHero quiz minigame.....	82





1. Introduction

The PR4 objective is to design and develop a 3D VWLE using the potential of a gamification-based approach in which school students could engage in environmental activities that will help them raise their environmental awareness and be better prepared for the future world. This is an innovative approach towards raising environmental awareness which is becoming a major challenge for the future society.

The 3D VWLE is a multidisciplinary and friendly gamified learning environment, allowing the technically non-expert users to deal easily with the in-world gamified learning activities about environment. The environment will be used within the framework of RAISE project and it will be open to the community, allowing students from any school to use it (either to play the games, or participate to the development of the virtual world), aiming for a high impact for the community.

The 3D VWLE that has been developed for the RAISE project offers users an environment characterized by gaming features. The special characteristics and distinct possibilities of the 3D Virtual Worlds make them a powerful technological tool towards enhancing the learning experience. This is one of the main reasons for the selection of a 3D VW platform for the development of the advanced, interactive, and motivating tool for the RAISE project t, as teaching and training applications in 3D Virtual Worlds seem to offer remarkable benefits to the students. 3D Virtual Worlds are ideally placed to support pedagogies that aim at moving away from chalk-and-talk learning and focus on more real-world learning styles such as learning through action, cooperation, gaming, problem-solving, etc.

A key goal of utilising a virtual environment that involves students in simulated scenarios, especially those designed to face environmental challenges, is to achieve a deep level of immersion. Without such immersion, students might not experience the intended learning outcomes, thereby diminishing the realistic aspect of the simulation.

The project's Virtual World Learning Environment (VWLE) prioritizes three critical elements to deepen immersion:

- The customisation of avatars by users, allowing them to design and modify these digital personas according to their personal tastes.
- The environment should support the existence and interaction of multiple users within the virtual space, facilitating social interactions in these digital settings.
- The virtual world's technical features must be top-notch; it should offer a convincing emulation of real-world experiences and visually appealing graphics, as far as current technology permits





1.1 Current state of the Learning Environment

As of the drafting of this report, we find ourselves in the Final version of the Virtual World 22th month of the project's duration. By the 11th month, we had unveiled the alpha version of the 3D VWLE, which featured all scenarios plus a tutorial room in the English language. Presently, in month 16, our efforts continue with the refinement according to the Alpha Version test that was done in M11 at Arsakeia schools with the use of the HCI lab equipment at 25 students. Currently, all scenarios are available exclusively in English, Italian, Greek and Portuguese. Figures 1 and 2 offer a visual summary of the 3D VWLE's progress to date.



Figure 1: Overview of the final version of the RAISE virtual world



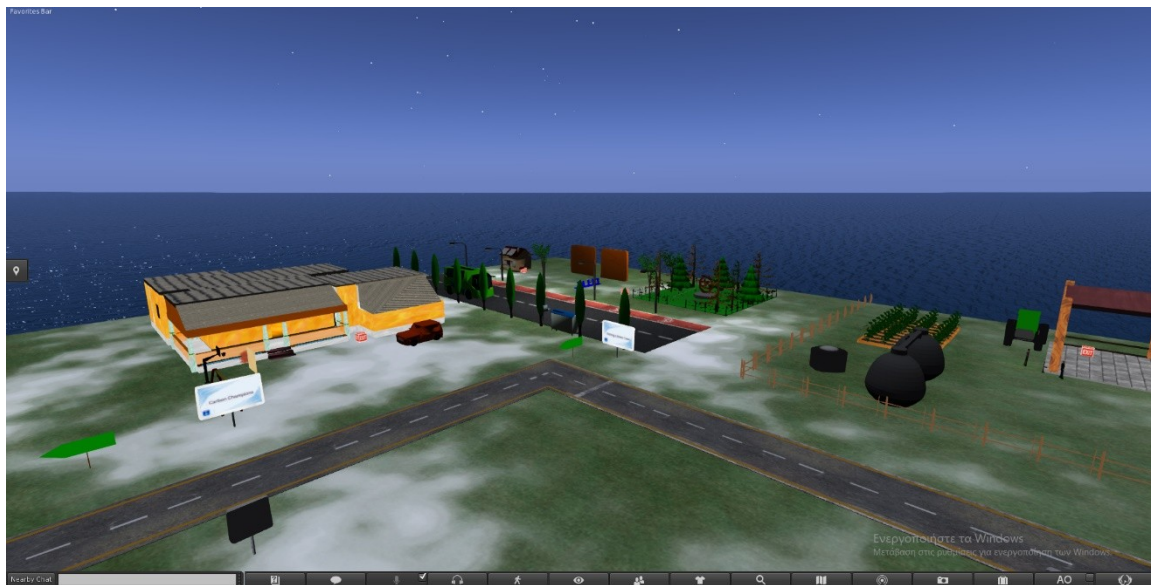


Figure 2: Another view of the current state of the RAISE 3D Virtual World



2. Game Mechanics Guideline

In the project's initial phase, the collaborators concluded that creating specific documentation was crucial for optimising the 3D VWLE's capabilities. This documentation, devised to guide the development of scenarios within the RAISE 3D VWLE, outlines the potential functionalities and serves as a directive for integrating various features. To achieve this, UPatras, with support from all partners, compiled a comprehensive guideline on game mechanics. This guide includes details on how users interact with the environment, the game mechanics that can be integrated into scenarios, any technical constraints, and the distinctive features uniquely designed for the RAISE project. Subsequent sections offer an in-depth overview of this game mechanics guideline. In pursuit of the RAISE project's objectives, the team decided to introduce some novel features into the 3D VWLE to better meet these goals. These innovative features are detailed in sections 2.6.

Initially, the guideline featured only a few images due to some innovations being conceptual rather than fully realised. However, this document now presents the final guideline version, enriched with images showcasing the completed features.



2.1 Interaction between Non-player characters and players

Players have the ability to engage with non-player characters (NPCs) by clicking on them. Following this action, a conversation box pops up, presenting various choices or responses for the player to select (as shown in Figure 3, in the top right corner). Choosing one of these responses advances the dialogue.



Figure 3: The player initiates a dialogue with an NPC, on the top right we can see the dialogue options

2.2 NPCs responses

PCs can respond to a click or a dialogue option by:

- Displaying a new dialogue
- Playing a specific sound
- Giving a notecard
- Changing their position (see limitations on 2.3)
- Performing an animation (see limitations on 2.3) or a combination of the above.



2.3 Limitations of NPCs responses

Technical constraints necessitate consideration of the following limitations in scenario creation:

- Dialogue screens can accommodate up to 256 characters of text (as seen in Figure 3, top right corner). This restriction is specific to the Greek language yet adopting it universally across all languages is advisable to ensure a uniform experience.
- The duration of sounds should not exceed 10 seconds. Sounds originate from objects, such as an NPC, and their loudness diminishes as the player distances themselves from the source.
- Notecards function similarly to tangible letters held in the player's inventory (illustrated in Figure 4). They can comprise multiple pages of text and are suited for delivering educational content, although lengthy texts are discouraged.
- While NPCs are capable of changing their location, it's advised to minimize their movements due to technical limitations. NPCs can move within the same building but not to different buildings associated with other scenarios. Their movement around obstacles can be problematic, and they are not designed to follow the player. Instead, their movements are pre-set (e.g., moving to point x, then to point y, and so on).
- NPCs are capable of performing animations, though the selection is limited, and it's suggested to use as few animations as necessary because of technical constraints. NPCs are unable to execute more than one animation at a time; thus, actions such as sitting and waving must be treated as separate animations. During an NPC's animation, interaction through dialogue with the player is temporarily halted, meaning players cannot engage with the NPC until the animation concludes. Moreover, NPCs are restricted from moving and animating at the same time.



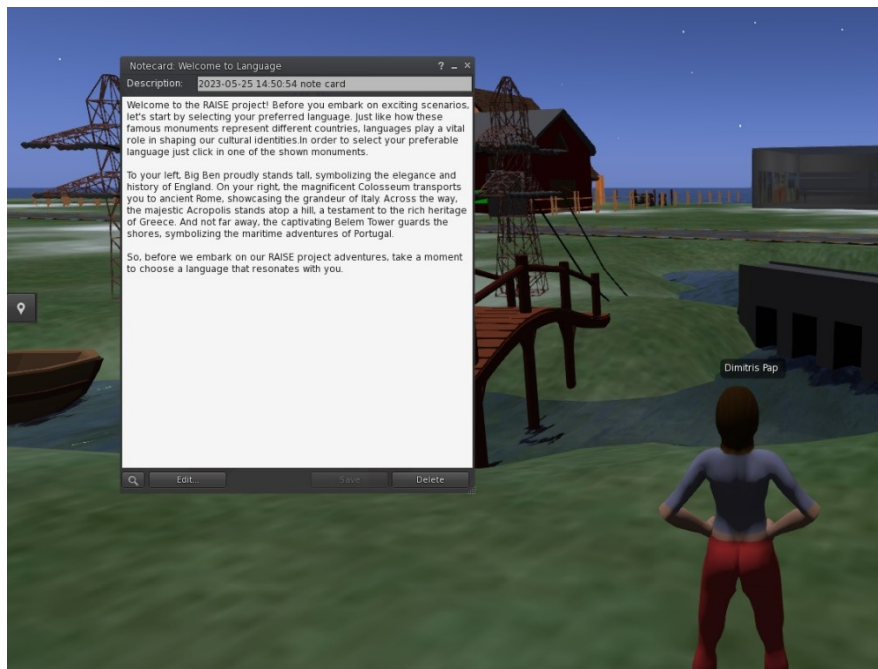


Figure 4: The player is reading a notecard with selecting language instructions

2.4 Interaction between the player and the virtual environment

Players can start an interaction with the environment by:

- Clicking on an object
- Passing by a certain place (e.g. through a door)

2.5 Environment responses

The environment can respond in the following ways:

- Displaying a dialogue
- Playing a specific sound
- Giving a notecard

The same limitations as NPC's responses apply.

2.6 Trophy Room

In our virtual world platform, we've introduced a distinctive feature that significantly enhances user engagement and motivation: a trophy room. This space serves as a tangible testament to the achievements and progress of our users. Each time a user successfully completes a scenario, they are awarded a trophy, symbolizing their accomplishment in that specific scenario. The inclusion of a trophy room is not merely a decorative choice; it is rooted in our understanding of intrinsic motivation and the value of recognition. Psychologically, the act of receiving a trophy



acts as a powerful motivator, encouraging users to engage more deeply with the content and strive for completion. It taps into the fundamental human desire for achievement and acknowledgment, transforming the virtual experience into a more rewarding and personal journey.

Furthermore, the trophy room serves as a visual representation of progress, offering users a clear overview of their achievements and the scenarios they have yet to explore. This not only motivates them to return and tackle new challenges but also fosters a sense of accomplishment and growth. In a world where digital experiences can often feel transient and ephemeral, the trophy room provides a lasting record of the user's journey and achievements.

Moreover, the trophy room encourages a sense of community and competition among users. By sharing their trophies and progress, users can inspire and motivate each other, creating a vibrant and supportive community. This social aspect of the trophy room adds another layer of engagement, encouraging users to not only advance their own progress but also to support and celebrate the achievements of their peers. In essence, the trophy room is a vital component of our virtual world platform, designed to motivate, recognize, and celebrate the achievements of our users. It embodies our commitment to creating a rewarding and enriching virtual experience, where every achievement is acknowledged and every user's progress is celebrated.



Figure 5: Trophy room where user can see which scenarios he has completed



2.7 Language selection room

In our virtual world platform, selecting a language for navigating the scenarios has been designed to be an immersive and culturally enriching experience. Users are presented with a visually captivating selection screen, where they can choose their preferred language by interacting with iconic monuments representative of each available language. To select Greek, users click on the majestic Akropolis, a symbol of ancient civilization and architectural marvel. For Italian, the leaning tower of Pisa stands tall, inviting users with its unique tilt and historical significance. English speakers are directed to select the iconic Big Ben, the emblematic clock tower known worldwide as a symbol of London and British culture. Lastly, for Portuguese, the Belem Tower beckons, a monument to Portugal's Age of Discoveries and a guardian at the mouth of the Lisbon harbor. This method not only makes the process of language selection intuitive and engaging but also pays homage to the rich cultural heritage associated with each language, setting the stage for the educational and immersive experiences that lie ahead.



