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Playful Campaigning

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While gamification is becoming an increasingly popular tool in HCI, it is often criticized for not being meaningful. In this work, we present a new approach: *narrative-oriented gamification*, applied in the context of environmental conservation. A biodata-driven game experience was developed to raise awareness during an environmental non-governmental organization (NGO) event at a music festival. The NGO representatives developed narratives, tailored to each potential outcome of the game, which encouraged participants to immediately reflect on the broader environmental issues and take action. In this paper we present the findings from this work suggesting that this form of gamification, predicated on narrtives and reflection, can be a powerful tool for creating engagement with, and raising public awareness of, environmental issues.

Narrative-oriented gamification, sustainability, biodata, awareness raising

1. INTRODUCTION

Gamification has become a popular tool in HCI, used to create engagement in various areas from everyday household activities to location-based marketing (Fitz-Walter et al. 2013; Frith 2013). Of particular relevance here, is the application of gamification to sustainability. Videogame elements such as rewards and leaderboards have been leveraged in many mobile apps and other systems to encourage communities of users to pursue more sustainable lifestyles (Froehlich et al. 2009; Consolvo et al. 2008; Thieme et al. 2012; Massung et al. 2013). Game-like systems, mostly known as serious games, have also been developed in the context of education to engage young people with the impact of their actions and the broader environmental agenda (Gamberini et al. 2011; Rusnak et al. 2008; Shivshankar 2007). However, gamification is often broadly criticised for being overly concerned with extrinsic motivation (points, rewards etc.) and applying only the less interesting mechanics of gaming (Nicholson 2015). In this paper we aim to show that gamification can indeed be both meaningful and useful, by developing and applying a new approach: that of narrative-oriented gamification. In our case, gamification is not about pointifying/adding rewards to a task, but instead refers to taking a task (e.g. engaging with biofauna in coastal habitats) and redesigning it into an experience that includes the playful elements of game design aiming to support intrinsic motivation. The game is not an end in and of itself; rather it is part of a wider trajectory, which is ultimately focused on encouraging reflection and awareness about environmental issues. Here we present the *Man vs Turtle* experience (MVT), packaged as a bio-driven interactive game but which then, through a process of discussion afterwards, leads players to surprising moments of revelation in a way that builds on previous research on uncomfortable interactions (Benford et al. 2012). The experience was deployed at a music festival, in collaboration with MEDASSET, an environmental NGO, with the purpose of engaging the public with issues surrounding marine and coastal habitats.

In the past few years HCI has been increasingly involved in supporting and engaging with the environmental and sustainability agenda. Methods range from providing people with ways to monitor, collect information on, learn about, and make sense of their environment and the issues around it, to supporting organizations with ways to create awareness, persuade the public, disseminate information, and impact legislation regarding environmental issues (Froehlich et al. 2009; Consolvo et al. 2008; Foster et al. 2010; Pousman et al. 2008; Thieme et al. 2012; Moran et al. 2014). Whether a mobile app, a web service, a public display, a performance piece

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or an online game, a major challenge to HCI for sustainability lies with how to engage the relevant communities in a dialogue that actually brings them to a point of reflection and possibly realisation regarding environmental issues. A significant amount of work in HCI centres around debates on how this may be best achieved. For example, there is a body of work that endorses and designs persuasive technology systems for sustainability (DiSalvo et al. 2010); while, conversely, there is work that is more cautionary and critical of such systems and nudging approaches (Brynjarsdottir et al. 2012; Knowles et al. 2014). In this paper, we present findings from studying the deployment of MVT at the Plissken music festival in Athens. We describe the experience in detail, concentrating on both the game aspect how players developed tactics for playing, and how this helped to later engage them in reflections on the topic and on how the outcome of the game was used to construct narratives, which served to drive discussion. We examine the application of empathy and guilt as narrative tools for engagement, and demonstrate how this narrative-oriented approach to gamification can be beneficial for community engagement in sustainability-campaigning settings.

The key contributions of this paper are: (a) A new narrative-oriented approach to gamification that is meaningful and not driven by extrinsic motivation and (b) evidence that this approach can be effective when used in a sustainability campaigning setting which provides HCI with a new method to engage with environmental sustainability.

2. MAN VS TURTLE

Man versus Turtle was an interactive experience designed to help an environmental NGO, MEDASSET, raise its public profile and create awareness in the local community regarding its aims. It comprised a public two-player, bio-data driven game in a marquee at the Plissken music festival in Athens, followed immediately by a short, carefully staged discussion that aimed to create conversation time between players (general public) and NGO representatives.

