Res'PIR : a serious game to explore effective solutions to eco-anxiety

Julie Bourgeais
INSA Toulouse
bourgeai@insa-toulouse.fr

Noé Caillet
INSA Toulouse
ncaillet@insa-toulouse.fr

Matthias Green
INSA Toulouse
mgreen@insa-toulouse.fr

Lélia Keizer
INSA Toulouse
keizer@insa-toulouse.fr

Amalia Magana
INSA Toulouse
magana@insa-toulouse.fr

***Abstract*—Eco-anxiety is a non-pathological response to the threats of climate change and biodiversity loss. It is a condition that especially affects women, young people, and those in vulnerable regions. Research in eco-anxiety healing is new and its results have not been made public yet. Our research means to gather some solutions to relieve the feeling of eco-anxiety and to give easy access to these solutions, that were proven efficient by other studies. We combined them to create a game that tries to help its players feel less eco-anxious. This paper aims to present a serious game that is both educational and playful. It helps people who are suffering from any kind of eco-anxiety to find relief in knowing how to deal with it. It promotes values of collaboration, action and self-care. Then, we conducted a large test phase where we invited diverse groups of people to play and complete a post game survey. We collected their opinion on how it made them feel and on what they had learned. Res'PIR is an open-source board game and can be accessed via a website. The tests concluded in demonstrating that the game is informative and playful. It also does not generate much additional stress for the players. Testing sessions should be continued with a more diverse and larger sample of tested people. Authors recommend it in order to finish asserting these results and improving the game. Res'PIR seems to be promising as a potential future academic tool to sensitize about eco-anxiety.**

***Index Terms*—eco-anxiety, climate change, serious board game, sociology**

I. Introduction

Over the past decade, climate change has gained more and more exposure and significance in public discourse, scientific research, and industry innovation. Media outlets, educational and political institutions dedicate more attention to climate change effects such as environmental degradation, biodiversity loss, and rising temperatures. As a result, citizens get more information than ever about the consequences of such a dramatic environmental change. This new awareness, while essential for triggering engagement, also comes with psychological effects. On the one hand, it empowers some to take positive actions, both professionally or personally. For instance, they may engage in environmental clean-ups, reduce consumption, or switch to a less meat-based diet. On the other hand, for a part of the population, this raising awareness generates a wide range of negative emotions, such as rage, helplessness, fear or despair. These emotions, referred to as eco-anxiety, are becoming more visible and discussed.

Recent literature frames eco-anxiety as a non-pathological emotional response to real ecological threats such as climate change and biodiversity loss. It is depicted as a rational and understandable response to climate change. Studies [1], [2] suggest that parts of the population are more affected by this form of anxiety such as women, young people, and individuals in the regions most vulnerable to climate disasters. Moreover, research differentiates various types of eco-anxiety, eco-guilt, eco-grief, and eco-coping and therefore identifies several ways to address them. As a result, the question is now to find a way to support those experiencing these feelings by providing them with coping mechanisms. Researchers have explored various approaches, including environmental education, psychological therapies, art-based interventions and climate action.

However, the exploration of eco-anxiety is a relatively new subject and has not yet undergone extensive study. Most published studies on the definition and understanding of eco-anxiety were conducted less than five years ago. Among those, very few are the result of large surveys that gathered diverse participants. While some articles maintain the pathological nature of eco-anxiety, others affirm that it is strictly non-pathological and should not be treated as a disease. Most studies focus on defining and documenting the phenomenon, while fewer investigate practical solutions or test concrete actions. This leads to a lack of tools to help people navigate their emotions. For these reasons, there is a significant gap in research and practice.

To address this gap, our goal was to explore how game-based methods could help people explore various coping strategies for eco-anxiety. We aimed to create a board game that applied many of the methods found in the literature and offered a space for discussion. We wanted people to confront their feelings in an amusing and safe way. For that reason,

we developed Res'PIR[1], a collaborative role-playing game, that would serve as a tool to combat eco-anxiety. The players embody diverse characters facing environmental challenges. The characters were selected to be relatable, and to emphasize that anyone can take meaningful actions. By encouraging open dialogue and exploring different coping strategies, we wanted Res'PIR to provide a place for emotional expression and reflection. Another goal of the game was to raise awareness and inspire meaningful participation in environmental issues. Finally, in order to measure the impact of our research, we organized several testing sessions with different participant groups and collected feedback about how our game made people feel through a post-game survey.

