

Science for Sustainable Societies

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Imagining, Designing and Teaching Regenerative Futures: Art-Science Approaches and Inspirations From Around the World



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Science for Sustainable Societies

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Julia Bentz • Jelena Ristić Trajković
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Chapter 41

Web-Based Application to Foster Pro-environmental Behavior via Empathy



Augusta Gaspar and Ana Paula Cláudio

41.1 Introduction

Forests are disappearing at a faster pace than ever. As the problem stems not only from business interests but also from consumer's lack of knowledge and weak motivation, we put Emotion Psychology into practice, creating a web page that addresses the problems and solutions for the world's great forests through gamification—to motivate people across the world to make a difference, raising their awareness and empathy, as a means to change small habits that nonetheless have great environmental impact.

Gamification and specifically serious games are increasingly popular in education and the cognitive sciences—they have assisted Psychology over the years in Psychoeducation, promotion of mental health, prevention, and therapy—for example, in the treatment of phobias (Claudio et al. 2018) or prevention of bullying (Raminhos et al. 2016), among others. Our approach is to provide a digital, universal, carry-on, and fun tool that uses gamification strategies to entice and engage young people. This chapter describes the *SaveDforest* Project, an inter-university project, that entails contributions from Emotion Psychology and Informatic Engineering. Its main goal is to change players' everyday behavior in ways that contribute to saving forests. Another important goal is to build an understanding that one's actions in one part of the world impact ecosystems in distant parts of the

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world, which, in turn, may be vital to the health of the entire planet and critical to environmental sustainability. The project entails a webpage on forests, from which several tools can be accessed and it lodges a game with the same name *saveDforest*. The first version of the game—*saveDforest 1.0*—is focused on the Borneo forest and is ready and is currently under testing by users and experts and is freely available online. The game can be found here <https://savedforest-temp-test-2.onrender.com/>. The developer team envisages a continued improvement of the webpage and the incorporation of games that include other forests. The development of *saveDforest 2.0* is underway focusing on the Amazon forest. This approach aims to promote knowledge and empathy toward critical world forests—saving forests one by one.

41.2 Transformative Potential

Specificity and “baby steps” make a difference—our methodological approach to building *SaveDforest* departs from the notion that, to change behavior, we need not only to provide critical information and change perceptions of the environmental crisis but also to be specific on the goals to achieve and the concrete actions one might take to reduce/minimize anthropogenic harm to the environment. Recent research shows that behavior change strategies have to go beyond changing attitudes to provide facilitators of action (Albarracín et al. 2024). In that regard, *saveDforest* provides not only keys to concrete actions but also points to foreseeable solutions, in addition to frequent and constructive feedback. The specificity of the actions is linked to the specific forest one sets out to save—and the overarching concept of the webpage is saving the great forests one by one—Borneo, in version 1, Amazon in version 2, and in the future, we hope to embed other games targeting other forests.

Emotion drives intrinsic sustainable motivation and persistent behavior—games often resort to gamification strategies only to keep the player motivated, such as showing points, offering badges, and giving positive feedback. While this game design also does that, we also use content and media that have been chosen to elicit emotion.

Within the environment topic game scenario, there are some games available or partly available that were developed to contribute to environmental education, and at least one has been validated for this purpose (Eco, Fjællingsdal & Klöckner 2019). They accomplish some information acquisition on ecosystems, recycling, or sustainable agriculture in an enjoyable activity. However, they usually do not use emotional mediators that may produce persistent changes as empathy does, and resort to challenge, the motivation to play, external rewards, and visual immersion, as games do.

To change behavior beyond the game and in real life, one has to change motivation. The specific type of game we propose and designed is built upon the

assumption that no behavior change is truly possible, and sustainable over time, if not driven by emotion. Emotion is the best predictor of intrinsic motivation, and ethical behavior has largely relied on affective empathy much more than on moral principles (Gaspar 2016). Thus, the saveDforest game is tailored to enhance two dimensions of empathy: (1) affective empathy, which entails an emotional response, feeling emotionally affected by others' experience, and (2) cognitive empathy, which entails the ability to understand the state and perspective of another being. Empathy, and especially a subdimension of affective empathy called empathic concern, changes people's actions in ways that strictly informative or hedonic approaches do not. Consistent with this, while playing the player will meet triggers of these two dimensions of empathy—empathic concern and cognitive empathy. These dimensions are measured before a player engages in the first game session, and again once the player has played at least three times. Additionally, throughout the game, and after each scene (scenarios with powerful information), the player rates how he/she feels in a validated widely used pictoric emotion scale that appears in a pop-out window.