2.1. Background

MEDASSET is an environmental NGO founded in 1988 and dedicated to the conservation of Mediterranean coastal and marine habitats. The sea turtle is used as a flagship species, and working towards its conservation, allows MEDASSET to preserve many other species of the Mediterranean biotopes. The Plissken music festival has been running for four years now and prides itself on its genre-defying philosophy and its green agenda. In 2013, it won the Greener Festival Award for



Figure 1: *Players participating in the Man Vs Turtle experience (humans in yellow, turtles in blue)*

delivering a festival with the least amount of environmental impact. The organisers describe their goal as *"pure and simple: to provide a meaningful and enjoyable music experience with respect to all its counterparts whether they be of human or environmental nature."* For MEDASSET, Plissken was an opportunity to improve their visibility with the local community and increase their supporter base, particularly with younger audiences. They wanted their participation to be different to what they usually do in campaigning/public engagement events: handing out leaflets and displaying their turtle mascot, as such methods have not proved overly successful in engaging people in the extended in-depth conversation they would prefer. They felt that an alternative approach would resonate more with the festival's identity: *"Plissken festival is not your everyday festival (. . .) It's an alternative music festival, so it is a niche in the market or a niche in the supporters that MEDASSET has not touched on (. . .) we wanted to do something that would resonate with people at the festival so having the mascot just running around waving at people or giving out leaflets wasn't a suitable approach for that kind of festival. And also experience from the past showed that just being there and trying to talk to people about what MEDASSET does isn't the right way to inform."*

2.2. The Game Aspect

Man versus Turtle as a game is deceptively simple, based on a classic tug-o-war mechanic. One player represents the humans, the other represents the turtles. Displayed in front of them, on a projector screen, are two alpha-blended videos, one of turtles, one of people dancing at a beach festival, and this view shifts between turtles and humans in response to players' biodata. While a 'winning' condition of the game was intentionally not explained to the players in a direct manner, the majority of players assumed

that the objective was for the 'human' player to make the screen display only humans and the 'turtle' player to make it show only turtles. In this way we allow the players to define their own 'win' condition, essentially their own game, then explore their reasoning.

The game interface makes use of electrodermal activity (EDA), which is a commonly used psychophysiological measurement indicating activation of the sympathetic nervous system (one component of the autonomic nervous system), and a good indicator for both physiological and psychological arousal (Cacioppo et al. 2007). Before the game starts, both players have electrodes attached to the index and middle distal phalanges of their non-dominant hand and this sensor serves as their means of interface with the game. The system monitors each of the players' arousal (as represented by their EDA), and calculates the rate of change of that arousal in real time. The blend of the videos is linked to a single variable (alpha). If either player's rate of change of EDA is positive, the alpha is increased in increments of 0.01, to a maximum of 1, causing the projected display to show more humans and less turtles in the blended image, and if the rate of change of EDA is negative or 0, alpha is reduced by increments of 0.01 to minimum of 0, showing more turtles and less humans in the display. This gives a total range of 100 steps, and represents a tug-o-war between arousal and relaxation. Overall scores are assigned to the players as a percentage of the game time spent in each state: relaxation (turtles) or arousal (humans).

Both players affect the video in the same way (more relaxation/excitement equates to more turtles/humans) The game mechanic is based on competing perspectives one player representing turtles and trying to relax, the other player representing humans and trying to maintain increasing arousal. The only interface to the game system for players is the EDA sensor, so the interaction is indirect, as EDA is not a bodily function we have direct control of, being an indicator of the sympathetic aspect of the autonomic nervous system, but it is one that can be heavily influenced by our activity. We provided some support for this task in the form of i) sweets, which we know to create a short lived increase in EDA associated with the taste experience (Rousmans et al. 2000); ii) guidelines for generating arousal or relaxation, such as dancing, breathing; and iii) the inclusion of coaches. Each player was assigned a coach whose task was to help them relax or become aroused, depending on to which team they belonged. The coaches were NGO volunteers who acted like personal trainers, standing next to the players and using various tactics to help them achieve their goals for example hugging the turtle player to help them relax, or dancing with the human player. To our knowledge MVT is the only game that uses this asymmetric variation on the familiar 'relax to win' game mechanic established by games like Brainball (Hjelm and Browall 2000)

A significant aspect of the game experience design was the careful avoidance of use of the word 'winning'. In fact, no explicit victory condition was ever described to the players during the experience. The effects of their behaviour were described to them in a carefully scripted manner to avoid using terms like goal, task or win. The following gives an example of how this was described to the players: *"Turtles, by and large, just want to be left in peace. To represent that, as long as you're [directed at turtle player] relaxing you'll be seeing more turtles on the screen. Humans on the other hand are mostly out for a good time, so as long as you're [directed at human player] excited you will be seeing more people on the screen."* The intention was to allow the players to draw their own conclusions about the goals of the game something that would drive the discussion in the second part of the experience. However, the experience was deliberately themed to create a competitive 'sports' atmosphere. Players were each given a team uniform (a custom made football-type jersey), a matching one of which was also worn by their coach and the game was explained and run by a moderator dressed as a referee, who started and stopped the game with a whistle. Team colours were also placed around the marquee. This theming was deliberately engineered to engender a feeling of competition between the players, pushing them in that direction to serve the narrative purpose, but still not explicitly defining their goals, to allow for a greater sense of player agency.