In the first section of this article, we provide a detailed overview of the academic literature that was useful for our game creation. We discuss the definition of eco-anxiety, several possible actions to alleviate its effects on mental health, and present a short criticism on the current advancement of research. The second section is about the methodology we followed to create and test our final game, including design choices and game strategies. In the third section, we present and analyze the results we obtained from the testing sessions and discuss the limitations of our work. Specifically, we discuss the lack of diversity in the people who tested our game.

II. Literature review

Studies [4], [10] indicate that eco-anxiety is non-pathological and cannot be dismissed as irrational fear or a solely intrapsychic issue. The fear of environmental collapse stems from the ecological crisis, including climate change and biodiversity loss. The psychological consequences of such a dramatic event are only recently being considered. It is now established that the threat of climate change triggers a spectrum of negative emotions, from despair to determination, and disproportionately affects women, young people, and those in vulnerable regions. Given its overlap with general anxiety, it's essential to explore psychological approaches for managing eco-anxiety. Different approaches are listed below.

A. Alleviating Eco-Anxiety through Psychological Monitoring and Therapy

Eco-anxiety is a normal response to a real threat, not a pathological condition. Psychological strategies, such as Acceptance and Commitment Therapy (ACT), cognitive reframing, and stress management, can help [4]. The goal would not be to dismiss the feelings but to encourage appreciated behavior. Unconventional methods like reconnecting with nature, practicing mindfulness or arts-based experiences [3], especially poetry therapy [6], also provide relief. Art-based therapy allows self-esteem through creative work, and the reflection and distancing from one's own feelings through writing down. These unusual strategies empower individuals to manage their eco-anxiety.

[1]Res'PIR is a pun on "PIR", short for Research Initiation Project, and "Respire" which means breathe in French.

B. Actively Participating in Climate Action as a Relief for Eco-Anxiety

Taking action can also help with eco-anxiety. Indeed, it can provoke positive emotions such as comfort, satisfaction and pride in changing one's lifestyle. It can be by recycling, reducing consumption, or endorsing civil engagement, such as writing to politicians, participating in climate strikes, or joining local organizations. Authors emphasize the importance of collective action, as individual limitations often accentuate feelings of helplessness [9]. Having an impact and joining a group can be an emotional support and foster hope. However, experts warn that depending only on action may result in burnout or create irrational expectations [9]. Taking action is proposed as a additional solution to psychological therapy. One should not rely entirely on climate action as a therapy for eco-anxiety.

C. Eco-Anxiety in the Field of Environmental Education (EE)

A potential action to prevent eco-anxiety is to teach subjects related to environment or nature to students and children [7], [9]. By adding a climate education and health component to the school framework, students are given the tools and skills they need to understand and critically think about environmental issues. Giving an active participation role to students, and being solution-oriented, has the potential of reducing eco-anxiety [7]. Moreover, connecting them with nature can create a love for nature and a need to protect it [5]. When building the content for a good environmental education, it is important to present clear information, easily understandable by all. Both the students' background and the current sociopolitical context must be considered before initiating discussions in class [7]. Educators should be very mindful when addressing this matter, in order not to generate more stress, especially with youth from vulnerable communities. Those include indigenous communities, or populations who have strong ties to the land [7]. On the other side, there is often a lack of focus on the negative aspects of eco-anxiety, which should be acknowledged in order to have a realistic view of the subject.

D. Reducing Stress from Media Exposure

Studies [1], [8] show that frequent exposure to worrying news about climate change is a recurring cause of the appearance and worsening of eco-anxiety. According to the authors of [8], the recommendation is to reduce contact with media that have an excessive and possibly overwhelming use of jargon. Medias such as TV channels, radios, newspapers and websites are regarded as potential causes of additional stress. They say an ideal climate change-related information is clear and helps to understand the challenges, regardless of educational background.It should also encourage people in addressing the issues. Along with a better media exposure, spending more time outdoors reconnecting with nature can be a practical and effective way to alleviate eco-anxiety [1], [3], [5]. Recommendations about outdoor time include forest walks, sylvotherapy sessions, transporting on foot or with a bike on natural paths.

E. Conclusion

Eco-anxiety being a rather recent subject (the oldest reference is from 2020, and the others are mostly from 2023 and 2024), not many in-depth studies have been conducted. The variety of opinions presented by researchers contrasts with the lack of concrete results from the implementation of these solutions. Approaching this subject via cultural and socioeconomic dimensions, examining its link with geographical variations as well as exploring innovative therapeutic approaches would help break down effective solutions to eco-anxiety.

Despite this, a definition has emerged from research. It can be described as a psychological issue that unequally affects people according to their gender, age, ethnic or even place of residence. Therefore, this issue needs to be addressed in an adaptive way, taking into account the background of the people feeling concerned. Several solutions to cope with eco-anxiety have been suggested, such as psychological therapy, climate action, environmental education or better media exposure. These solutions might help reduce anxiety regarding environmental issues, but need to be further investigated as they are rather recent.