Figure 6: Language Selection Room

2.8 Scenario selection room

We've added a Scenario Selection Room to the virtual world. It allows users to choose from various scenarios for learning or gameplay. This feature streamlines the process of finding and engaging with content, making the virtual experience more efficient and user-focused.



Figure 7: Overview of Scenario Selection Room

2.8 A few more things to consider when writing a scenario

In crafting a scenario, developers are required to integrate the previously discussed features and account for the inherent technical constraints of the platform. This entails meticulously planning out the outcomes of player-NPC interactions, detailing the consequences of each player action. For instance, selecting the second dialogue option should trigger both a new message and a specific sound effect, while choosing the third option prompts the NPC to move.





3. Alpha Version

The initial phase in launching the Alpha version of the 3D Virtual World Learning Environment (VWLE) involved crafting a multiuser 3D immersive virtual world designed to mimic real-life curriculum activities to raise environmental awareness of young learners. This virtual world was constructed based on the specifications outlined in the Scenarios deliverables, where it encapsulates the scenarios into the learning platform. It features a comprehensive setup with buildings, avatars, non-player characters (NPCs), interactive elements, multimedia educational resources about environmental problems, informational boards detailing user instructions, and various landscapes. All interactions within this world are facilitated by custom scripts developed specifically for the RAISE project, ensuring the virtual world aligns with the learning goals, scenario-based specifications, and educational frameworks considered during the planning stage.

To support the partners in utilising the alpha version of the 3D Virtual World Learning Environment, a detailed manual covering viewer installation and controls was compiled and made accessible in the relevant documents section. This manual is subject to updates throughout the duration of the project to accommodate any necessary changes. Upon public release of the environment, an updated manual will be available for end-users, guiding them through the use of the platform.

Adhering to an iterative development approach, the process starts with creating an initial scenario version, followed by exhaustive testing by partners. Feedback received during these tests is then integrated into subsequent versions of the scenario, enhancing and refining the learning experience progressively.

The scenario sequence begins with number 1 followed by the next scenarios, and so on. The scenarios crafted for the alpha version of the 3D Virtual World Learning Environment include:



3.1 Tutorial Room

The objective of this scenario is to design an introductory experience where players familiarize themselves with the environment, making it the initial scenario encountered by newcomers to the 3D Virtual World Learning Environment. Here, we showcase screenshots from within the game to illustrate this scenario:

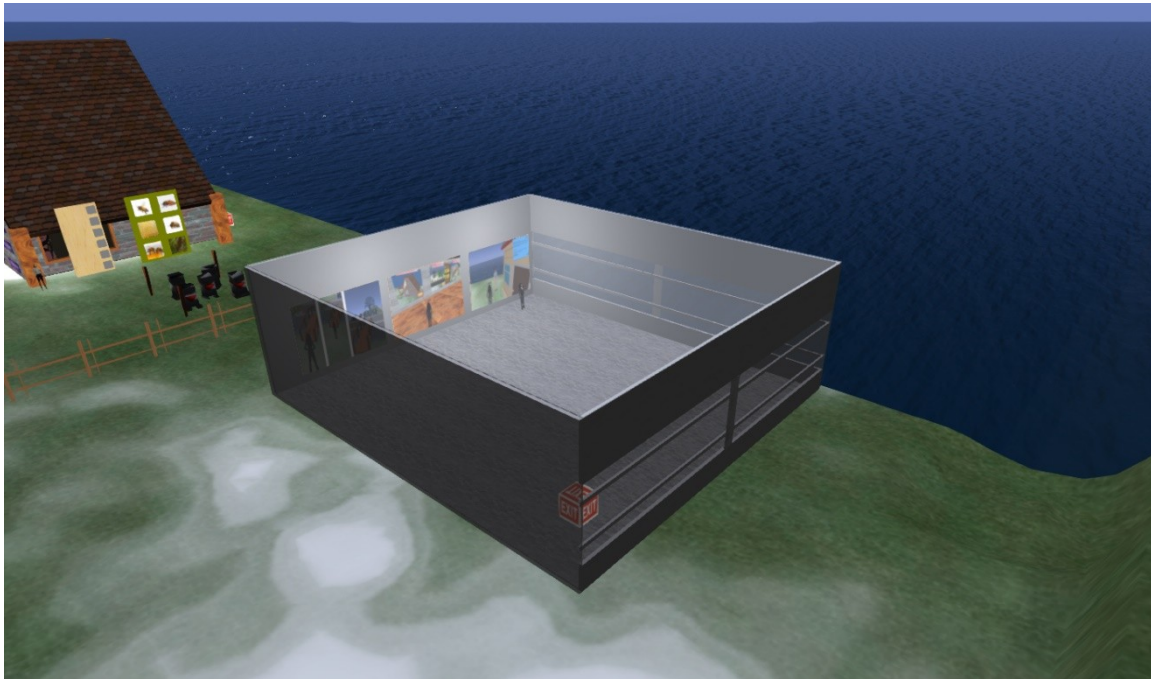


Figure 8: Tutorial Scenario building



Figure 9: Tutorial contains information about basic functionalities of the RAISE Virtual World

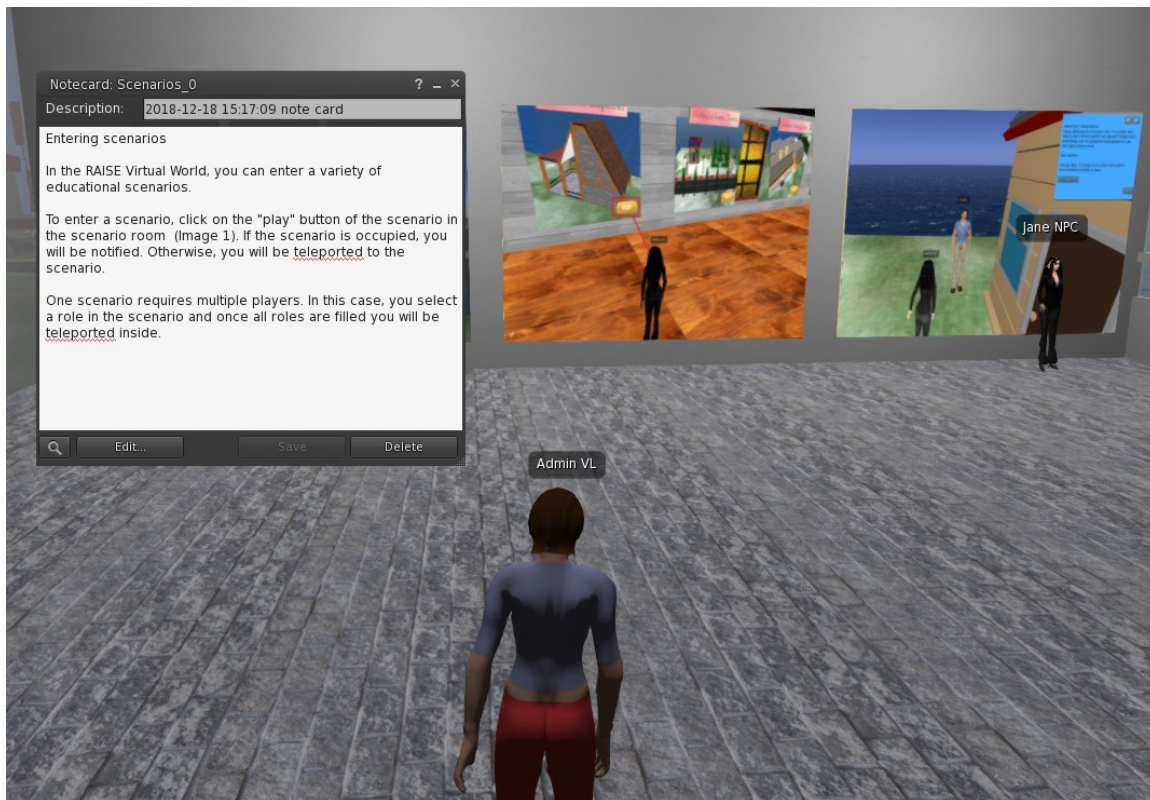


Figure 10: Notecard if you click a tutorial panel





3.2 Scenario 1 – Green Champions

The "Green Champions" scenario is set in a school environment immediately following a student party, where the aftermath has left the sports facilities cluttered with waste. As students gather for a Physical Education (PE) lesson, they find the area too littered for play. Seizing the educational opportunity, the PE teacher initiates a game designed to teach students the vital skills of waste segregation and recycling, aligning with the educational aim to promote awareness around reducing consumption of heavily packaged products. In this scenario, students learn to correctly identify and segregate waste according to the European Union directive, choosing the appropriate recycling bin—green, blue, yellow, or brown—for each item. The setting transforms the school's basketball field into an interactive learning arena, where waste items need to be sorted into corresponding-coloured hoops as a metaphor for recycling bins. This innovative approach not only engages students in a physically active cleanup but also imparts crucial environmental education, emphasizing the importance of recycling and waste reduction.

Characters include the student/player, tasked with cleaning the sports field, and the PE teacher. The game mechanics are ingeniously designed to combine physical activity with learning, using a timer, success messages, and educational pop-ups to enhance the experience. Incorrectly sorted items trigger additional educational content, further enriching the student's understanding of recycling. Through this immersive experience, students not only clean up the virtual environment but also internalize valuable lessons on environmental stewardship, making "Green Champions" a pioneering scenario in the realm of educational gaming.



Figure 11: Green Champions scenario overview





Figure 12: User interacts with the Teacher

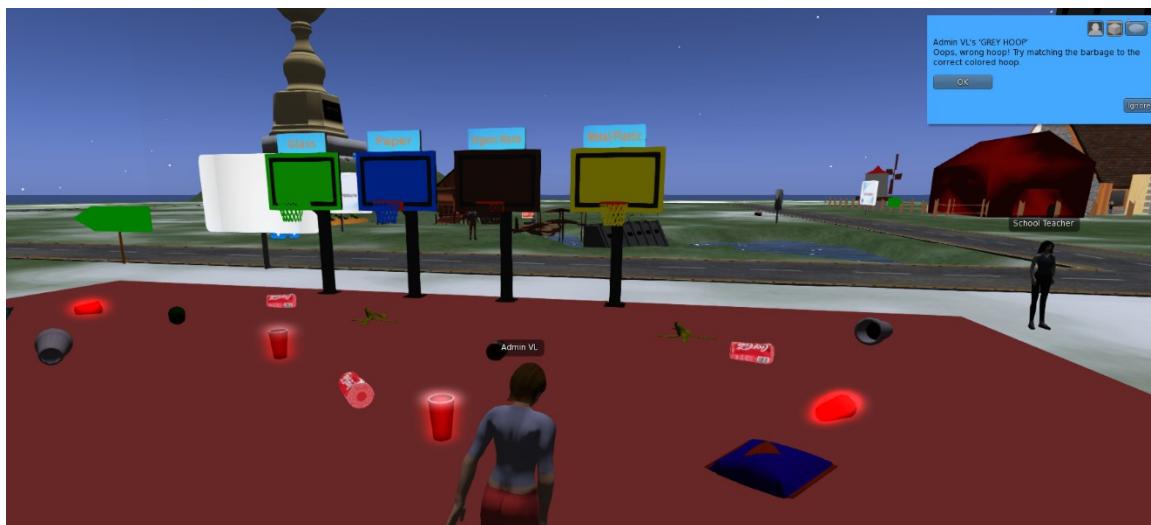


Figure 13: User corresponds the trash to the recycling hoops



Figure 14: The trash is showing up at the hoops if aligned correctly



Figure 15: Congratulations message





3.3 Scenario 2 – Walk in the forest

The “Walk in the Forest” scenario, transports players to a richly detailed forest environment for an educational journey through various landscapes. The game aims to deepen the player's understanding of forest ecosystems, emphasizing the significance of biodiversity, the ecosystem benefits forests provide, and the dynamic interplay between biotic and abiotic elements within these environments. As players traverse different forest landscapes, including areas near rivers, residential regions, and both production and mountain forests, they are tasked with engaging in a variety of activities that highlight the critical role forests play in food security, water production, climate regulation, and more. Through interactions with characters like a shepherd and a forest ranger, players are introduced to the diverse species inhabiting these ecosystems, the threats forests face, and innovative approaches to their conservation.