2.3. The Discussion

Following the game, a discussion was held with the participants. This served two purposes: debrief participants about the game and its purpose, and provide the NGO with the opportunity to discuss key environmental issues and present its activities in turtle and coastal conservation. The latter was of high importance to the NGO - finding ways to campaign and raise awareness for environmental issues within the context of an alternative music festival was a driving force for the design of the MVT experience. The discussion provided the necessary 'quality time' between members of the NGO and participants and for this reason it was considered the critical element of the experience as a whole. This is counter to the expectation that the game aspect would be the main component.

The discussion was semi-structured and was co-designed by our team of researchers and the members of the NGO. In this way, we were

able to follow up specific events during the game to probe for more depth. Overall, the discussion explored participants' impressions of the game, their experiences with the other players and the technology of the MVT game. We also enquired whether they grasped the underlying environmental symbolism of the game and their knowledge of current environmental issues and actions regarding turtle and coastal preservation. Crucially, the direction of the discussion was determined by the outcome of the game, centring on one of two predefined narratives, the details of which evolved during the experience.

3. STUDYING MAN VS TURTLE

Our methodological approach followed the tradition of 'studies in the wild' (Brown et al. 2011; Rogers 2012) in that we were interested in *"experimenting with new technological possibilities that can change and even disrupt behaviour"* (Rogers 2012, p.58). We undertook a naturalistic study using qualitative methods. MVT took place over a period of two days during the Plissken music festival in Athens, Greece. Each day the game ran for approximately 3-4 hours, (from sunset to midnight). Over the two days 72 people (40 female, 32 male) participated in pairs. Our participants' age range was between 18-40 years old (average 25), which is in line with the age group of the music festival audience being younger than the general population. Out of the 36 games, there were 2 ties, 20 wins for the turtle team and 14 wins for the human team. During the game phase, researchers observed the way people played, made notes and took photographs; while the discussion phase was audio recorded and further observed by our research team. After the festival, we interviewed NGO representatives to capture their views of the MVT experience. All collected data was analysed using thematic analysis (Braun and Clarke 2006). Below, we present findings that detail how people engaged with/played MVT (e.g. tactics used and the role of coaches), how they reflected and commented on their play experience and how the NGO facilitators drew on the play experience and its outcome to create narratives to engage participants with pro-environmental behaviour.

3.1. Playing the Game

Participants played differently depending on to which team they belonged and whether they were actively trying to win or not. For the most part, the human team participants engaged in physically active behaviour (running, dancing etc.) whereas the turtle team participants stood still and focused on breathing and meditative behaviour. There were two cases where the pairs had pre-agreed a 'turtle win' and in both those cases, the human team participant stood still and supported the turtle team member in being calm and focused.

Participants on both teams commented on the physical aspect of playing, and debated amongst themselves on whether being a human and maintaining excitement, was harder than being a turtle and staying relaxed with each team claiming their task to be the hardest: *"-H: I thought it was a great experience although I felt my part was the hardest because to sit down and relax is easier. You close the eyes and I think it is much easier as it doesn't involve physical activity. It is about mental activity which you control easier. -T: Want to swap and play again to see how hard it is? -H: Sure! It is much easier to relax. -T: Lie, lie! I think it is much easier to be a human and dance all the time. I put a lot of effort into being a turtle. -H: I could have easily been a turtle, you are in the water and swim slowly and calmly."* In pursuit of a win, participants developed various tactics. These differed between the turtle and human teams, given the former were trying to relax, while the latter were trying to stay excited. For each team, a member of the research team or an NGO volunteer was present as a coach. This form of coaching was found helpful especially for the turtle team. Due to the often highly physical nature of the tactics employed by the human coach and player, the human and turtle coaches switched teams between plays, so had the opportunity to develop tactics for coaching both teams. In the next sections, we present the tactics participants and coaches used in the game.

3.2. Human Team Play

Participants who played for the human team, generally engaged in active and mischievous behaviour. The majority danced or jogged throughout the game to remain excited. When tired or when the feedback from the screen showed an activity wasn't working, they teased or 'trash-talked' their opponents. Some human team participants, poked, tickled or even gently kicked their opponents to interfere with their calm. This behaviour was dependent on the relationships between the players couples and close friends were more likely to physically interact than relative strangers. Several human participants asked for help from friends or audience in raising excitement by talking or dancing with them. Participants also ate sweets and some tried to make the turtle participants eat them too. A few participants tried to achieve an excited state of mind without physical activity, but later reported finding it very hard: *"When I tried to do it mentally, I couldn't. I was thinking of the Black Lips [band] and how mental it will be and was trying to do it without moving but I couldn't beat you like that."* The coach for the human team danced or ran

with the participants and cheered and cajoled them to keep going. The coaches suggested they could tease their opponents or eat sweets to increase their sugar levels: *"Getting people energised was a little more difficult if they were calm people. I would talk to them about things that interested them and made them excited. I would try and seem equally excited about it. I would encourage them to misbehave, to tease the turtle participant, maybe even throw sweets at them. Eating sweets and dancing around was always a good option too. I tried different tactics while watching the faces of participants and the screen to see what worked best for each individual."*