III. Methodology

A. Target Audience

We designed our game, Res'PIR, to be accessible to a broad audience, including people of all ages and backgrounds. Although we intended to reach participants already knowledgeable about environmental issues, we also aimed to engage those less familiar with ecological concerns. Our objective was to promote awareness and emotional reflection without restricting access based on prior knowledge or environmental commitment. We wanted everyone to be able to learn new ways to cope with their eco-anxiety, but also to help those around them, and to realize the importance of this topic. In order to reach this goal, we made sure that all the information provided in the game was thoroughly verified and sourced, so that anyone could look for more information on a given topic if they wanted to. Moreover, the theoretical aspects of the actions or questions are either generally very-well known or are rather easy to grasp for someone new to the subject. For example, the Conference Of Parties (COP) is the subject of one question. It is defined and explained.

B. Game Design

1) Inspiration: During our design process, we drew on several existing formats, including the "2tonnes" workshop, board games, role-playing games and even video games. These inspirations drove us to create a participatory and engaging experience, rather than a prescriptive or moralizing one. We sought to maintain a playful atmosphere, encouraging critical reflection and emotional engagement without exacerbating feelings of anxiety or guilt among participants. We also had the ambition for the game to be a safe space for everyone to speak about their experiences, both personal and general. There would then be an opportunity for everyone to express themselves, and the game could then just be a trigger that encourages discussions.

2) Goal: We wanted to avoid competitiveness among players. Therefore, the game is collective and every aspect of it is designed to encourage collaboration and discussion. The aim of our game is to maximize a collective well-being score, and there is no win or loss condition. Points are mainly awarded for performing predefined actions. The details of the scoring system will be discussed in detail in section III-C5. It is however important to note that the score is mostly intended to encourage players to reflect on their actions' impact.

3) Character design: Players embody one of seven distinct characters, each with a different relationship with ecological issues. Their roles are as follows: psychologist, student, teacher, journalist, elected official, scientist, and factory manager. The inclusion of different characters was intended to inspire diverse perspectives and facilitate meaningful dialogue among players. We also wanted to show that everyone, no matter their career, social status or age, can have an impact and take action. Although the characters are not named, they have a visual representation that is either more feminine or more masculine. We made sure to show the same number of feminine and masculine characters, and to associate the characters with a gender that was not linked to the societal representation of the character. Naturally, every player, no matter the gender they identify with, can embody every one of the characters.

4) Character sheet design: For each character, we created a sheet which lists the various actions that they can perform. During the game, players can refer to these character sheets to choose which action they wish to carry out. A separate sheet, to be shared by all players, lists actions that can be performed by any character. See Fig. 1 for an example.

5) Action design: During their turn, players can perform actions chosen from a list. Actions can be individual or collective, and character-specific or shared. We wanted to highlight the importance of collective initiative, which was shown in our literature review to be of major importance in the process of coping with eco-anxiety. The idea was to allow people to notice that rounds featuring collective play and teamwork rewarded them more points. For each action, we wrote a short story or description, and a bonus question which expands upon the idea introduced by the action. The bonus question is either:

- An open-ended question or challenge

  These were intended to make the players test their knowledge, share and discuss their ideas, and engage in artistic activities. A player is never forced to perform a challenge and the players can choose to perform it collectively. It is also never degrading nor humiliating.

- A closed-ended question

  The aim of these questions was to make the players learn something new. Clear and accessible information

Fig. 1. Journalist character sheet with available actions

has been shown to improve outcomes regarding eco-anxiety.

- A multiple-choice question

  If a question required a precise or difficult answer, we typically opted for multiple-choice questions instead.

We strove to include a large variety of actions in order to create complexity in the decision-making process, to increase replay value, and to provide more learning experiences. We selected actions that reflect realistic everyday decisions, thus promoting relatability and authenticity. We conducted extensive research to ensure the relevance and credibility of in-game actions and the accuracy of bonus questions. We used Wiley Online Library, Taylor & Francis, and Springer to collect scientific articles. Using these databases, we were able to discover specific documents relating to our subject. Indeed, although eco anxiety is still a recent subject, environmental problems and some solutions are increasingly documented (e.g., scientific literature, environmental reports, government guidelines).

Examples of proposed actions and their bonus question include:

- Organizing a scientific conference

  Question: Which themes would you like to hear about during a conference about the environment? Why?

- Improving waste management in the factory

  Question: In France, which percentage of mineral waste is recycled? 55%, 75%, or 80%?