Educational content is woven seamlessly into gameplay through quizzes, mini-games, and informative dialogues with NPCs who offer insights into the species and processes vital to forest health. Players learn about the importance of trees and forests in historical and cultural contexts, identify professions related to forestry, and understand the consequences of human actions on forest sustainability. This immersive experience not only educates players on environmental stewardship but also encourages them to adopt behaviours and attitudes beneficial to the interaction of humans with forests. By completing the scenario, players emerge with a heightened appreciation for forests' irreplaceable ecosystem services and a better understanding of how to protect these vital natural resources.



Figure 16: Overview of Walk in the Forest scenario





Figure 17: Initial view of the scenario



Figure 18: The player is interacting with the NPC progressing the narrative of the scenario





Figure 19: After the dialogue with the NPC the user should proceed completing the image correspondence minigame



Figure 20: The user receives educational material pictures



Figure 21: The user proceeds to the narrative by talking to the shepherd





3.4 Scenario 3 – Lost in Waste

The “Lost in Waste” scenario plunges players into the operational world of an integrated waste treatment plant. This educational journey demystifies the lifecycle of waste—from segregation at home to the advanced technologies employed in its recycling and treatment. Through this adventure, players gain a profound understanding of the processes involved in waste management, including collecting, transporting, and treating waste, alongside the principles of the circular economy. Set within the premises of a state-of-the-art waste treatment facility, the scenario is divided into different sections each dedicated to a specific treatment process, such as sorting, composting, and a laboratory where circular economy concepts are brought to life. Players interact with facility technicians, including a manager, an incineration plant technician, and a circular economy researcher, who guide them through the complexities of waste treatment technologies. These interactions aim to enlighten players on the significance of their everyday waste disposal choices and inspire more environmentally conscious behaviours.

Gameplay integrates a blend of exploration activities and mini games, where players learn about the intricacies of recycling different materials. For example, they'll delve into the glass recycling process, understand the sorting and baling of plastics, and explore the fascinating world of composting organic waste. Each section culminates in quizzes that test the player's newly acquired knowledge, allowing progression to the next stage upon successful completion. The narrative begins with a personal quest to find a lost tablet, leading the player to the waste treatment plant. This personal thread weaves through the educational fabric of the scenario, maintaining engagement as players unearth the intricacies of waste management. By the journey's end, not only is the lost item recovered, but players are also imbued with a deeper appreciation for waste treatment technologies, the importance of recycling, and the principles of the circular economy. This scenario stands as a testament to the educational power of immersive gaming, fostering environmental stewardship among its players.



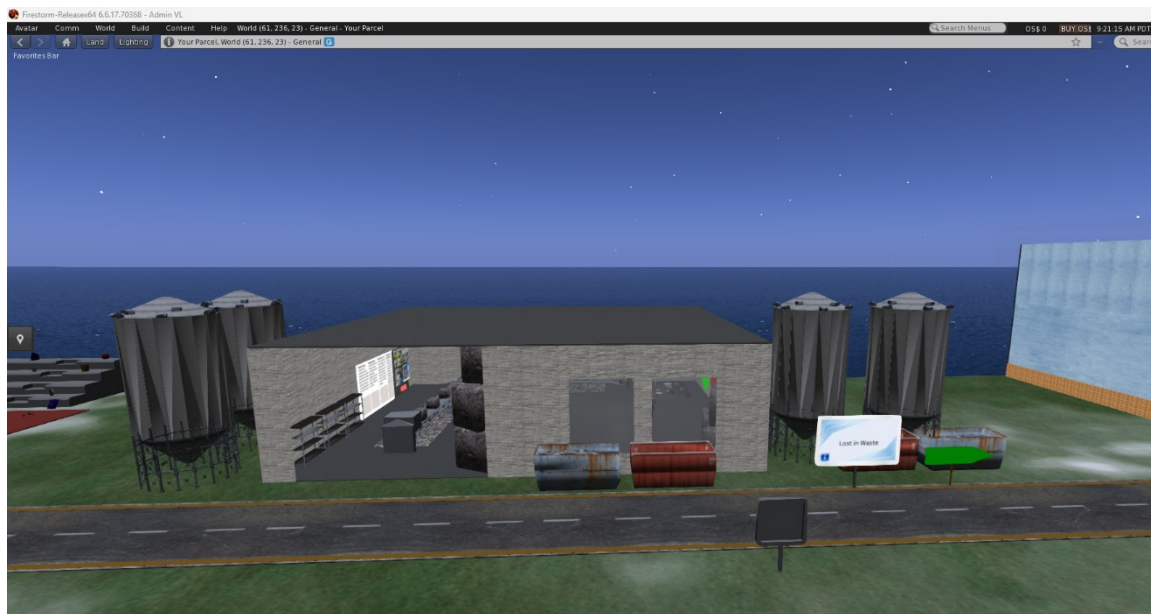


Figure 22: Overview of Lost in Waste



Figure 23: Initial view of the scenario when the user is entering the scenario





Figure 24: The user is interacting with the technical manager by solving a quiz

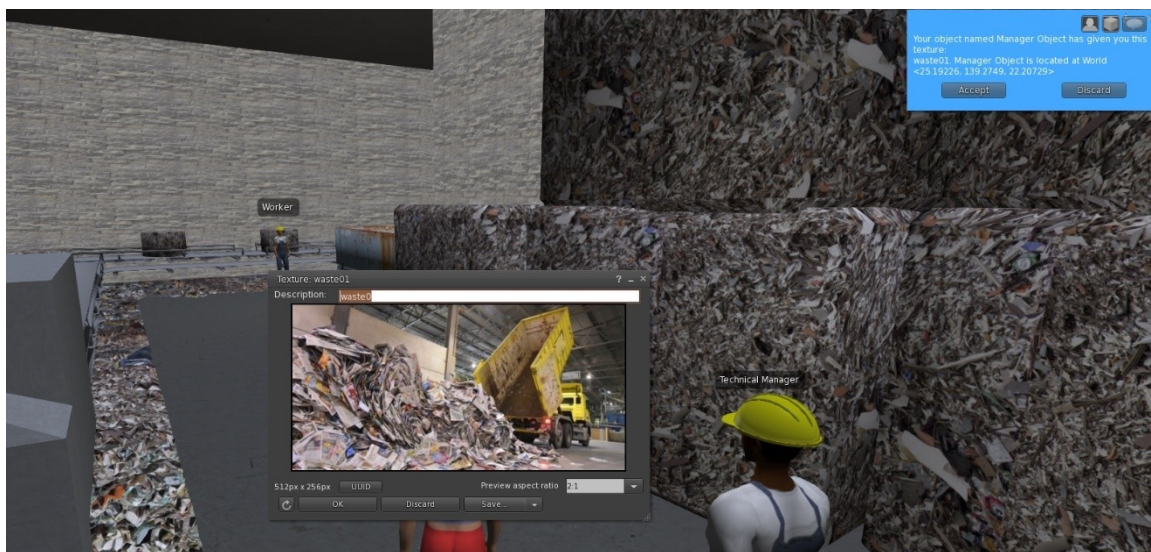


Figure 25: Educational material about the dumping of trash

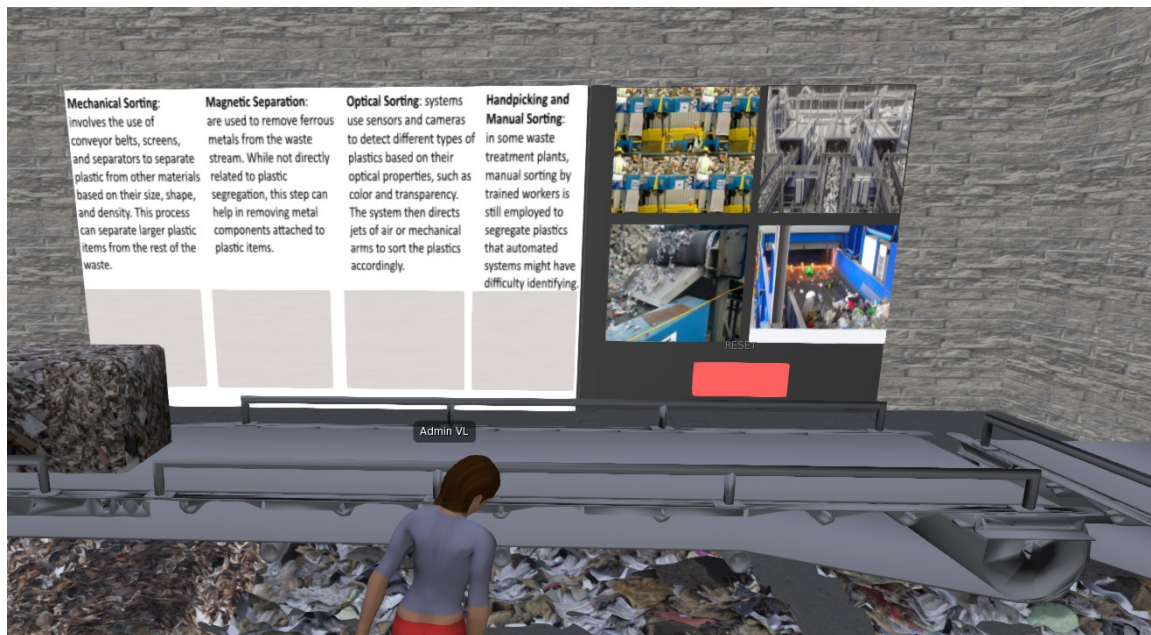


Figure 26: Minigame depending the sorting ways



Figure 27: Educational material concerning the waste composting



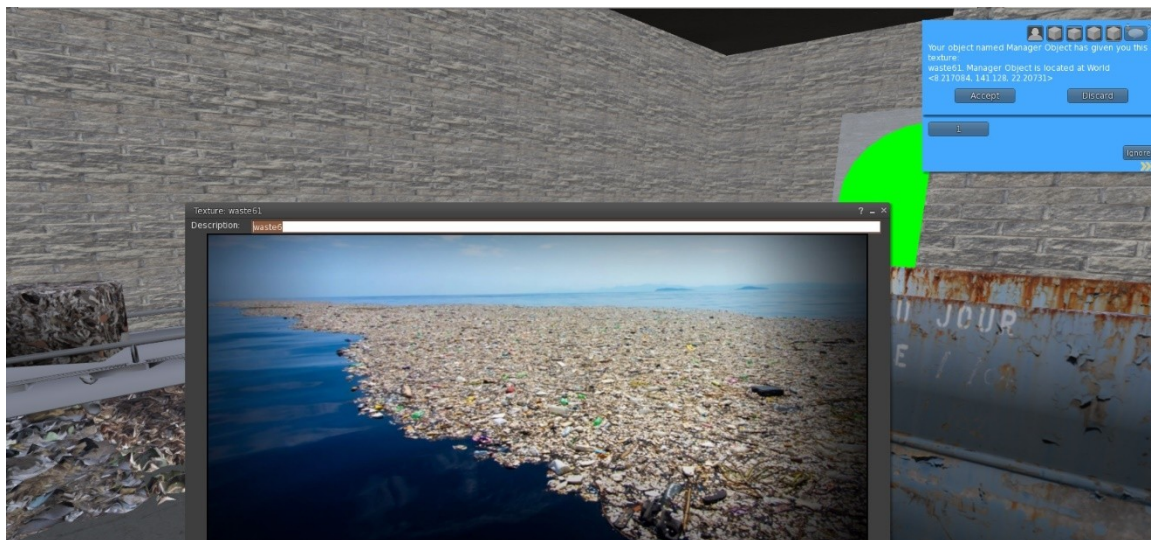


Figure 28: Educational material throughout the scenario narrative concerning the dumping of waste into the ocean

