MOTIVATION FOR CHANGE
GAMIFICATION AS A TOOL FOR SUPPORTING SUSTAINABLE BEHAVIOUR

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This article reports on applied research and the aspiration to find ways to increase sustainable behavior through the application of game mechanics and playful solutions. One of the main questions investigated through the research activities was what would motivate people to adopt more sustainable behavior and sustainable consumption. To create a better understanding of the problem, researchers and students looked into the awareness and different perceptions of sustainability in a variety of cultural settings, with special focus on waste separation, energy, and water consumption. In addition to documenting the details about current sustainable behavior, additional questions included how and where people find out about sustainability concepts, and how these concepts are currently being taught.
Keywords: *environmental behavior, green skills, sustainability, interviews, co-creation*

Avtorja predstavita aplikativne pristope in načine za spodbujanje trajnostnega načina življenja z uporabo igralne mehanike in poigritve. Eno glavnih raziskovalnih vprašanj je bilo, kaj bi motiviralo ljudi pri prehodu k bolj trajnostnemu vedenju in porabi. Raziskovalci in študenti so za boljše razumevanje problema preučevali osveščanje in različne predstave o trajnosti v različnih kulturnih okoljih, pri čemer so posebej poudarili ločevanje odpadkov ter porabo energije in vode. Poleg dokumentiranja trajnostnih načinov vedenju sta se raziskovalca ukvarjala tudi z vprašanji, kako in kje se ljudje informirajo o konceptih trajnosti in kako trenutno te koncepte poučujejo.
Ključne besede: *okoljsko vedenje, zelene veščine, trajnost, intervjuji, soustvarjanje*

INTRODUCTION

As identified in the UNESCO Roadmap for Implementing the Global Action Programme on Education for Sustainable Development (UNESCO roadmap 2014: 8), "rapid, sweeping, and long-lasting change is altering our planet's environment in an unprecedented manner . . . . It will require a wholesale change in the way we think and the way we act—a rethink of how we relate to one another and how we interact with the ecosystems that support our lives." This raises the following questions: How can we introduce and improve a sustainable lifestyle and associated practices, such as recycling, reducing food waste, and responsible energy use and water consumption? How do people understand and experience the concept of sustainability, and what are their values, personal attitudes, and strategies related to this?

Kollmuss and Agyeaman (2002) carried out an extensive literature review of studies trying to explain the gap between environmental knowledge and environmental awareness on the one hand, and pro-environmental behavior on the other. They pointed out that developing a model that incorporates all the factors behind pro-environmental behavior might be neither feasible nor useful. Further studies, such Feng (2012), identified sustainability

education as very interdisciplinary, and determined that interdisciplinary subject areas such as sustainability education need to be encouraged for collective empowerment of a "learning society."

In the literature, three spheres of transformation draw attention to the relationships and interactions among the practical, political, and personal dimensions of change processes (O'Brien 2018). O'Brien argues that, especially in relation to paradigms, transformations in the personal sphere can have significant consequences for systems. He expands further on the personal sphere of transformation, which consists of the subjective beliefs, values, worldviews, and paradigms that influence how people perceive, define, or constitute systems and structures, as well as their behaviors and practices.

More than a decade after the publication by Kollmuss and Agyeaman (2002), Bezjak (2017) notes in her conclusions that none of these approaches (economic incentives, environmental citizens, or social practices) have proven entirely satisfactory in practice. It is clear that the current theoretical understanding of the relationship between attitudes and behavior is far from conclusive.

Lander (2017: 1) suggests that educators working in higher education are often charged with preparing the sustainability leaders of tomorrow, and yet they are challenged to find ways to educate about what sustainability means and how they should practice it. She states that "many educators have encountered resistance for reasons that range from concerns over time constraints and lack of professional development, to debates over sustainability as ideology."

Huber and Hilty (2015: 1) explored the potential of gamification to overcome such limitations. They found that a "gamification-based approach may give the user more autonomy in selecting goals and relating individual action to social interaction." After suggesting that the motivation for sustainable consumption required a link between physical and social realities, Huber and Hilty (2015: 16) found that "gamification adds a virtual world that creates a new link between the two spheres and supports the transformation of practices by using elements of games."

Games that are concerned with educational elements, such as "serious games," are able to indirectly affect players' behavior "through constructed narratives, fostering empathy for the characters and creating shared knowledge about the issue at hand, with the overall aim for personal involvement and activism towards the issue" (Arora & Itu 2012: 5). Kelly and Nardi (2014) also see games and gamification as a beneficial element within education. They suggest that the issue of "futures of scarcity," which include environmental issues such as climate change, resource depletion, and pollution, are topics that can be addressed.

However, creating a successful gamification strategy or a game to change behavior is not always straightforward. Maru Nihoniho (2018) of Metia Interactive says that a developer must first learn about behavioral therapy and translate it into a digital form. She states: "I did a lot of work researching a problem that is there, why that is a problem, and what way you can address the problem."

METHODOLOGY

The research reported in this article sought to identify overlaps in comprehension and resulting behavior related to sustainability and green skills, with a focus on the culturally specific and country-specific differences in the responses.