3.3. Turtle Team Play

Participants who played for the turtle team for the most part stayed still without talking and engaged in breathing and meditative techniques. Many sat or even lay on the ground and closed their eyes to block visual stimuli and concentrate on breathing. Others mentioned visualising being the turtle and swimming calmly in the water and how when the turtle video was visible, it enhanced that feeling: *"The screenshots helped me a lot - especially the sea. To be in the bottom of the sea, this image in my mind helped me to be relaxed. I felt like a turtle in the water and I loved it"* Many of the turtle team participants mentioned the role of the coach in helping them relax: *"(. . .) I was visualizing the beach but the girl [coach] helped me the most. She held me and kept telling me to relax"*. The coach would hold them or provide meditation instructions, and give them positive feedback on their performance while their eyes were closed and could not see the feedback screen themselves. *"I ask them generally what they were interested in, what they enjoy doing. I also ask them what they did to calm down when they got stressed. If neither of these tactics produced any results I could use when we were playing the game, I told them techniques which help me meditate(. . .). For example imagining golden light all around you then breathing deeply into your noise, deep into your stomach and then out through your mouth. If they were not the type of people who could visualise easily then I would ask them to follow my breathing, or close their eyes. I spoke to them, telling them how well they are doing, or that they were nearly there. Without doubt the best way to calm people down was to put my arm round them. Some times I stroked their hair. Sometimes they wanted to lean on my shoulder, a few just wanted to hug. I always asked them, what they preferred, while keeping an eye on the screen."*

3.4. Reflecting on the game

After the game was complete, participants were encouraged to reflect on their experience by means of a semi-structured discussion. The aim was to use the game aspect of the experience as a cue to encourage discussion and reflection of the antagonistic biotopes (turtle/human) beyond the game and highlight some of the current environmental issues, as well as actions that can be taken to prevent them. This discussion was led by a representative of the NGO the facilitator. Initially, participants were asked to freely comment on their experience of the game. Next, participants were asked to consider the wider issues hinted at by the game. At this point, the facilitator introduced the concept of the antagonistic biotopes that the game had aimed to portray and how easily human activities can interfere with the turtle conservation efforts. The game experience was used to create narrative hooks for discussion and two distinct narratives evolved depending on the outcome. The discussion was the critical part of the experience in which the facilitator carefully engineered a transition from a playful state of mind, in which participants were excited to have won or disappointed to have lost, to a more reflective one in which participants engaged in considering how they may be more proactive in supporting conservation efforts as part of their everyday lives. Key to this was the narrative framing which led players to reflect on the environmental messages behind/beyond the game and ideally to introduce an element of discomfort and sometimes even shock into this experience. How this was done depended on the outcome of the game.

3.4.1. Human win narrative: humans' interference

In the pairs where the human team won, the facilitator drew on this win condition to stress the extent of human interference with turtle conservation efforts as well as how easy it is for humans to interfere, and had participants reflect on what may be done. The narrative in this case leveraged the difficulty that turtle team participants reported when describing how they were trying to stay calm but couldn't. The facilitator drew analogies between the players' in-game experiences and those of real turtles. One main analogy related to sound and noise pollution. The facilitator drew on participants' comments on the loud music from the festival and how it interfered with their staying calm, to talk about the effects of noise pollution on turtles. Noise in the festival was used as a narrative hook for noise pollution which opened the discussion to other types of pollution and how humans contribute to those, while counter-presenting ways that people can help to prevent those and specific actions that the NGO is organizing and contributing to. *"-Turtle player: (. . .) right when I was calm, he talks to me and I lose my concentration, imagine what the poor turtles have to cope with -Facilitator: exactly the same happens with the turtles, they try to go towards the sea and there is the music from the beach bars and they*

see the lights from the shops on the beach and they lose their direction and instead of going towards the water they go to the shops". Another analogy drew on multiple interferences that put turtle conservation in a very disadvantageous position. Usually during the game, the turtle participant had to deal with a number of distractions (music, poking, trash-talking etc.), which made it hard for them to stay relaxed and many expressed feeling their opponent had an unfair advantage in the game. The facilitator drew upon such comments to talk about how turtles are faced with a similar disadvantage: *"-Turtle player: She was playing very dirty; I was trying to concentrate (and relax) and she was interfering. -Facilitator: This is exactly what happens to the turtles. For example, in a nesting beach when a turtle wants to give birth and there are many interferences from the human presence. And that game is dirty too (. . .)."*

This could be quite shocking for the players. Emotions of guilt and regret were exhibited both from the human and turtle participant. Human team participants felt ashamed or regretted that they had tried so hard to win and stated how they would do differently had they known:

"I won but in the end I lost."