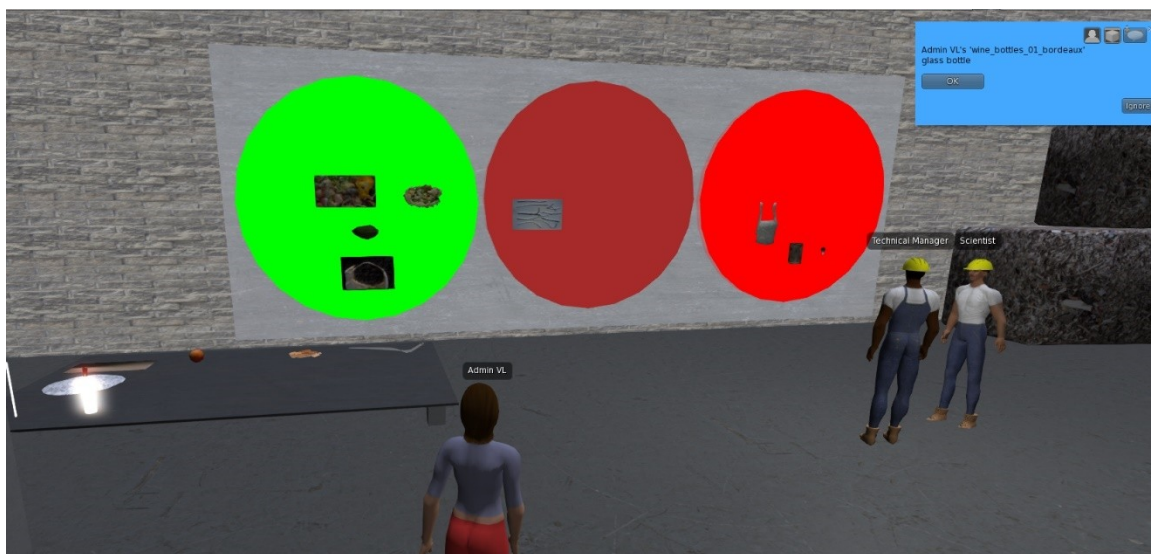


Figure 29: Minigame on the sorting of waste into composting compounds



Figure 30: End game scenario where the engineer talks with manager



3.5 Scenario 4 – Polluting Factory

The “Polluting Factory” scenario embarks players on an educational field trip gone awry. This immersive experience confronts players with the harsh realities of environmental pollution caused by a nearby factory, leveraging interactive storytelling and decision-making to foster awareness and action against industrial pollution. As the story unfolds, players, embodying a student named PLAYER, alongside their friend Mark and a teacher, discover the once vibrant surroundings near their school have been devastated by pollution. The narrative vividly describes the environmental degradation observed - sickly trees, brown grass, a filthy lake, and dying flowers, painting a grim picture of the ecosystem in distress. This alarming discovery propels the students and their teacher to investigate the source of the pollution, leading them to the polluting factory.

Engaging with various characters, including factory workers, the head of the factory, the environmental police, and local residents, players navigate a series of choices and actions aimed at mitigating the environmental damage. Through exploration, interaction with before-and-after images showing the destruction of the area, and engaging mini-games, players witness the direct impact of their decisions on the environment.

Central to the scenario are the negotiations with the factory's head, challenging players to advocate for positive environmental changes. The game integrates educational content seamlessly, including quizzes on general environmental facts and the opportunity to make critical decisions affecting the factory's operations. Players must weigh the costs and benefits of adopting eco-friendly practices, such as recycling waste, working with green partners, upgrading to eco-friendly equipment, and hiring environmental experts. The narrative reaches a climax as players decide the factory's fate, with the environmental conditions visibly improving as a result of their choices. This transformation underscores the scenario's core message: individual actions and decisions can have a significant impact on environmental health.

"Polluting Factory" serves not just as a call to action against industrial pollution but also as an educational tool, empowering players with knowledge and the understanding that they can make a difference. The scenario concludes with a nod to further learning opportunities, directing players to the United Nations Environment Programme (UNEP) for more information on combating environmental pollution, thereby extending the educational impact beyond the virtual world.



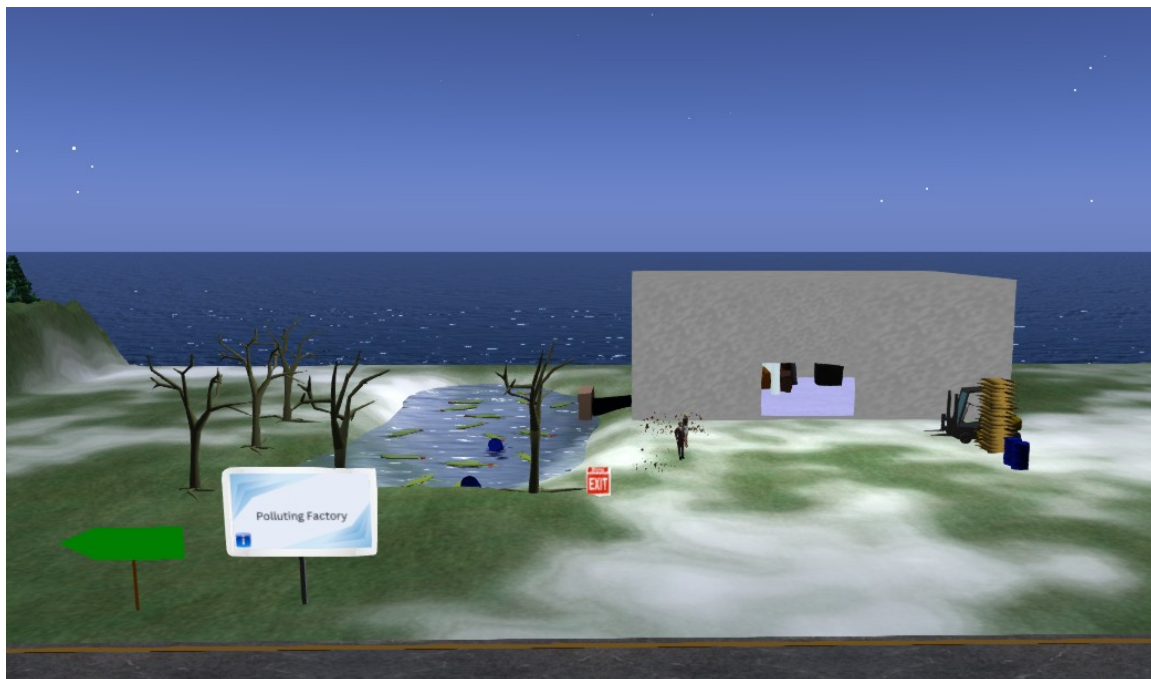


Figure 31: Polluting Factory overview



Figure 32: Initial view of the Polluting Factory





Figure 33: Educational material concerning the environmental polluting from the factory



Figure 34: The user is interacting with the Factory Worker



Figure 35: The user has entered the Factory Owner room to discuss with him the environmental impact of his factory



Figure 36: Police Officer has arrived to settle the discussion





Figure 37: Educational material concerning the environmental pollution



Figure 38: The user has to solve the minigame to give instructions to the factory owner



3.6 Scenario 5 – Carbon Champions

The “Carbon Champions” scenario, engages players in a proactive journey to understand and minimize their carbon footprint. This interactive experience is set in the relatable backdrop of an everyday household environment, where players, accompanied by a Green superhero, navigate through various daily decisions impacting carbon emissions. The game's core mechanic is a carbon calculator that dynamically reflects the carbon impact of players' choices, ranging from dietary preferences to modes of transportation, household energy use, and more. A key educational element is a quiz that tests players' knowledge on carbon footprint and its significance, providing immediate feedback and learning opportunities.

Players begin their day making choices that affect their carbon footprint, such as selecting food for breakfast, deciding how to travel to school, and finding ways to heat or cool their home efficiently. Each decision is accompanied by detailed carbon footprint measurements and ratings, offering insights into the environmental impact of these seemingly mundane choices. For instance, choosing a bike over a car for a short commute significantly reduces one's carbon footprint, a lesson underscored through interactive gameplay.

The narrative guides players through a "normal weekday," where the accumulation of choices fills a carbon footprint 'thermometer.' Exceeding a certain threshold prompts a warning, encouraging players to revisit their decisions. Successfully managing one's carbon footprint throughout the game awards the title of "Carbon Hero," signifying a commitment to sustainable living practices. "Carbon Champions! / Carbon Heroes!" stands as a testament to the power of interactive learning, emphasizing that reducing one's carbon footprint doesn't necessarily require drastic lifestyle changes. By presenting players with practical, everyday choices that contribute to global carbon emissions, the scenario effectively demonstrates how small, thoughtful adjustments can have a significant impact on our planet's health. The game concludes with resources for further exploration, encouraging players to continue their journey toward sustainability beyond the virtual world.



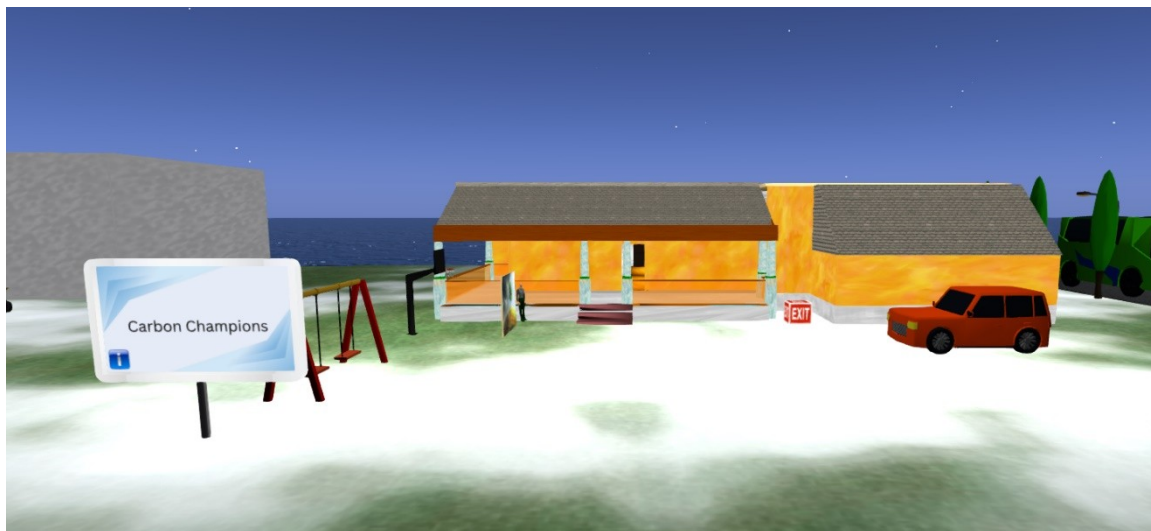


Figure 39: Carbon Champions Overview



Figure 40: The user is interacting with the NPC to proceed to the narrative of the scenario