The game links to documentaries and reports, and uses music and sound effects to produce impact—either driving attention when providing critical information or offering quizzes to test the player's knowledge.

Realism and links to the real world with a transformative potential—the game entails a storyboard and presents a series of scenarios created with real photos of Borneo presented on a full-size screen along with intermittent informative content, and it provides challenges and questions to the player. The player makes choices on optional answers, what to learn, and what to do. The written content in the storyboard is aimed at creating interest and cognitive empathy. In each scenario, several different options to move forward are provided to the player. Some choices are more valuable to earn points, as they will expose the player to videos or non-governmental organization (NGO) webpages with more intense content on forest animals such as orangutans or Bornean elephants, or local Bornean people, and their plight—which are intended to induce affective empathy. Other choices are more hedonic (e.g., touristic), and the player drives forward to what she/he wishes but earns no points. One option is to take a quiz—if one feels confident about his/her knowledge on the topic—which is a way of rewarding both cognitive empathy (understanding) and affective empathy (as one can take this option after choosing first to see a video) in an objective way. The quiz is presented with a background animation showing an orangutan frolicking in the forest, with a combination of forest sounds and other visual effects.

All in all, the game provides a journey through images, videos, and written content, along which the player is challenged with optional paths and quizzes on specific knowledge or on how one feels. Even making the least valuable choices (the easy paths, moving forward, or seeing pleasurable videos only), the player will finish the game learning a substantial amount of information on the Borneo forest, the

plight of its living beings, taking along important tips on how to change some of his/her impacting consumer habits.

To most players, the game will hopefully attain the goal of promoting empathy toward forest animals and people who are affected by forest destruction. This is the first step toward transformation. The first step is understanding the potential regenerative power that lies in the adoption of consumer choices that do not contribute to further damage to the Borneo Forest—the game promotes this not only by raising empathy but by rewarding answers and choices that convey knowledge of the problem and pro-environmental behavior choices through active learning. Although this version of the game focuses on the Borneo forest, its animals, and the native people of Borneo, it also raises awareness of the global effects of forest destruction and encourages pro-environmental behavior in general.

41.3 Application

The *saveDforest* application project targets mostly young audiences but is suitable for any age group. It is an educational tool that can be easily used in a school setting, at home, in a library, or any other place where there is a computer with a fast internet connection.

The *saveDforest* 1.0 game has been designed for a target audience of adolescents and young adults and young adults. Notwithstanding, the game can be easily played by older children and preadolescents and remains challenging and enjoyable to other adults. So, educators can incorporate the game into school activities or homework. They should promote 30–60-minute sessions each time students log in, as the game entails large amounts of information acquisition having in mind that the project games are available in English only.

The game is ideal for triggering, supporting, and enriching discussions on forest protection, but also to monitor behavior changes—for example, asking players about any changes in their environment-related habits as a result of the experience of playing this game.

NGOs interested in forest protection can create links to the project webpage to further reinforce their mission. By lodging the games in a web portal that conveys relevant environmental information and that links to several NGOs, we provide a community tool solely based on academic knowledge and critical assessment, with no commercial or institutional interest attached—a public service. That is an important reason for educators and NGOs (Table 41.1).

Table 41.1 Method overview

Main purpose
Awareness building/motivation and behavior change
Gained competences
Knowledge acquisition on environmental issues and key stakeholders; practical consumer habits in everyday life that impact the Borneo forest
Educational setting
Informal (format—The game is introduced in a website, that can be presented in a brief workshop, conferences, or through a link from a stakeholder website—School, environmental organization, etc.)
Space requirements/restrictions
Indoor activity; the game is available in English and players need to have a strong domain of the English language.
Resources and necessary materials
Requires a computer (preferably) or, alternatively, a tablet, with access to the internet.
Number of participants
The game is played individually, but small groups (up to 12) may be organized to compete and discuss what they have learned from playing the game
Facilitator competences and skills
No specific skills are required, other than experience using the computer (preferably) or tablet and the keyboard
Participants skills/age/competences
Target audience—Students and young people starting in adolescence from 12 to 29 years old, but extensive to any age. Ideal for environmental education settings
Duration
The game should be played for a minimum of four sessions throughout the week. Each session should take 30–60 minutes. The best results should be obtained with further sessions and the entire game being played at least twice

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