"Now I am ashamed that I danced and had the candy! I love turtles and I know a lot about them."

"I am a misanthrope now. I'm sorry I didn't try to lose"

Equally, turtle team participants felt guilty and disappointed that they didn't try hard enough to win and often blamed their partner, the human, for not allowing them to win: *"-Turtle player (T): I thought that I could to stay calm but I failed. Shame on you! Human player: So I was acting as the as***le sunbather. T: You were the as***e human."*

3.4.2. Turtle win narrative: Resilience of the turtle species

In the case of a turtle win, the facilitator focused on the resilience and adaptability of the turtle species to bring the conversation round to the environmental issues and encourage reflection. The narrative in this case emphasised how turtles survive and persevere against all odds drawing parallels with how the turtle team participant stayed calm despite the distraction and stressful surroundings (e.g. noise levels), while at the same time arguing that efforts towards conservation are still much needed by using examples from the game such as how distractions easily affected the turtle's calm state or the proximity of the score: *"-Facilitator: your win reflects a fact that is well known in nature: that turtles are a very resilient species; they first appeared in the dinosaur era and still exist [participants nod in agreement], however, the impact of human activity in particular in the nesting areas is very direct and you can see that from the turtles numbers that are decreasing and even from the score of the game; A. could have very easily won just by being a bit more active. (. . .). If human activity (. . .) prevents the turtles from laying their eggs, that population will disappear completely(. . .) this is the message, that while it is much easier for people to interfere in the ecological circle of the turtle, with a small effort from our part and the turtles' resilience a lot of positive things can be achieved and this is where environmental awareness helps"*. Participants who had won as 'turtles' felt rewarded for their perseverance and participants who had lost as 'humans' felt content to have contributed to the turtles' 'survival'. *"To me it felt like a great challenge, that the music was beating so loud but I will persevere and win like the turtle"*

In both conditions, the narrative and shock value of the reveal, together with the earlier embodied and experiential aspects of the game seemed to have enabled participants to reflect on the environmental issues at a more personal level:

"Now that you said this, I understand much better; in my head, it was disconnected exactly how difficult it is for a turtle, the noise, the difficulty in focusing, what a disaster!"

"It is a great concept and especially the unexpected turnaround, that what you do has a different meaning; you try for a good percentage and then you realise that this was hurting the turtles."

"-Turtle player: Usually you just think about this in the summer if you are in a beach and there are turtles. Human player: But when an action like this takes place, you don't remember it only in the summer or for the few minutes of a TV commercial, I have run for this now so I will remember for much longer."

3.5. Reflections from the NGO representatives

The debrief with the NGO representatives after the end of the festival was positive and provided a number of useful comments and ideas to follow up on with respect to enhancing the experience. All the representatives felt that the event an overall success and a good fit to the alternative music festival atmosphere. Success was defined both in terms of the participation numbers and the publics feedback to MEDASSET, MVT as an experience had delivered on branding them as a fun and innovative NGO among a young green community:

"People couldn't stop talking about their experience - we are very excited"

"We did reach the audience we wanted to reach, people saw us there and even if someone didn't participate in the experience, they still saw it. It is more of a branding thing (. . .) we wanted to generate surprise and curiosity around what we are doing"

The members of the NGO further commented on things that stood out for them such as the significant role of the coaches in the game and suggested new elements for the design of the experience that they thought would improve the reflection process or maximize participants exposure to the environmental agenda: *"I didn't realize the coaches would have had such a major role, which was great, people were happy to have someone there apart from their friends to help them win (. . .) I thought later that maybe there is an opportunity that the coaches can also transfer some messages about the environmental agenda during the game"* and *"It would be nice to create within the game environmental goals such as 'guide the turtle towards the water' using your biodata"*

The NGO members were very keen to be able to continue running the experience in future events and felt this was a good tool for engaging relevant communities and audiences in general but at the same time expressed concerns regarding the resources that are needed to do so both in terms of the number of people needed to assist and the technical skills required to set up or alter parts of the experience per occasion: *"That would be an excellent tool for us but can we make it that we don't need so many volunteers, could it be a box with sensors and people walk in and interact (. . .) will we be able to support this from a technical point of view? Who is going to program it? Would our or any organization be able to change the scenario each time depending on what issue they want to stress?"*

4. DISCUSSION

In this work we have explored a novel approach to gamification. More specifically, we have designed a game experience that incorporated reflective narratives as a core facet of the experience and in this way provoked moments of reflection among the players e.g."I won but in the end I lost". The game and the reflective narratives were embedded in a carefully designed experience structure to engage participants in the given context in this case raising awareness for coastal and marine habitats. A little clarity on the use of the term 'gamification' is necessary here. Gamification refers to the addition of a game-like layer on top of an existing task. In MVT we do not seek to 'gamify' the process of environmental activism, but rather to 'gamify' the process of engaging with the campaigners. This is arguably 'game-based learning' however the two terms need not be mutually exclusive. The game is not an end in and of itself; rather it is part of a wider trajectory (Benford et al. 2009), which is ultimately focused on creating a discussion about environmental issues. The game is used to drive one of a set of predefined narratives, so the trajectory of the experience is shaped by the game. We seek to make a task more attractive with a game-like element, which is ultimately the purpose of gamification so we consider the term appropriate here, and the lessons valid.