Figure 41: The user selects which breakfast item he usually have

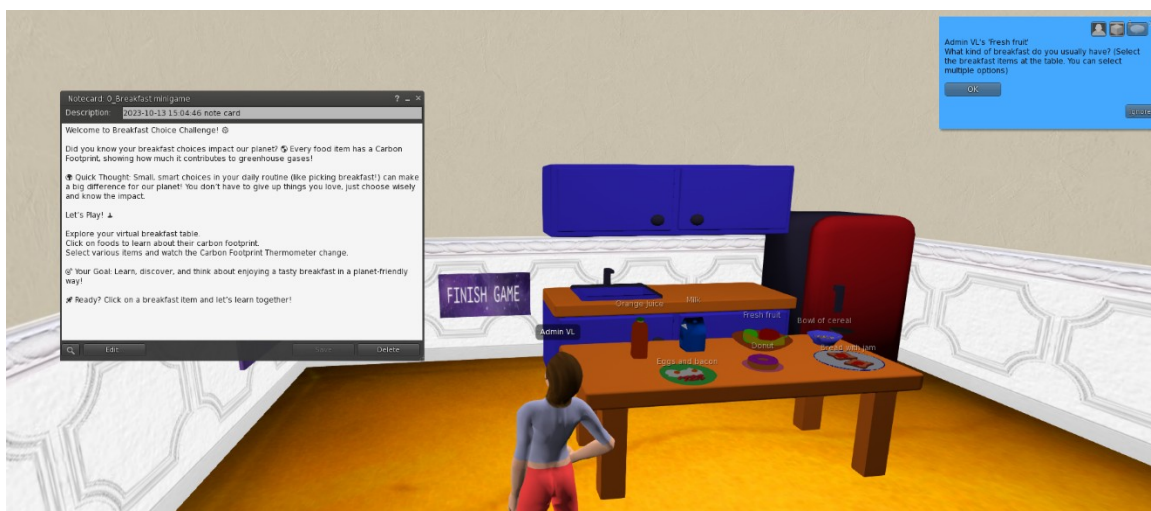


Figure 42: The user gets instructions on how to play the breakfast minigame



Figure 43: The user has selected the breakfast items and he can see the carbon footprint of those items



Figure 44: After the end of this minigame the board remains to signalize the carbon footprint of user everyday actions



Figure 45: The user selects a way to cool down and see his/her carbon footprint by choosing this way

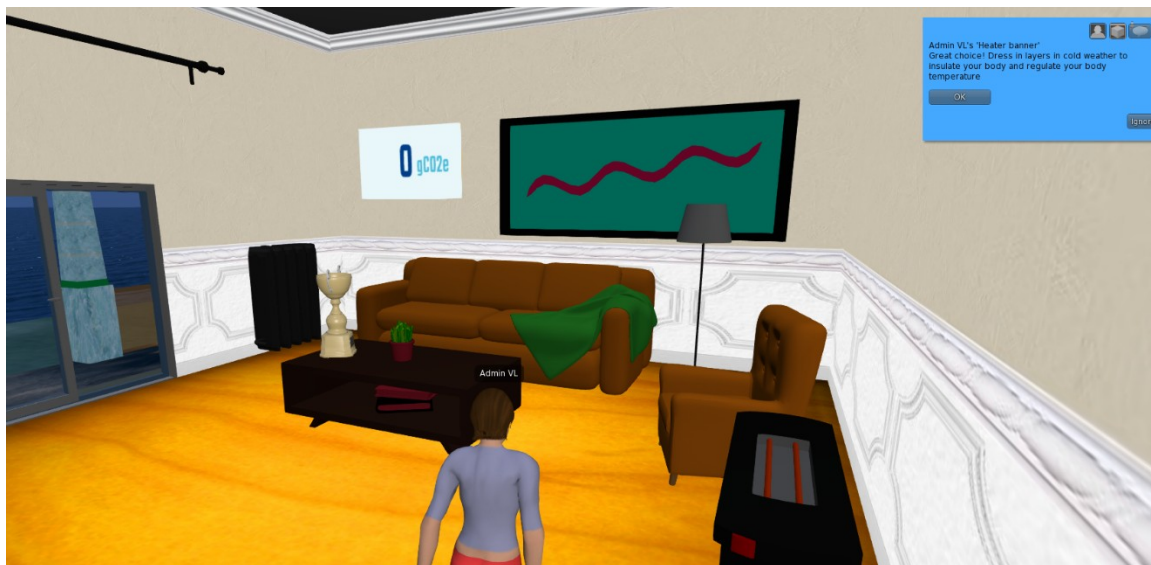


Figure 46: The user selects a way to get harmer and sees his/her carbon footprint by choosing this way



Figure 47: At the end of the scenario the user gets an educational material



3.7 Scenario 6 – Visiting Green Town

The “Visiting a Green Town” scenario is designed to immerse players in the eco-friendly lifestyle of a modern, sustainable city. The game unfolds in a residential area within a green town, complete with a park, green houses, and advanced energy-saving technologies. This educational journey, guided by the main character's uncle, a fervent environmentalist, is aimed at showcasing various environmental protection strategies through interactive challenges. As players explore the green town with their uncle, they encounter different elements that contribute to the town's sustainability. Key educational points include the benefits of solar panels, the advantages of electric buses over traditional fossil fuel-powered vehicles, and the importance of bike sharing systems and green urban planning. Each discovery is paired with engaging mini-games and quizzes designed to reinforce the educational content, such as matching benefits to the correct environmental solution or filling in gaps about the advantages of cycle lanes and bike sharing.

The scenario starts with an introduction to solar energy's potential and its role in reducing carbon emissions. Players then proceed to learn about electric buses' environmental, community, and economic benefits through a categorization game. The journey continues with an exploration of bike sharing stations, emphasizing the convenience and environmental advantages of cycling over driving.

A significant part of the game involves interactive learning about the importance of green spaces within urban environments, particularly the role of evergreens in air purification, wildlife shelter, and maintenance of ecological balance. Players match pictures of evergreen trees to their names, deepening their understanding of these vital plants.

Throughout the game, players accumulate points by successfully completing challenges, with the ultimate reward being a bicycle. This prize symbolizes the game's core message: adopting more sustainable modes of transportation as a practical step toward environmental stewardship. The visit concludes with a reflective conversation between the player and their uncle, emphasizing the transformative experience and newfound awareness of environmental protection methods. "Visiting a Green Town" not only educates players about sustainable living practices but also inspires them to adopt a more environmentally friendly lifestyle, underscoring the role of individual actions in preserving the planet for future generations.





Figure 48: Visiting Green Town Overview



Figure 49: The user initiates the dialog with the NPC



Figure 50: The user gets educational material about the solar panel electricity system



Figure 51: The user solves a quiz to progress to the scenario narrative



Figure 52: The user solves another quiz concerning the pros and cons of electric buses

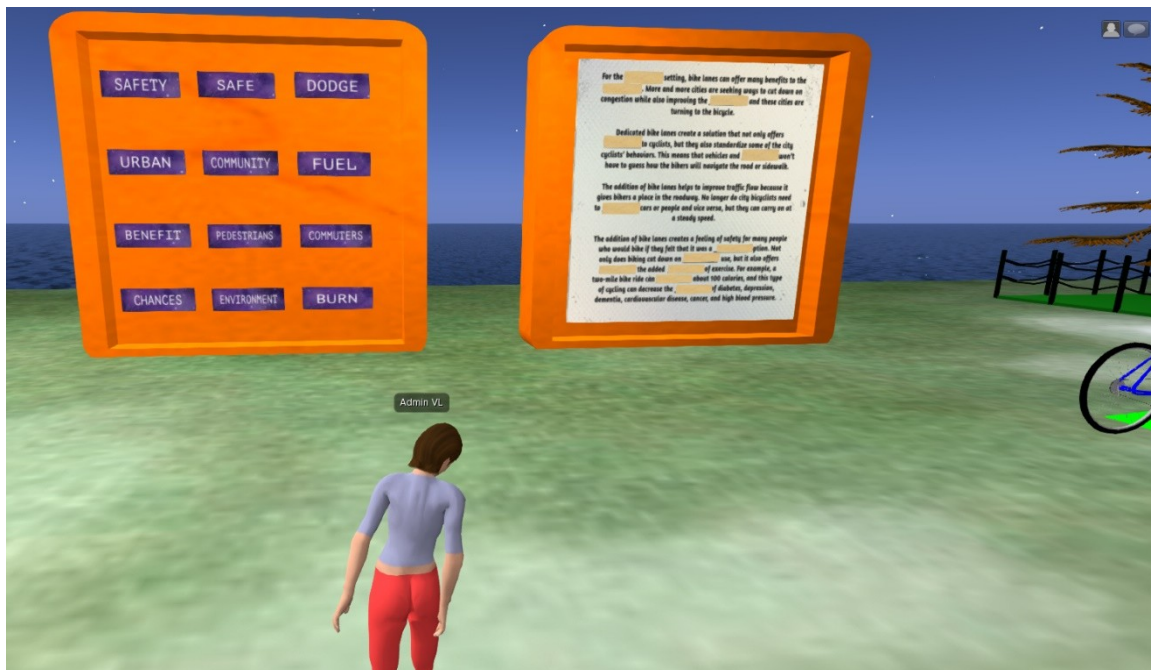


Figure 53: The user solves a word filling minigame about cycle parks



Figure 54: The user corresponds the tree images to the tree words



Figure 55: The user earns a trophy for completing the scenario



3.8 Scenario 7 – Eco-Farm explorer

In an engaging and interactive virtual scenario, players step into the shoes of a young avatar visiting their relative's farm, designed to educate on sustainable agricultural practices and environmental conservation. This digital experience, set in a picturesque farm close to a small town, offers a comprehensive look into organic farming operations, including fields, a cowshed, a biogas plant, and a beehive. As players navigate through the farm, they encounter various farm workers and specialists, from those tending to organic crops to engineers designing green energy solutions. The narrative unfolds through a series of explorations, dialogues, and interactive challenges. Players engage in activities such as matching educational content to corresponding images, sequencing steps in organic farming processes, and making choices in quizzes that test their knowledge on topics like the use of pesticides, soil enrichment techniques, and the principles of anaerobic digestion for biogas production. This scenario emphasizes learning through doing, encouraging players to observe, inquire, and apply knowledge in mini-games that mirror the real-world application of sustainable farming techniques.

The educational goal of this virtual farm tour is to deepen the player's understanding of how sustainable agriculture contributes to environmental health, emphasizing the importance of ecological pest control, biological fertilizers, and the recycling of organic matter. Through this immersive experience, players are not only educated on the theoretical aspects of organic farming but are also prompted to consider its ecological benefits and the role it plays in promoting biodiversity and reducing environmental harm.



Figure 56: Overview of the Eco-Farm Explorer





Figure 57: Initial conversation with NPC



Figure 58: Minigame quiz after the conversation with the NPC



Figure 59: Minigame identifying the different species of bees

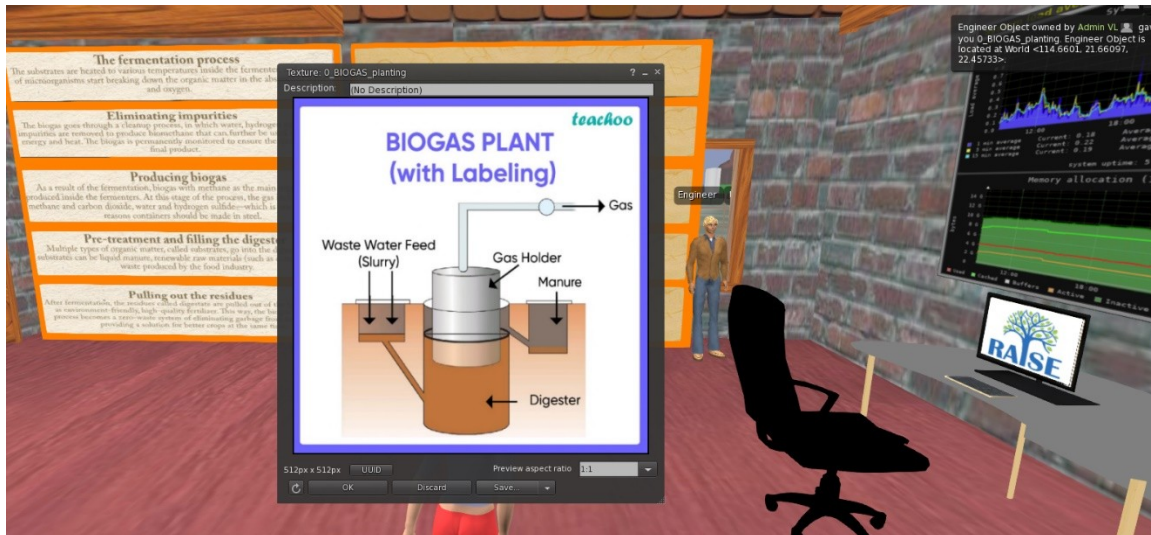


Figure 60: Educational material concerning the Biogas Plant





Figure 61: Quiz for the animal farm



3.9 Scenario 8 – Wind Turbine Challenge

This educational journey introduces players to the fundamentals of wind energy, from its renewable nature and significance in achieving energy sustainability to the intricacies of wind farm management. Players take on practical tasks simulating the setup of a wind farm, encompassing environmental considerations and budget management, culminating in a knowledge-reinforcing wind energy quiz. Set on a virtual wind farm and within a wind farm station, players, guided by NPCs such as a wind farm expert manager and turbine technician, embark on a mission to strategically place wind turbines. This task requires careful consideration of environmental factors, land availability, and the potential impact on local wildlife and ecosystems, mirroring the real-world challenges of sustainable energy production.