- Organizing artistic activities relating to the environment at the school

  Question: Write a Haiku about nature.

- Planting trees in the forest

  Question: Approximately how many trees are planted in the world each year?

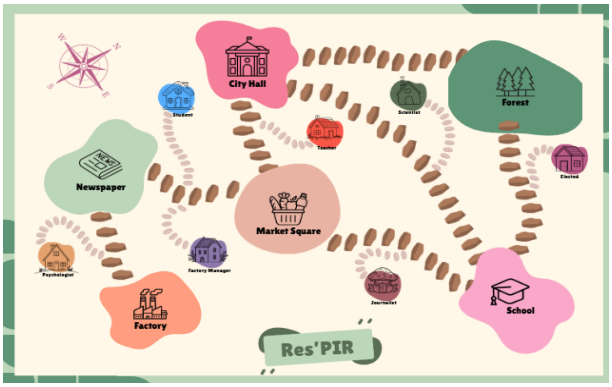

Fig. 2. Game board of Res'PIR

6) Map design: We decided to include a board on which a map is depicted. The map is an undirected graph in which nodes represent locations and vertices represent roads which players can move along. We decided to choose places in and around a small town, including a school, a forest, a market square, a city hall, and a factory. These places were chosen to create a laid back atmosphere and a familiar environment where important actions can nonetheless take place. See Fig. 2.

All players also have a starting point which is depicted as their place of residence. A player's personal actions are typically linked to a specific place (e.g. the factory for the factory manager, or the media office for the journalist), we chose the put the characters homes two moves away from their main location. This choice was meant to allow them to visit the map, and carry out actions other than their personal ones at the beginning.

7) Strategy and engagement: In order to create an engaging experience, we aimed to provide meaningful choices with unclear outcomes. These choices would introduce strategy elements while also inviting players to reflect about real life. Such decisions include:

- Choosing an action without knowing the point reward or getting immediate feedback
- Choosing where to move next while planning for future actions
- Choosing between commuting by car or on foot, with a point penalty if the car is used, which leads to a discussion and debate on the importance (in terms of points) of the future action, and therefore the profitability of the car's use
- Choosing between trying to gather the players for collective actions or trying each to perform their "best" personal

actions

C. Game Mechanics

1) Contents: The game consists of the following:

- A printed board depicting the map
- Character sheets listing character-specific actions
- A sheet listing shared actions
- Character pieces to be placed on the map
- An online platform which manages certain game elements.

2) Online platform: Due to the complexity of the action process, we decided to develop a digital platform (available at https://pir-eco-anxiety.github.io) to serve as a "game master" responsible for guiding participants through the session without requiring the intervention of a facilitator. We chose to create a website in order for our platform to be freely accessible on most devices without the need to install anything, and for our project to be more discoverable.

Functions handled by the website include:

- Presenting the game's rules
- Keeping track of the players' score
- Interactively presenting the story and bonus question for each action
- Allowing players to quickly reference which actions can be performed by a given player in a given location.
- Allowing players to learn more about information presented in bonus questions
- Allowing potential players to print out physical game contents

In order to satisfy our interactivity and fast development cycle constraints, we chose to create a single-page web application using the React library. We also used the Material UI library which provides many ready to use components. We used Typescript to guarantee type safety at compile-time and reduce the potential for malfunctions.

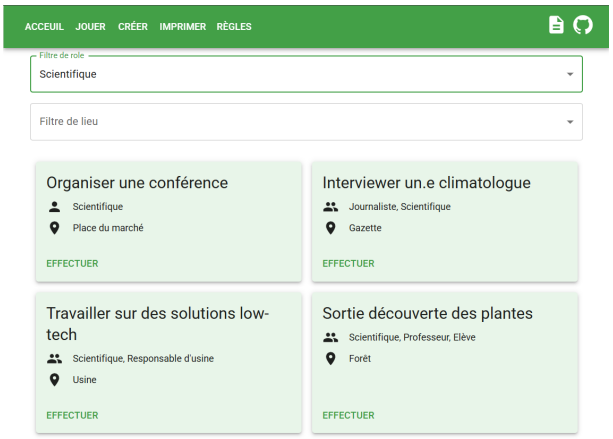

Fig. 3. A screenshot of the Res'PIR website, showing the actions that can be performed by the scientist.

3) Game Flow: A game session starts with each player choosing a character, and one player being selected to start each round. Before a round begins, players are encouraged to discuss their collective strategy. Players then take turns moving around the map and performing actions. Once the round is over, the team's score is announced and players are encouraged to discuss the impact of their actions' choices, and what they want to do in the next round. They can decide to meet in a specific place with another player, and discuss their route. This structure sought to balance game-play with opportunities for reflection and discussion.