Our study provides initial evidence that this can be an effective strategy, at least for campaigning events such as the music festival described in this work. We suggest that this work extends the repertoire of existing gamification approaches. Previous approaches have for the most part focused on introducing videogame-like elements, generally in the form of achievements or leaderboards, to non-gaming systems in an attempt to improve users' experience and motivate them to engage with tasks that are not by nature entertainment (Deterding et al. 2011). With particular relevance to our topic of sustainability, gamification has been used to encourage users to new, more sustainable, behaviours and attitudes. Various mobile apps have been developed to promote more sustainable healthy lifestyles and increase community awareness or even competition (Froehlich et al. 2009; Consolvo et al. 2008; Foster et al. 2010; Pousman et al. 2008; von Ahn and Dabbish 2008; Massung et al. 2013). For example, Massuung et al. developed mobile apps using two extrinsic motivation approaches pointsification and financial incentives in an effort to engage the local community in data collection and overcome public apathy towards environmental issues. Mobile and desktop-based applications have also leveraged gaming features to motivate the public to assist biodiversity professionals in surveying (Moran et al. 2014) and classifying rare and endangered species (e.g. www.zooniverse.org). Serious games have also been widely applied, especially in educational contexts, to engage people with the broader environmental agenda (Rusnak et al. 2008; Gamberini et al. 2011; Shivshankar 2007). All of these approaches use games, or game-like activities, to promote reflection and conversation processes among the general public or specific communities in a way similar to our own approach.

Our approach is distinct in that rather than simply relying on players to reflect in their own time, as previous more freeform approaches do, the experience deliberately and explicitly incorporates a discussion with coherent pre-constructed narrative(s) based on the outcome of the game. This approach embeds the initial reflection

into the performance. The discussion is guided by experts: the NGO representatives, and those experts employ strategies of empathy and guilt to create community engagement. In our approach the players interact live in the real world rather than on a simulated world or online platform, which again differs from more familiar approaches to gamification. The game also relies on the use of biosensing through a unique mechanic that combines both excitement and relaxation. We will now explore here various issues in depth.

4.1. Narrative-oriented gamification

The design of the MVT experience relied on two main components that had to be considered in conjunction: the narratives and the game itself. Carefully considering and developing narratives is vital. For each outcome of the game there was a tailored narrative that aimed to draw on or influence participants' emotional reaction and drove the reflective aspect of the discussion. A combination of experience design strategies is necessary to achieve this. In our case, we drew on discomfort and empathy as the two principal strategies, one for each of the potential game outcomes. The strategy for the human win included a moment of reveal as to what this represented from an environmental perspective, aimed at making the participants feel guilty and uncomfortable. This was the case both for the human team (winner) and the turtle (loser). Guilt is an interesting emotion to work with and recently has been at the forefront of social psychology and campaigning research with respect to its potential impact to pro-environmental and sustainable lifestyles (Elgaaied 2012; Kathy Keeling 2010). For example, in (Elgaaied 2012), findings showed that anticipated guilt influenced peoples' behaviour more directly than the awareness of negative consequences and was found to mediate the relationship between environmental concern and intention to recycle. Based on these results, the authors suggest guilt appeals can be a good communication strategy in order to promote recycling. One principal challenge with this strategy though lies in the ethical risk that needs to be considered and managed. In MVT, having a human facilitator present allows participants to raise concerns they may have and discuss them. Also having trained coaches in the game allows for quickly detecting and addressing problems. While human support is costly it serves as an ethical safety net.

Creating uncomfortable experiences has been discussed previously by Benford et al. in (Benford et al. 2012), with Ulrika and Eamon Compliant, a theatrical performance with game-like characteristics, which forces the participant to confront challenging themes (in this case the theme of freedom fighting/terrorism), during a staged interview at the end of the performance. In that experience the feelings of discomfort build throughout the experience, whereas in MVT, they are introduced later in the discussion phase. However, we do aim to create a sense of empathy towards the turtles that builds throughout the whole experience. In the case of a turtle win, the narrative resilience of the species is aimed at inducing feelings of reward for both the winning and the losing team and also at triggering empathy. Participants in the turtle team identified with the endangered species and many expressed interest in taking part more actively in preservation efforts organized by the NGO. Both the human and turtle win conditions depended on developing a sense of empathy, or at least identification between the players and the turtles. In order for this to work correctly, the introductory guidance before the game had to be carefully written, to suggest that connection. The coaches were tasked with compounding that connection by encouraging the players to share the emotions of the characters in the interface. In the cases where this approach worked, the discussion was seen to flow more easily, for example one participant said: *"It is something you remember, for me being a turtle I really tried to stay calm; humans really don't get it. I really really tried my best"*.