Through interactive gameplay, dialogue-based learning, and visual aids, the scenario offers an engaging and comprehensive exploration of wind energy. Players gain hands-on experience with the complexities of wind farm development, from assessing wind speed and consistency to minimizing environmental impact and maximizing energy output.

The "Wind Farm Challenge" stands as an innovative approach to educating about renewable energy, encouraging players to reflect on their decisions and the broader implications for environmental sustainability. This scenario not only educates about the technical aspects of wind energy but also promotes critical thinking and problem-solving skills essential for the future of sustainable energy solutions. Both scenarios exemplify innovative educational strategies that leverage interactive gaming to foster understanding of environmental sustainability, showcasing the potential of virtual worlds in enriching educational content with engaging and meaningful experiences.





Figure 62: Wind Turbine Station Overview



Figure 63: Wind Farm Overview



Figure 64: Overview of the Wind Farm Station Control Room



Figure 65: Snip of the Wind Farm Manager of the Wind Farm Station





Figure 66: Quiz canvas of the Wind Farm Scenario



Figure 67: Overview of the wind farm

3.10 Scenario 9 – Water treasure

"Water Treasure" unfolds along a majestic river, embarking students on an enlightening journey from the river's source in the mountains to its mouth at the sea. This scenario, aims to educate on the paramount importance of water, highlighting challenges in water management, pollution, and conservation. As students traverse along the river, they encounter various environmental challenges and pollutants that hinder their planned activities, prompting a resolve to take action. This educational journey is structured around interactive dialogues, quizzes, and mini games, designed to engage students with environmental issues directly impacting the river's health. Encounters with local inhabitants and professionals, including fishermen, engineers, and farmers, facilitate discussions on the repercussions of water pollution, overuse, and mismanagement. These interactions are supplemented by quizzes and tasks challenging students to apply their knowledge, from identifying causes of glacier retreat to suggesting measures to reduce water pollution and consumption.

"Water Treasure" serves as a multifaceted learning experience, offering students insights into the ecological significance of rivers, the impact of human activities on water resources, and the collective responsibility towards water conservation. Through exploration, observation, and active problem-solving, students gain a comprehensive understanding of the delicate balance between human needs and environmental sustainability.



Figure 68:Initiation of dialogue at Water treasure scenario

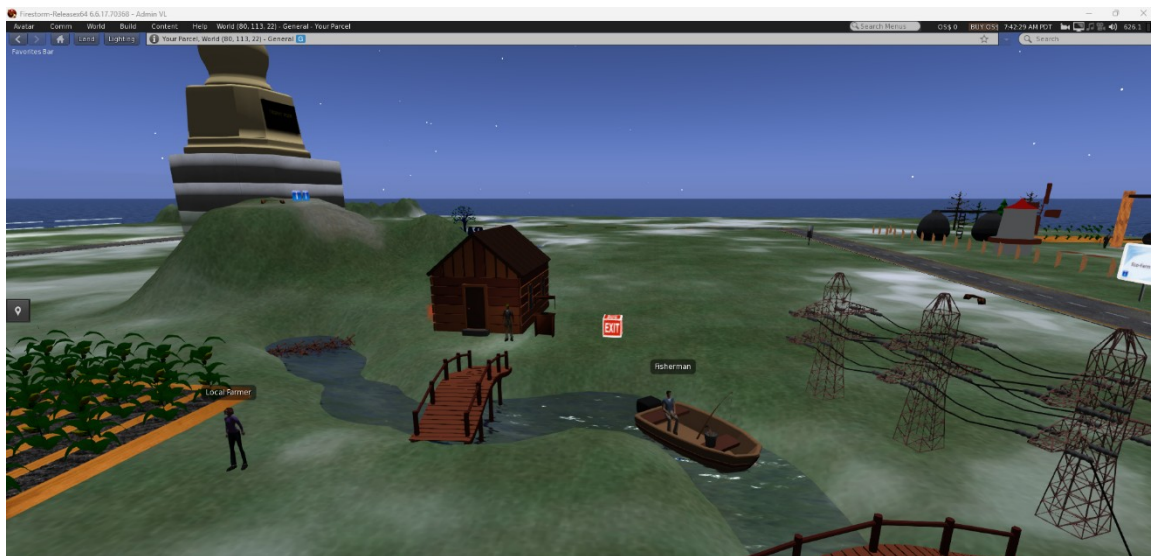


Figure 69: Overview of the Water Treasure scenario

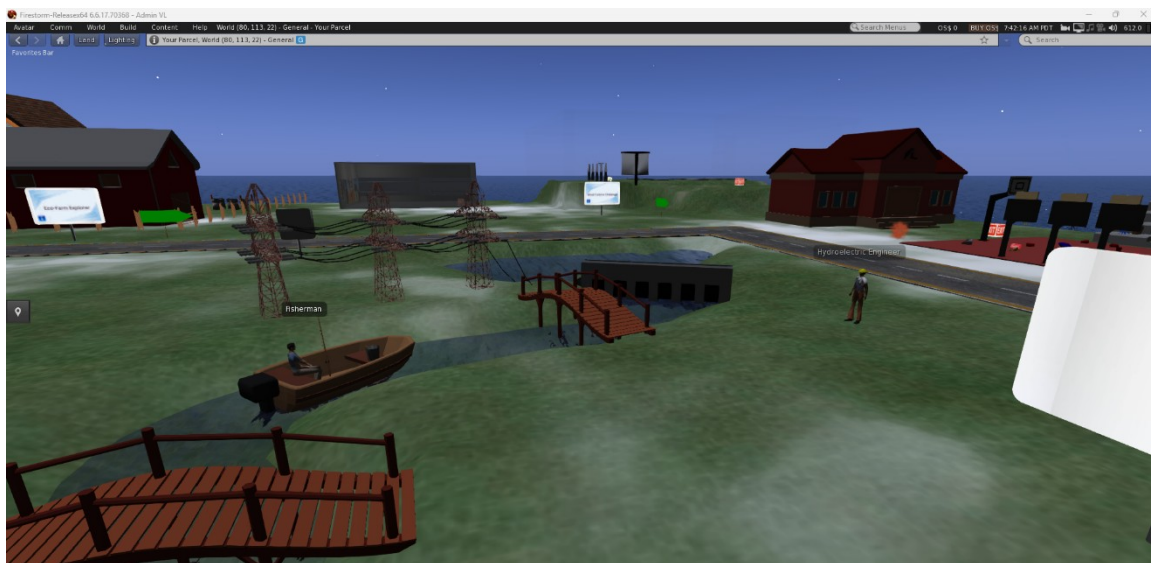


Figure 70: Overview of the Water Treasure scenario



3.11 Scenario 10 – House-Eco Explorer

This educational and interactive adventure transports participants to a meticulously crafted virtual house, complete with rooms and a backyard, each brimming with items that range from eco-friendly to non-eco-friendly. Players are tasked with identifying these items, guided by their roles as "Non-Environmentally Friendly Spotters," "Eco-Friendly Spotters," and "Eco-Educators." The game's primary educational goal is to enhance awareness about sustainability and the environmental impact of daily objects. The game begins in a central scenario room where players select their roles, setting the stage for a collaborative exploration. As they navigate through the virtual house, players discuss, decide, and discern the environmental significance of various household items, from armchairs made with sustainable materials to incandescent light bulbs known for their energy inefficiency. The Eco-Educator role is pivotal, providing in-depth information about each item's environmental footprint, thus enriching the team's knowledge.

This scenario cleverly incorporates teamwork and learning through a point system that rewards accurate identification and penalizes mistakes. Players are encouraged to communicate effectively, whether through chat or voice, to make informed decisions. Items become semi-visible once selected, signalling that they've been interacted with, which adds a layer of strategy to the game. "House Eco-Explorer" aims not just to educate about the sustainability of everyday items but also to instil a deeper understanding of the choices we make and their impact on our planet. By blending fun, teamwork, and environmental education, this scenario offers a comprehensive and engaging learning experience about sustainable living.



Figure 71: House-Eco Explorer Overview





Figure 72: Educational Material from the House Eco Explorer Scenario



Figure 73: Reset Game button for House Eco Explorer Scenario



Figure 74: Snip of the House Eco Explorer scenery



Figure 75:Yard of House Eco-Explorer House



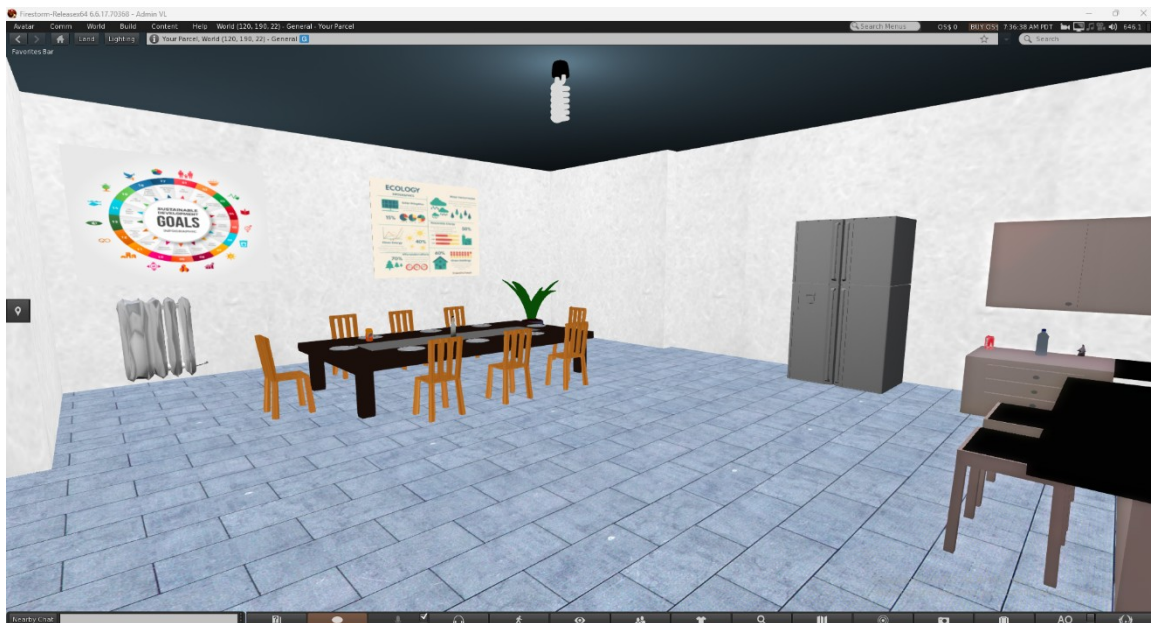


Figure 76: Inside House Eco-Explorer House inside you can locate educational material