4) Turns: During a turn, each player can move to a different location on the map, and perform one action. Players can walk to an adjacent node or can decide to drive a greater distance at the cost of some points. Players can choose an action from the list on their character sheet or on the shared action sheet. Certain actions can only be performed by a specific character or group of characters at a certain location. Actions can be performed before or after moving. Participation in actions was made entirely voluntary, reflecting our intention not to impose additional stress or emotional burden on the players. After each action, the players have the possibility to increase the points earned by 20 percent by answering the bonus question tied to the action.

When answering these questions, priority is given to the player who performed the action, but others can answer as well. This ensures that the process does not induce stress and encourages discussion among players.

5) Scoring System: The scoring system was deliberately structured to highlight the value of collective action. Actions undertaken collaboratively yielded more points than those performed individually, reinforcing the importance of solidarity and systemic change in addressing environmental challenges. The precise score is kept secret from the players to encourage them to debate and discuss which actions are best. In fact, since objectively measuring each action's impact is impossible, the number of points awarded is subjective. Actions that were proven efficient by other studies were rewarded higher points, but since everyone has a different way of coping with their feelings, an objective score is hard to achieve. Therefore, our scoring system is intended to be a rough guideline which encourages debate and discussion. All actions are positive and improve the players' overall well-being score.

D. Testing and Validation

1) Testing: During the development process, we conducted several testing phases that involved different groups:

- Internal tests within the project team
- Pilot sessions with professors
- Sessions with peers working on a similar project
- Sessions with friends, teachers and people from the school library

The sample of people tested consists of twenty-two participants at the time this article is written. Among those twenty-two, thirteen are women and nine are men. Twelve are teachers

or occupy highly educated positions in the academy field, while ten are students. We are conscious that this sample is quite small and we project that the process of testing the game could come to an end after a number of one hundred fifty people have tested the game. As previously stated, we want the game to reach different populations, from all ages and with different backgrounds. Because of this, the future testing sessions will be conducted with these kinds of groups: people not or not very educated about environmental issues, seniors, people not related with science, groups that contain players of different ages. We also invite administrators to consider introducing the game to first year students at INSA, who are typically eighteen years old. We believe the game could be a great fit in their environmental education classes.

2) Test Sessions: Usually, a test game of Res'PIR lasts for a little more than an hour. This includes in order:

- A brief description of the context (who we are, what is eco-anxiety, ...)
- A explanation of the rules to the players
- The selection of roles, followed by a moment of discussion about them, in which each player says who they are and what their possible actions are
- Three game turns, as described above in III-C4, with discussion time in between to prepare next turn's strategy
- A final discussion to close the game, plus time to fill in the post-game survey

During the session, one of us was present to act as a game master, answer questions, and take notes on the game dynamics to help our research.

3) Feedback: These sessions allowed us to identify potential misunderstandings, technical issues, and emotional reactions to the mechanics of the game. The feedback gathered during these tests informed subsequent iterations of the game's design. For example, we changed the formulation of some actions, the explanation of the rules, or the format of the questions, including some options for difficult questions. Moreover, during the sessions, we wrote down the actions chosen by the players, in order to see if some of them had better success or not. In particular, we noticed that the actions "artistic activities" were performed in all of our testing sessions. It was also useful to see the proportion between personal and collective action. On average, counting every turn of every testing game that was played, participants chose to perform a collective action 63% of the time. The 37% left are people that chose to perform a personal action. We noticed a strong tendency from players trying to gather in order to perform collective actions. Most of the time, those who performed a personal action were those who could not act otherwise, and most of them said they would have preferred to perform a collective action but did not because they were not able to.

E. Post-Game Survey

In order to evaluate the game's effectiveness and emotional impact, we designed a post-session survey combining qualitative and quantitative measures. We wanted to identify if the player's role had an impact on their feelings about the game. Moreover, the main idea of the game is to show ways to cope with eco-anxiety, make people feel better, make them know that they have an impact, and, lastly, to teach them interesting facts. In order to evaluate the possible success of these objectives, we asked multiple questions. Firstly, for a bit of context, we asked them their age group, their initial sensibility to climate stake and their current approaches to deal with that. We then asked them their global feelings about the game:

- Possible stress
- The actions that were liked/disliked
- If they learned something
- etc...

In order to have answers for all of these questions, and be the most precise possible, participants were invited to:

- Respond to open-ended questions, allowing them to freely express their impressions and suggestions,
- Assign numerical ratings (from 1 to 10) to different aspects of the game, facilitating objective analysis.

At the end, we asked them if they had any advice, suggestions for improvement, or general comments.