Developing appropriate narratives for this task was a challenging and evolutionary process. By the second day of the experience, the stories were more clearly defined, and the discussions more regular. However, in retrospect, it would have been desirable to have these more clearly defined in advance, and we suggest here that fundamental to the development of a similar experience is careful and balanced design of the narrative(s). Additionally, if that narrative is to be driven by empathy, then that empathy requires care and time to develop. This approach also requires significant performative skill by those delivering the narrative aspect of the experience, which may have subsequent implications for scalability.

It should be noted that narrative-oriented gamification as described here is distinct from story-based games in that the game itself does not provide the narrative, as would be the case in story-based games. Rather, the game serves as a selection method for the relevant dialogue starting point. The experience as a whole has been gamified but critically includes a distinct narrative component within its trajectory, of which the game is only one aspect.

4.2. Biodata as a catalyst for reflection and empathy

There has been a recent trend in the consumer world for systems which monitor our physiological

state or activity and then visualize it for future reflection whether it is mobile apps such as *mapmyrun* (mapmyrun.com), to devices such as *fitbit* (fitbit.com) and the Apple Watch (apple.com). This suggests an increasing familiarity with biodata in the public consciousness and thus that biodata might be a suitable method of engendering reflection in games (or gamified experiences). Using biodata as an input mechanic to games is a well trodden path in the literature, with many systems applying heart rate (Stach et al. 2009), breathing (Tennent et al. 2011) and even brain activity (Hjelm and Browall 2000). In MVT, EDA was used as the principal interaction mechanic, not only because it is engaging and immediately responsive, but because it engenders a reflection on ones' physiological, and consequently emotional, activity. By putting players into this frame of mind, we argue that it is more feasible to later introduce, through narrative, the feelings of empathy and/or guilt discussed above. This is somewhat similar to (Marshall et al. 2011) where a breath controlled thrill ride forced people to consider and become more aware of their physiological state and their (lack of) control over it. In the case of MVT, the performative, biodriven experience feeds into a narrative in which one's performance is reflected on, deliberately leading to feelings of empathy or guilt.

There is much literature in HCI discussing the formulation of empathy through the visualization or experience of biodata. For example in (Slovák et al. 2012), the authors look at a system that communicates heart rates to create a sense of connectivity between two people. In MVT, while we are not equating ones' biodata directly to that of the turtles or the humans on the beach, we do signpost, in the introductory talk, themes of relaxation and excitement and the activities of each. This cue is designed to plant seeds of empathy within the players that can be picked up in the discussion phase. Another technique used to heighten, or at least prepare the players for, the feelings of empathy engendered by the narrative is that the game goals are asymmetric. One player is attempting to relax, while their opponent is attempting to stay excited. This asymmetry, apart from its value towards engendering empathy, is also a new type of interface mechanic for biodata-based games. There are many examples of games which use the 'relax to win' mechanic e.g. brainball (Hjelm and Browall 2000) or the opposite, for example (Nenonen et al. 2007) but to our knowledge no game has made use of both.

4.3. Balancing the game (is it fair to be unfair?)

Balance is fundamental to all games but even more critical in the design of multiplayer games. Balance in such games is achieved either by giving players identical controls and assets, as in e.g. chess, or by a careful process of testing and refining as in (Knizia 2004). When dealing with gamification however, we are not making a game per se. We are making something which shares many characteristics with a game, but it has an overt additional purpose. In the case of MVT, the purpose was to feed into a narrative to engage the public with specific environmental issues. When there are multiple potential outcomes, it is necessary to develop multiple narratives, however in MVT, when the human team 'won', the narrative was stronger. When we designed the system we made the assumption that the game would be intrinsically stacked in favour of the humans, based on the distracting music festival setting. Our game was mechanically quite straightforward, and mathematically fair though the situation seemed to favour the humans. We compounded this by providing stimulants (sweets) for the humans. We were however, unprepared for the meditative skills of many of our turtle players. As such, contrary to our expectations, we had more cases of turtles 'winning' than humans (55%-39%).

Is it then acceptable to engineer an unfair game in order to create the desired outcome? Many games of chance are balanced in favour of the house, but a game needs to at least seem fair a game where the humans win 100% of the time would likely quickly be disregarded, similar to a slot machine which never pays out. However, we would prefer the humans to win as it is better for our reflective narrative. We suggest here that in the case of narrative-oriented gamification, it is acceptable to manipulate the odds to a degree to navigate the narrative towards a final goal, with the caveat that it should be a limited manipulation so as not to jeopardise core playability.