Figure 77: Overview of the inside house of House Eco-Explorer

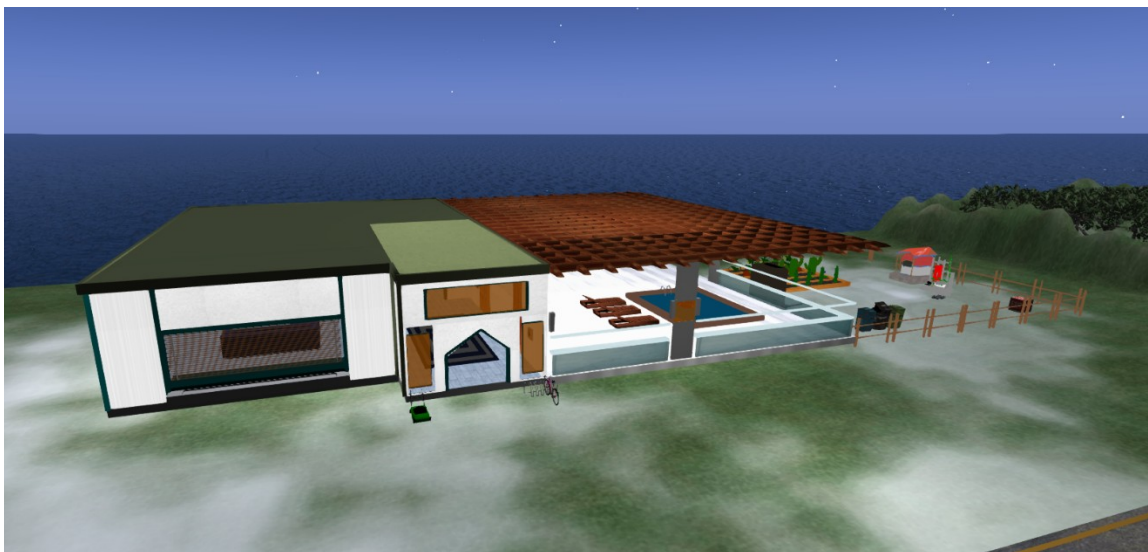


Figure 78: Overview of the House Eco-Explorer



4. Beta Version

The development of the beta version is ongoing, **the beta version is to be released on M17.**

Following an in-depth assessment of the Alpha Version, the Beta Version has been launched. This version presents enhanced iterations of the scenarios initially introduced in the Alpha Version, along with the debut versions of the remaining scenarios. The beta version incorporated all the scenarios (10) translated in the partners' languages (English, Greek, Italian, and Portuguese) and were incorporated to the virtual world. The layout for the scenario environments has been reimagined into distinct small islands. Feedback and evaluations from the Alpha Version testing enabled the consortium to review and adjust key design aspects of the scenarios, including:

- The average time required for a user to complete a scenario.
- Students' preferences and critiques regarding the Alpha Version.
- The effectiveness of the tutorial in providing comprehensive guidance for both new and experienced users, ensuring it is concise.
- Ensuring the educational content within the game is of optimal length, striking a balance between being engaging without being overly lengthy or too brief to the point of not delivering enough information.
- Accessibility of the educational content within the game.
- Clarity for students on the necessary actions to successfully navigate through the scenarios.
- Identification of any potential glitches.

4.1 Version Changes

Following the objectives mentioned in the previous section and after examining the student feedback, the following changes were made to the environment:

- Some users reported that the tutorial had a lot of instructions resulting in the tutorial being too long to complete. Based on this feedback, the beta version of the 3D VWLE the tutorial became smaller.
- The tutorial billboards were modified to be bigger to be more visible in smaller computer screens based on user feedback.
- A general description of the game's story was created that the players read before playing the scenarios to grasp the general idea of the game.
- Some users indicated that it is better to include the in-game educational materials in posters because they are easier to find while also provide visual information, and the corresponding changes were made to the scenarios.





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- Several smaller bugs were reported and fixed for the beta version.
- The timing of inactivity while standing in a scenario was increased from 2 minutes to 8 minutes.

4.2 Tutorial Room

The Tutorial Room (Figure 7) is the tutorial of the 3D VWLE and serves as an introduction of the players to the virtual world and the mechanics and functionalities it includes. The Tutorial Room was introduced in the alpha version of the environment in section 3.1. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- The steps decreased from 7 to 4, incorporating updated instructions.
- The banners were redesigned with bigger and higher quality images to improve legibility.

4.3 Scenario 1

Scenario 1 was introduced in the alpha version of the environment in section 3.2 and involves a user corresponding the trash to the correct hoop. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- Players didn't understand which trash was selected to put in the hoop for that reason the selected items now are now shining.

4.4 Scenario 2

Scenario 2 was introduced in the alpha version of the environment in section 3.3 and involves a user walking in the forest and exploring it. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- The minigame mechanism changed and now if a user completes the image correspondence minigame and he hasn't passed the threshold to progress the scenario narrative, now the minigame keeps the right answers and resets only the wrong answers. Previously the whole minigame was being reset.
- The building was redesigned to be smaller because it caused some performance issues in older systems.

4.5 Scenario 3

Scenario 3 was introduced in the alpha version of the environment in section 3.4 and involves a user exploring a recycling factory. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:





- The minigame mechanism changed and now if a user completes the image correspondence minigame and he hasn't passed the threshold to progress the scenario narrative, now the minigame keeps the right answers and resets only the wrong answers. Previously the whole minigame was being reset.
- The building was redesigned to be smaller because it caused some performance issues in older systems.

4.5 Scenario 4

Scenario 4 was introduced in the alpha version of the environment in section 3.5 and involves a user exploring a recycling factory. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. There were no significant changes made.

4.6 Scenario 5

Scenario 5 was introduced in the alpha version of the environment in section 3.6 and is about informing the user about the carbon footprint of everyday activities. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- The minigame mechanism changed and now if a user completes the image correspondence minigame and he hasn't passed the threshold to progress the scenario narrative, now the minigame keeps the right answers and resets only the wrong answers. Previously the whole minigame was being reset.
- We detected a bug in the breakfast minigame where the banner that showed the carbon footprint was not having the best quality in its board.
- We detected another bug where a reset was needed in order to detect the user entrance into the bedroom.
- The building was redesigned to be smaller because it caused some performance issues in older systems.

4.7 Scenario 6

Scenario 6 was introduced in the alpha version of the environment in section 3.7 and involves a user visiting a green town. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- We detected a major bug at the letter filling minigame where the minigame didn't reset after its completion after a user didn't exit the scenario correctly.
- We corrected the listen event by replacing it with





4.8 Scenario 7

Scenario 7 was introduced in the alpha version of the environment in section 3.8 and involves a user exploring an eco-farm. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- The minigame mechanism changed and now if a user completes the image correspondence minigame and he hasn't passed the threshold to progress the scenario narrative, now the minigame keeps the right answers and resets only the wrong answers. Previously the whole minigame was being reset.

4.9 Scenario 8

Scenario 8 was introduced in the alpha version of the environment in section 3.9 and involves a user exploring a recycling factory. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- Updated NPCs appearances
- Updated visuals with simpler design to improve the environment's performance in older systems

4.10 Scenario 9

Scenario 9 was introduced in the alpha version of the environment in section 3.10 and involves a user exploring the water utilities. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- An exit cube, in case players want to leave the scenario without completing it

4.11 Scenario 10

Scenario 9 was introduced in the alpha version of the environment in section 3.10 and involves a user exploring the environmental status of everyday items. The beta version of this scenario incorporates all the relevant changes mentioned in section 4.1. Some significant changes are:

- Changing the reward mechanism and now the player gets 3 points for correct decision and loses 3 points for each correct decision.
- The walls and floor have changed materials and colours.
- The exterior of the building used in this scenario was reworked to represent a house





5. Final Version

In the final version of the RAISE project, we have introduced several enhancements and addressed various bugs to provide a more seamless and engaging experience for users. Our primary focus was on improving the overall functionality, user interaction, and educational value of our 3D Virtual World. These updates were driven by valuable feedback received during the Beta testing phase, which involved extensive testing on a much larger scale than the Alpha version. In the Beta phase, the virtual environment was tested with 227 students, allowing us to observe its functionality in a controlled setting with a significant number of users interacting concurrently. By enriching the virtual environment, refining interactive elements, and correcting language and content errors, we aim to deliver an immersive and informative platform for environmental education.

This phase of extensive testing allowed us to gather comprehensive feedback on various aspects of the virtual world, including its usability, engagement levels, and educational impact. It also provided valuable insights into how users interact with the system when many users are active simultaneously, enabling us to make crucial adjustments to enhance system performance and reliability. Key improvements included:

- Refinement of the outdoor environment with decorations and interactive elements
- Extended idle sensor time from 2 to 10 minutes in scenarios 1-10
- Corrected language selection error for Italian and Portuguese language
- Refined entrance to scenario mechanisms in scenarios 1-8
- Revised quiz questions for clarity and accuracy
- Updated dialogues and instructions in various scenarios
- Added educational content to the bee minigame
- Corrected content errors in the anaerobic digestion explanation
- Improved the spaceCountTrails function for efficiency

For each scenario in the virtual world, detailed feedback was distributed through our communication channels to all project partners. These forms allowed partners to gather feedback based on the experiences and insights of the students who piloted the virtual environment. Each partner collected feedback from the students who interacted with the scenarios. Focusing on their engagement, understanding, and overall experience. The feedback from students was pivotal in shaping the final version of the virtual world, as it provided direct input on the effectiveness of the educational content, usability of the platform, and overall enjoyment. Additionally, the partners themselves reviewed the scenarios from their perspective, offering suggestions on how to improve educational delivery and engagement based on the student's experiences.





This collaborative effort ensured that the final version of the 3D Virtual World was not only technically refined but also tailored to meet the educational needs and preferences of the students who would be using it. The feedback forms and the partners' evaluations will be included in Appendix 1, providing a detailed record of the inputs and adjustments made throughout the piloting phase.

5.1 Detailed Description of the Changes

Here are the detailed descriptions of the changes made in the final version of the RAISE project:

- **Enrichment of the outdoor environment**, we added decorations and interactive elements, including small minigames such as picking up trash and exploring a maze. Users navigating the maze to its end can observe the difference between a dead tree and a living tree, offering a practical lesson in environmental impact and conservation. These enhancements aim to make the learning experience more engaging and informative.
- **Extended Sensor Reset Time**, to address the issue of students remaining idle for extended periods, we extended the sensor reset time in scenarios 1-10 from 2 minutes to 10 minutes. This adjustment ensures that users have ample time to engage with the content without unnecessary interruptions, making the experience smoother and more enjoyable.
- **Language Support Improvements**, we corrected the incorrect messages displayed when users selected Italian in the language selection room. This fix ensures that users receive accurate information in their chosen language, enhancing their experience and understanding. Additionally, we resolved issues with language selection for Italian and Portuguese, ensuring users can choose and receive information in their preferred language without any errors.
- **Refined Input Mechanism**, the input mechanism in scenarios 1-8 was refined to improve user interaction. This update ensures that user inputs are processed more accurately and efficiently, resulting in a smoother navigation experience. Additionally, the spaceCountTrails function in scenarios 1-10 was enhanced to calculate spaces more efficiently, speeding up the entry process into scenarios and allowing users to begin their interactive experience more quickly.
- **Quiz and Dialogue Updates**, we revised the second question in the environmentalist's quiz within scenario 9 for clarity and accuracy, providing users with more precise information to support the educational goals of the project. In scenario 5, we updated the dialogue to clearly instruct users to enter the house, eliminating confusion and guiding users more effectively through the scenario.



- **Bee Minigame Enhancement**, a new “fun fact” was added to the bee minigame in scenario 7, providing additional educational content in an engaging format. This addition aims to enhance the learning experience while keeping it enjoyable.
- **Anaerobic Digestion Explanation Fix**, an error where the Italian version displayed the Greek text for anaerobic digestion in scenario 7 was corrected. This fix ensures that users receive the correct information in their chosen language.
- **Quiz Error Correction**, A duplicate answer in the quiz question regarding the term for total carbon emissions caused by a user was fixed. The correct answer, “carbon footprint”, is now accurately presented, eliminating confusion and ensuring the educational integrity of the quiz.