The survey structure was intended to capture both the emotional nuances of the experience and statistically analyzable data points.

F. Data Analysis and Iterative Improvements

Following the collection of responses, we conducted a preliminary analysis aimed at identifying patterns of satisfaction, emotional resonance, and areas for improvement. Based on these findings, we proposed several modifications to enhance the user experience and educational relevance of the game.

IV. Results

A. Final version of the game

The final version of our game Res'PIR is now fully and freely accessible on our digital platform. The interface automates gameplay tasks to ensure accessibility for a wide range of audiences, including educators, environmental associations, and individuals seeking tools to cope with eco-anxiety. By making it openly accessible, we aim to raise awareness and provide support for those experiencing eco-anxiety.

B. Survey results

1) General information: As of today, we have collected sixteen results from the post-game survey. The first part of the form gave us general information about the players. 44% of them identify as female and 56% as male. In terms of age group, 40% of them between 25 and 60 years old, and 60% between 18 and 25 years old.

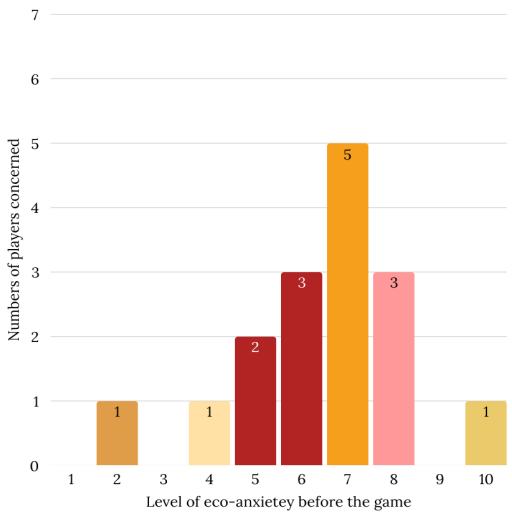

Fig. 4. The level of eco-anxiety felt by the players before their test game session

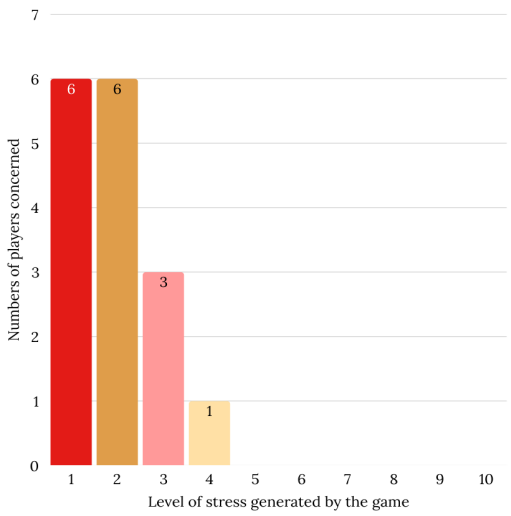

Fig. 5. The level of stress due to the test game session

2) Eco-anxiety: In the first part of the survey, we also asked players about their level of concern before the game about environmental issues and eco-anxiety. To the question "Are you sensitized to environmental issues?", each player gave a number above or equal to five, showing a panel of participants already aware of climate change issues. Some of them are already doing actions in their everyday life, like using gentle mobility solutions or reading books to learn more on those topics. Fig. 3 above shows that eleven out of fifteen of the test players were already dealing with eco-anxiety before playing this game.

3) Stress generated: In the survey, we asked players the amount of stress generated by the game. Talking about topics such as waste products or the loss of biodiversity might generate a significant amount of stress. As our main goal with this game is to reduce eco-anxiety, we wanted to make sure that our game did not generate too much stress among the players. In order to do so we tried to select and adapt the topics covered by our questions. We can see on Fig. 5 that the players did not feel really stressed after the game.

4) Information learned: Another important point for us was the amount of information that the players would learn by playing the game. Indeed, more than being an amusing way of fighting eco-anxiety, we also wanted Res'PIR to be educational. Regarding this particular goal, the results are more nuanced. Fig.6 show that some players did not learn as many information as we had hoped. To have a more precise view of what information was relevant to the players, we asked them what would be the main thing they would remember from playing the game. Here are some of the answers that came back :

- Information about the Conference Of the Parties
- List of atmospheric layers
- Collective actions are more impactful than individual ones

However, it is important to underline that most of the players were already fully aware of environmental issues, and some were very informed on the subject. Therefore, they already knew most of the information we tried to pass through the game.

Trying it with a broader audience, maybe less aware of the subject, might show different results.