4.4. Meaningful Gamification

Meaningful gamification is a term coined by Nicholson in (Nicholson 2015). The design of MVT follows this different approach to existing gamification. As discussed earlier, gamification is applied for the most part by the inclusion of points, achievements, levels etc. While there is evidence that this approach can yield positive results (Zichermann and Cunningham 2011), there is also significant underlying criticism. Nicholson points out that these may be the least interesting elements of game design. Indeed Robertson, (Robertson 2010) goes so far as to somewhat derisorily suggest the term 'pointsification' for this approach. Nicholson suggests that there is a need to make gamification more *meaningful*, by taking the interesting parts of game design, namely the playful elements and applying them to non-game contexts. In MVT, we focus on using play to gamifiy the non-game activity of environmental awareness raising, using the play

to create the relevant 'hooks' for the narratives in the discussion part of the experience.

A key difference between *meaningful* and *meaningless* gamification in (Nicholson 2015) is the separation of intrinsic and extrinsic motivation. Most gamification is based on extrinsic motivation, e.g. rewards for doing tasks a player would otherwise prefer not to be doing. Adding extrinsic rewards to a task though can reduce people's interest in doing the task for anything other than the reward (see cycle of rewards in (Zichermann and Cunningham 2011)). Sustained extrinsic rewards were also found to reduce intrinsic motivation in educational settings (Deci et al. 2001). This suggests that it may be desirable to focus on intrinsic motivation. To sustain intrinsic motivation, we must consider the situational relevance of our task (Nicholson 2015); there needs to be a match between the users' interest and some aspect of the game experience, which Deterding (Deterding et al. 2011) refers to as "situated motivational affordance". Our game was situated at a music festival known for its green credentials, in a marquee hosted by MEDASSET. Players had actively chosen to visit the tent, which suggests at least a spark of interest in environmental concerns. Indeed this is reflected in the data of the seventy two players who participated in the experience, some forty one had prior engagement with environmental activism. In this case it is the theme of the game that creates the necessary motivational affordance. This could be considered an intentional positive application of selection bias. Another aspect of meaningful gamification discussed in (Nicholson 2015), is the need to allow users to set their own goals. If we remove the extrinsic motivation (points etc.) then users have to create their own goals for their experience. A good example of this in practice is ChoreWars (Fitz-Walter et al. 2013) where users create 'quests' with the ultimate goal of completing household tasks. In this way the players are given agency to set their goals, but there is still an overarching goal other than. In chorewars that purpose is to clean your house, whereas in MVT, that purpose is to learn about marine coastal habitats and engage with MEDASSET. In MVT, we explicitly avoid giving goals to the players, leaving them to decide what that should be, but the game has a finite set of outcomes (more turtles, more humans, tie), each of which leads to a prefigured narrative and each narrative, while different, has the same end goal, revealed in the discussion: to encourage reflection on the environment. We allow agency, giving players meaningful choices, which change the path through the experience, but which ultimately work towards the same final aim.

5. CONCLUSIONS AND FUTURE WORK

Our findings from the MVT experience suggest that combining a biodata-driven game with a set of narratives tailored to the game's outcomes can promote reflection and support extended discussion. However, the experience was, by nature, tailored specifically for the context of a music festival and one particular environmental agenda. Potential distractions of such a venue etc. were considered and incorporated into the design of the game and narratives, and thus may limit this specific approach to similar settings. Indeed, running the MVT experience required a minimum of seven people, and such manpower is not always available, especially in the case of NGO campaigning with limited resources. Equally the technical knowledge required to design, deploy or troubleshoot such experiences can be an issue. Considering these limitations, we present two questions whose further exploration can inform future studies/experiences using a narrative-oriented gamification approach: a) Can a narrative-oriented form of gamification be applied to themes other than the sustainability campaigning example shown in this paper? and b) Given the cost and manpower required to run this experience, is it possible to develop narrative-oriented gamification that requires less manpower to develop and run?

With respect to the first question, we believe that our approach can indeed be applied in other contexts; one such application could be in educational settings where directed reflection may be driven by the play elements of our approach. In terms of the second question, one way of reducing cost and manpower would be by providing a packaged game interface for less techno-savvy operators or by replacing the human coaches with an automated 'within the system' coaching mechanism. Naturally, for the above suggestions, further research is needed to identify whether and to what extend they have a similar impact to the embodied experience detailed here.

Ultimately MVT has demonstrated that the appeal of a game-like experience to attract participants, which serves as part of an experience trajectory with a clearly defined narrative can be a powerful tool for engaging with the public. The immediate reflection created by the wider experience makes this approach quite effective. We have shown an example of the application of gamification not to make a dull task more fun, but rather as a method of public educational engagement with a difficult issue.

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