Figure 79: Addition of decoration object in the RAISE virtual world learning environment

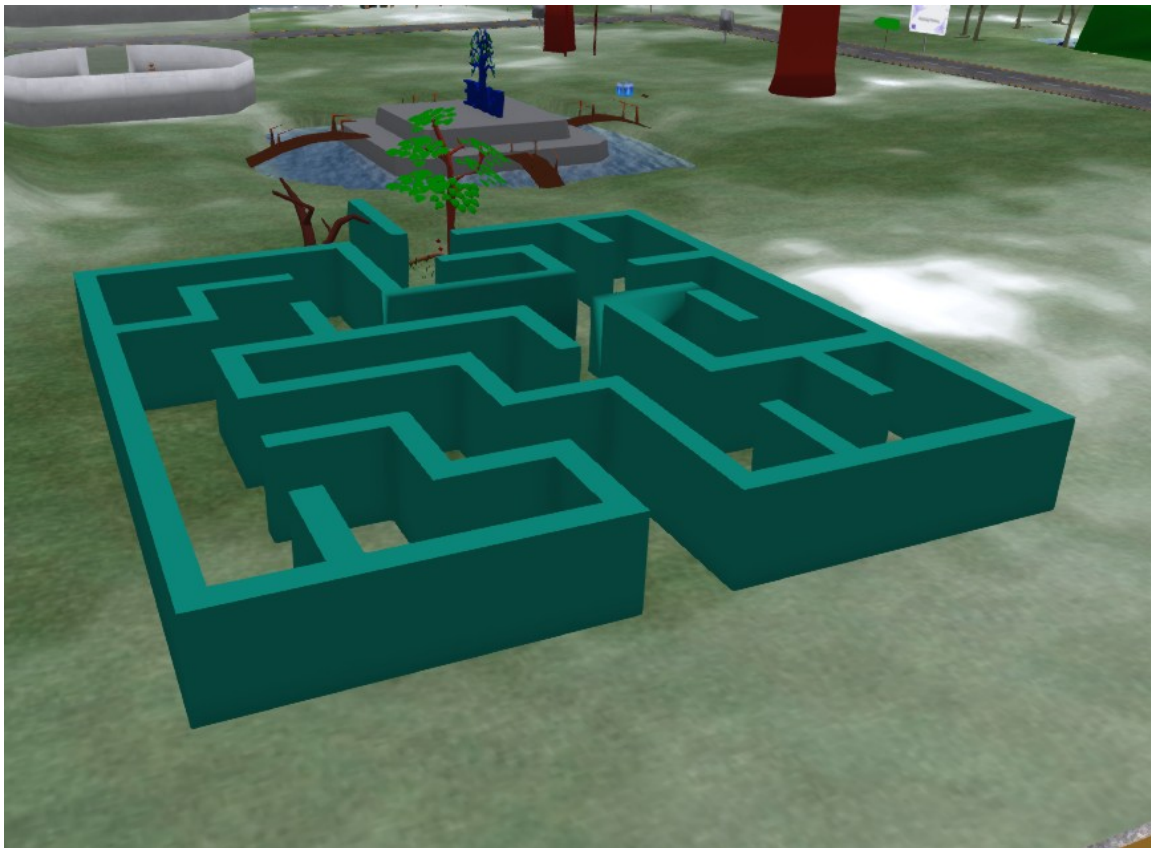


Figure 80: Addition of decoration object in the RAISE virtual world learning environment





Figure 81: Addition of information box when someone clicks it then he get a fun fact about the environment



Figure 82: Overview of the RAISE virtual world after the changes proposed in the beta version

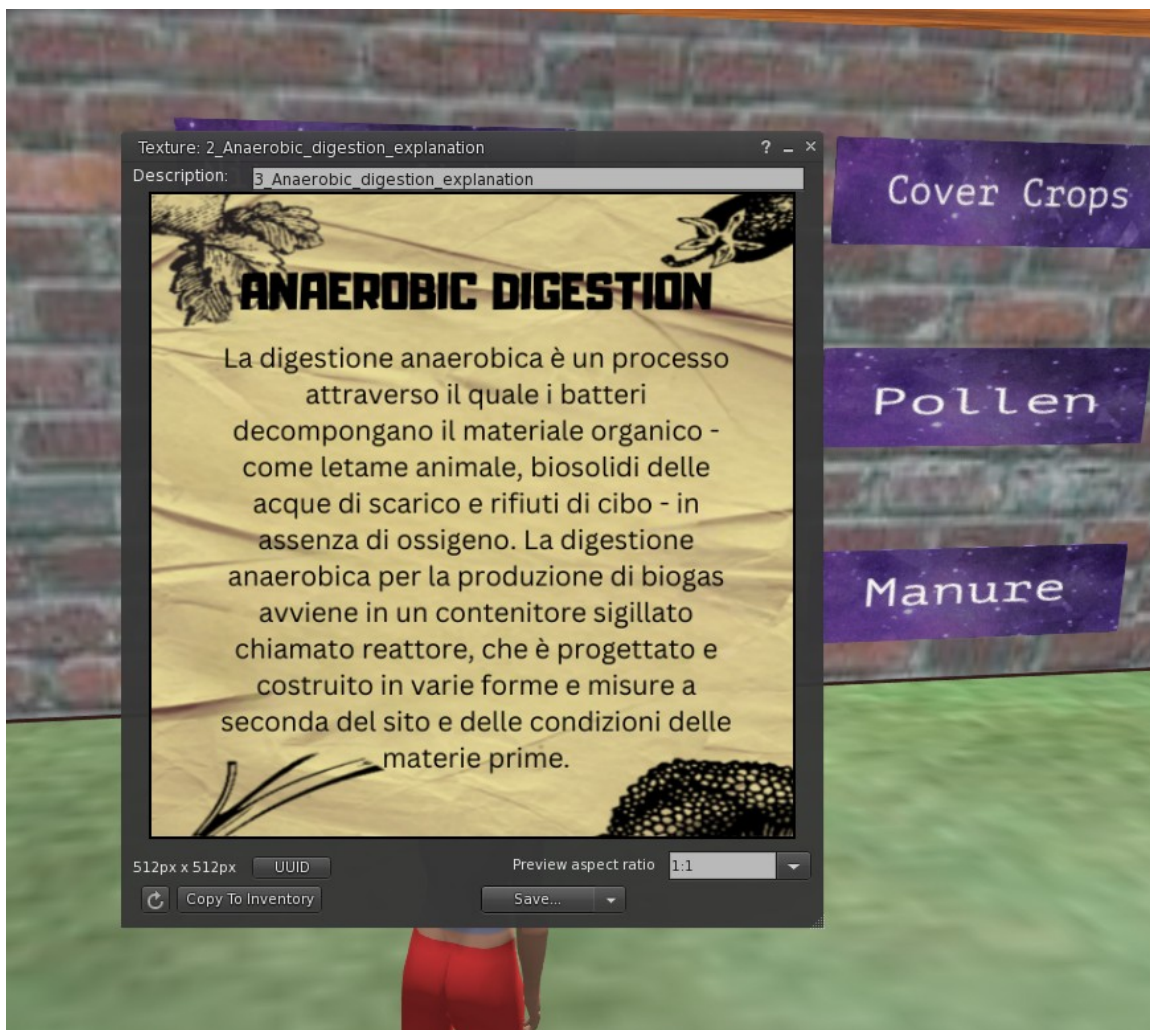


Figure 83: Correction of Anaerobic description





Figure 84: Addition of a fun fact with option is clicked in the bee minigame of Eco-Farm explorer minigame



Figure 85: Addition of a fun fact with option is clicked in the bee minigame of Eco-Farm explorer minigame



Figure 86: Correction of quiz at Water treasure minigame



Figure 87: Correction of bug when user clicks the Italian language as his preferred language



Figure 88: Correction of bug when user clicks the Italian language as his preferred language



Figure 89: Correction of Green SuperHero quiz minigame



6. Appendix 1 – Feedback Forms

6.1 Scenario 1

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 1 House Eco-Explorer version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 1 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 1 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 1 Feedback

- Scenario Playability (how user-friendly it is):

- Scenario Visual Aesthetics (graphics, world design):

- Scenario Enjoyment:

- Feedback Concerning the Scenario Multiplayer aspect

Did the users understand their roles?





Did the minigame foster cooperation?

(Fill this box)

Did the users understand the reset mechanism?

(Fill this box)

Did the users understand which are items are
clickable? If not, mention the items.

(Fill this box)

• Comments and/or Ideas & Proposals for the
Scenario:

(Fill this box)





6.2 Scenario 2

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 2 Water Treasure version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 2 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 2 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 2 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





6.3 Scenario 3

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 3 Eco-Farm Explorer version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 3 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 3 Feedback Document - upatras.docx"). Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 3 Feedback

- Scenario Playability (how user-friendly it is):

{Fill this box}

- Scenario Visual Aesthetics (graphics, world design):

{Fill this box}

- Scenario Enjoyment:

{Fill this box}

- Feedback Concerning the Bee minigame
Was the information sufficient?

{Fill this box}





Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?

(Fill this box)

- Feedback Concerning the Engineer minigame (inside the house)

Was the information sufficient?

(Fill this box)

Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?





(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





6.4 Scenario 4

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 4 Visiting Green Town version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 4 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 4 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 4 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Feedback Concerning the Cycle Station Minigame
Was the information sufficient?

(Fill this box)





Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?

(Fill this box)

- Feedback Concerning the Green Park (Tree Type)
Minigame

Was the information sufficient?

(Fill this box)

Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?





(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





6.5 Scenario 5

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 5 Carbon Champions version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 5 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 5 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World -
>Files-> 3.2 Development of the 3D Virtual World Beta Version -
>Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario





Scenario 5 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Feedback Concerning the Breakfast Minigame

After the end of the quiz was it obvious that the
scenario narrative continues at the house?





(Fill this box)

Was the information sufficient?

(Fill this box)

Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?

(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:





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(Fill this box)





6.6 Scenario 6

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 6 Polluting Factory version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 6 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 6 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 6 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





6.7 Scenario 7

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 7 Walk in the Forest version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 7 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 7 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 7 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Feedback Concerning the Plant Minigame
Was the information sufficient?

(Fill this box)





Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?

(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





6.8 Scenario 8

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 8 Lost in Waste version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 8 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 8 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World -
>Files-> 3.2 Development of the 3D Virtual World Beta Version -
>Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 8 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Feedback Concerning the ways of sorting waste
Minigame (first minigame)

Was the information sufficient?

(Fill this box)





Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?

(Fill this box)

- Feedback Concerning the Bin Minigame (second minigame)

Was the information sufficient?

(Fill this box)

Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?





(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





6.9 Scenario 9

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 9 Wind Farm version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 9 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 9 Feedback Document - upatras.docx").

Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 9 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Feedback Concerning the Wind Turbine Minigame
Was the information sufficient?

(Fill this box)





Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?

(Fill this box)

After the end of the wind farm minigame a quiz follows. Was that obvious?

(Fill this box)

- Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





6.10 Scenario 10

Brief Introduction

This document will be used by each partner to provide feedback for Scenario 10 Green Champions version.1.

We ask that for each partner, two people test the scenario.

Please provide any feedback that you deem important for each section.

After filling this document, rename it to "Scenario 10 Feedback Document - partner_name.docx", where partner name is filled by you (e.g., "Scenario 10 Feedback Document - upatras.docx"). Then upload it to WP3 Development of the 3D Virtual World - >Files-> 3.2 Development of the 3D Virtual World Beta Version - >Testing and Feedback->Feedback.

Important Remarks

- We request that you provide the most honest feedback based on the experience you got by playing the scenario. Positive and negative feedback is equally important to making the project better.
- The section "Scenario Document – Implementation Correlation" is meant for feedback on how well the scenario you played matches the respective scenario document. This is a good section for stating whether you wanted something different from what was implemented.
- The second page contains "questions" that concern the minigame of the Scenario (the one you play on the interactive board).





Scenario 10 Feedback

- Scenario Playability (how user-friendly it is):

(Fill this box)

- Scenario Visual Aesthetics (graphics, world design):

(Fill this box)

- Scenario Enjoyment:

(Fill this box)

- Feedback Concerning the Sorting Minigame
Was the information sufficient?

(Fill this box)





Were the mechanics robust?

(Fill this box)

Do you believe the educational goal was reached?

(Fill this box)

• Comments and/or Ideas & Proposals for the Scenario:

(Fill this box)





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