C. Analysis

Among a total of five test sessions conducted and a number of twenty-two different players, we did not reach a sufficient

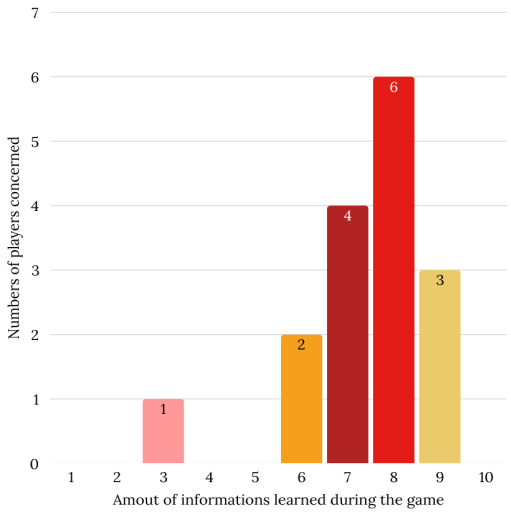

Fig. 6. The amount of information learned by the players in a test game session

number and variety of people to be able to give a definitive conclusion on the success of this game regarding its objectives. But we can deduce from those previous graphs that among the population of players who participated in those test sessions, the results are convincing. Indeed, most of the players were feeling eco-anxious before the game, and playing it did not generate additional stress, which was our main objective. On the contrary, people seemed to have spent a good time playing Res'PIR and enjoyed the discussions triggered by the game. The feedback we got showed that the most appreciated thing from the game was the personal experience sharing. All the test sessions led to fun anecdotes. As creating a space for discussion was an important guideline during our game creation process, the positive reactions we got from the players were encouraging.

D. Limitations

Although the feedback we received was overall positive, we recognize several limitations in our approach.

First, the sample of participants may not be fully representative of the general population. Indeed, the participants had an existing interest in environmental issues, which could have biased their engagement and emotional receptiveness to the game. It would therefore be valuable to conduct sessions with people who do not necessarily suffer from eco-anxiety or have an ecological background. This would help us assess whether the game can also foster awareness, or even trigger eco-responsible behavior in a broader audience.

Second, as highlighted during the research phase of our project, we are aware that individuals respond to eco-anxiety in diverse ways. Emotional needs and coping mechanisms can vary depending on personal, cultural, or psychological factors. As such, while our game may offer relief or empowerment for some, it may not resonate with others who require different forms of support, like individual therapy. We aimed to design a game as inclusive as possible by presenting diverse coping strategies such as collective discussion, artistic expression or nature-based therapy, to avoid promoting a universal approach. However, since eco-anxiety is a personal experience, we acknowledge that our game may not suit everyone.

Lastly, the post-game survey we conducted may not capture long-term emotional impact or behavioral change, as feedback was collected immediately after the game session. A follow-up survey conducted some time after the session could have helped determine whether the benefits observed immediately after the game persist over time.

E. Going further

Our main goal for this game is to have it implemented on a larger scale. At the very least, we intend to have it tested by a lot more people. For now, we have mostly tried the game with people already sensitive to eco-anxiety, and mostly with players of the same age group and/or background. All of them were from the National Institute for Applied Sciences (INSA of Toulouse, France). A good idea would be to do testing sessions with other people, and generate a database of around a hundred and fifty responses, which would be better to represent a possible trend.

We also wish to see our game included in some climate related classes. It could be done at INSA at first, but the accessibility of our game makes it reproducible everywhere. However, an important part of our project is the test phase, and getting feedback about game is a key point in our development process.

V. Conclusion

Overall, Res'PIR is a success. We have achieved the goal of creating an open-source board game about eco-anxiety. According to feedback, players generally had a good time, or at least did not dislike the experience, which was one of the original goals of the project. Furthermore, every test session became a moment of discussion, and those discussions often went beyond the context of the game. Another goal that was reached is that the game successfully conveys precise and useful information. The actions and the content which players were exposed to was interesting enough to make them enjoy the collaborative experience. The game is also rather easy to play.

We have some reservations about the results of our research. First, as previously stated, the sample of people that was used to test the game is not really representative of all the different groups the game was intended to be played by. Furthermore, the scientific background of the game is not perfect. Sources for the literature review include articles from predatory journals. The content of these sources might be accurate, but should be removed from the sources of the game. Also, the questions were made using various websites as sources. Theses sources could be improved as well.

Now that the game has reached a finished state, we propose its diffusion in academic environments. We believe it could be a great tool to raise awareness about environmental issues and different negative feelings related to climate change, as well as proposing some ideas on how to cope with those feelings.

Anyone wishing to try the game is welcome to access the website and play. We also recommend that other people try to improve upon it. Those who propose improvements should keep their work free to access.

VI. Acknowledgments

We deeply thank our tutors Elodie Chanthery and Gwendoline Le Corre for their guidance during our project.

We are also very grateful to Morgane Flahault who helped us during the process of writing our article.

We also want to acknowledge each tester who gave us their time and energy to help improving the game.

Finally, we express our special thanks to the different tutors of the Bib'INSA who taught us how to assemble articles for our bibliography.

Generative AI, in the form of GitHub Copilot code completions, was used to accelerate the website development process.

The generated code blocks were typically shorter than one line, and verified or modified during the development process. The quality of the code as a whole was verified through manual testing of the website.

REFERENCES

[1] C. Ágoston et al., "Identifying Types of Eco-Anxiety, Eco-Guilt, Eco-Grief, and Eco-Coping in a Climate-Sensitive Population: A Qualitative Study," Int J Environ Res Public Health, vol. 19, no. 4, p. 2461, Feb. 2022, doi: 10.3390/ijerph19042461. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8875433/. [Accessed: Jan. 13, 2025]

[2] L. Prisniakova, O. Aharkov, I. Agapova, and O. Aleshchenko, "Environmental anxiety and its impact on the mental health of the individual," E3S Web of Conf., vol. 452, p. 01009, 2023, doi: 10.1051/e3sconf/202345201009. Available: https://www.e3s-conferences.org/articles/e3sconf/abs/2023/89/e3sconf_ipfa2023_01009/e3sconf_ipfa2023_01009.html. [Accessed: Jan. 13, 2025]

[3] K. J. Raatikainen, A.-K. Tupala, R. Niemelä, and A.-M. Laulumaa, "The intricate diversity of human–nature relations: Evidence from Finland," Ambio, vol. 53, no. 2, pp. 181–200, Feb. 2024, doi: 10.1007/s13280-023-01933-1. Available: https://doi.org/10.1007/s13280-023-01933-1. [Accessed: Jan. 13, 2025]

[4] C. R. Bellehumeur, L.-M. Carignan, and N. Robinson, "Acceptance and commitment therapy to alleviate climate-induced psychological distress," British Journal of Guidance & Counselling, pp. 1–13, Oct. 2024, doi: 10.1080/03069885.2024.2384745. Available: https://www.tandfonline.com/doi/full/10.1080/03069885.2024.2384745. [Accessed: Jan. 13, 2025]

[5] R. C. Edwards, B. M. H. Larson, and S. Clayton, "Navigating eco-anxiety and eco-detachment: educators' strategies for raising environmental awareness given students' disconnection from nature," Environmental Education Research, vol. 30, no. 6, pp. 864–880, Jun. 2024, doi: 10.1080/13504622.2023.2286929. Available: https://www.tandfonline.com/doi/full/10.1080/13504622.2023.2286929. [Accessed: Jan. 13, 2025]

[6] P. Raile, "Poetry therapy and Eco-Anxiety – a case study," Journal of Poetry Therapy, vol. 37, no. 1, pp. 35–48, Jan. 2024, doi: 10.1080/08893675.2023.2203833. Available: https://www.tandfonline.com/doi/full/10.1080/08893675.2023.2203833. [Accessed: Jan. 13, 2025]

[7] T. Léger-Goodes, C. Malboeuf-Hurtubise, T. Mastine, M. Généreux, P.-O. Paradis, and C. Camden, "Eco-anxiety in children: A scoping review of the mental health impacts of the awareness of climate change," Front. Psychol., vol. 13, Jul. 2022, doi: 10.3389/fpsyg.2022.872544. Available: https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.872544/full [Accessed: Jan. 13, 2025]

[8] K. Kricorian and K. Turner, "Climate Change and Eco-Anxiety in the US: Predictors, Correlates, and Potential Solutions." medRxiv, Aug. 30, 2022. doi: 10.1101/2022.08.28.22279314. Available: https://www.medrxiv.org/content/10.1101/2022.08.28.22279314v1. [Accessed: Jan. 13, 2025]

[9] P. Pihkala, "Eco-Anxiety and Environmental Education," Sustainability, vol. 12, no. 23, p. 10149, Jan. 2020, doi: 10.3390/su122310149. Available: https://www.mdpi.com/2071-1050/12/23/10149. [Accessed: Jan. 13, 2025]

[10] H. Brophy, J. Olson, and P. Paul, "Eco-anxiety in youth: An integrative literature review," Int J Mental Health Nurs, vol. 32, no. 3, pp. 633–661, 2023, doi: 10.1111/inm.13099. Available: https://onlinelibrary.wiley.com/doi/10.1111/inm.13099. [Accessed: Jan. 13, 2025]