To describe the current situation and elicit user needs in Austria related to increasing green skills (Promoting Green Skills through Games 2017), extensive research was carried out to obtain insights into policies and strategies, as well as into what kinds of education, projects, and best-practice examples are available in sustainability education. To augment the results obtained through desk research, four interviews were conducted with teachers at primary and secondary schools.

Semi-structured interviews containing mainly open-ended questions that allowed for narrative answers from the participants were used to guide the conversation. An interviewer may prepare a list of topics and questions but does not necessarily need to ask them all, or to ask them in any particular order (Bryman 2016; Bajuk Senčar 2017).

For thoroughness, in Taiwan interviews with different age groups were carried out, followed by a co-creation workshop held in Austria. Through semi-structured interviews, stories and opinions were elicited and deeper insight was obtained into the specifics of the people and target groups interviewed. The co-creation workshop was used to gather the creative potential of students from different backgrounds, collaborating with anthropologists and designers, and from different countries with regard to increasing sustainability. Steen et al. (2011) outline short-term benefits of co-design, such as generation of better ideas with a high degree of originality and user value, and improved knowledge of user needs.

In the first phase of the preparatory research, two sets of interviews in mixed-sex groups were conducted in Taiwan to obtain insight into knowledge (Steen et al. 2011) and to further increase the diversity of the samples,. The first interview was performed with five high-school students attending their last year of classes. The approval of the school director was obtained for the interviews, and teachers asked some more active students if they would be willing to take part in a group interview. All the students that participated were volunteers and had a good command of English. However, they preferred to answer in Chinese, and so a translator was also present. The second group interviewed was five university students; they were advanced students interested in participating in this study, and they did not require a translator. The interview was carried out in English.

The questions for the field research were the following:

1. When does an item become waste? When and how do we decide to throw something away? Consider this in your household, or school, or at work.
2. What is your awareness and perception of sustainability?
3. Where do students get in contact with sustainability? What do they think about this concept?

4. Document details about (awareness of) waste separation and energy and water consumption (in the city vs. rural areas)
5. What would increase your awareness regarding food, water, and energy consumption (i.e., sustainability)?
6. What would motivate you to change your opinion and behavior regarding food, water, and energy consumption?

This article only considers findings related to Questions 2, 3, 5, and 6.

In addition, following the Four Steps for the People: People-Centered Development Toolkit (Podjed et al. 2019) as preparation for the co-creation workshop, master's-level students from Austria and Slovenia were given the same research questions to carry out preliminary observation research within their environments. During the preparation for this research, the students from Austria were involved in fieldtrips (one group went to Russia and one group to Finland), where they were able to extend their research to these environments. In addition, the students themselves came from different countries, and so insights were also obtained from France and Germany.

FINDINGS FROM THE INTERVIEWS

The interview participants stated that they have high awareness regarding waste separation and energy and water consumption; however, they also pointed out some differences. For example, they all separate waste in schools and at home, but there is less of a focus on saving electricity and water. Only one participant's family talked about saving utilities, and they saved electricity by turning off the lights. Four out of five participants separated waste at their own initiative and as they learned in school.[1]

One female university student pointed out that, although she is well informed about recycling, she observed that when visiting China many of her friends do not recycle. *But I think the behavior is influenced by peers and the environment; I recycle in Taiwan, and not in China.* This statement mirrors the conclusions from the literature that "individuals' knowledge and attitudes towards environmental change are not sufficient to stimulate lasting change in behavior" (Bezjak 2017).

To find out where students get in contact with sustainability and how they learn about it, one female student shared her experience:

> *In elementary school the teacher told me to recycle and I asked why (because it's a bother), and teacher said it's for the Earth (and I really didn't understand that). But when I grew up, I saw this as more like a fashion, that everyone does something about*

[1] Children take turns being in charge of the lunch break in school, and collecting and separating food waste at the end of the break.

sustainability and more action (like using straws made of glass or stainless steel instead of plastic). So now I can understand it a bit better. . . . But sometimes I think the Earth will disappear because of pollution and our bad behavior, and then I think the Earth disappearing is not my problem; maybe our children will have to deal with this problem.[2]

Another student's story about learning about sustainability provided some more detailed information spread through different levels of formal education:

In elementary school, our teacher taught us to "R R R": reduce, reuse, and recycle. The teacher explained to us that we should do this for a better world. At the university I attended some conference and lectures about the environment and economics, and so I think sustainability is about business, maybe corporate social responsibility. At the conference speakers always talked about how to invent and introduce a new business model to save the Earth and do business (sustainable business).

His colleague then expanded further on this, from the perspective of business studies, which they were enrolled in:

Development of the economy contradicts development of sustainability because economic growth is almost equivalent to destroying the environment (or damaging the environment). It's the circle of economics, ecology, and social business; everything is about the development of economics and sustainable business.

To better understand how the younger generation perceives the world, students were asked what they believe would increase their awareness regarding food, water, and energy consumption and sustainability in general.

I am easily influenced by others . . . and so the behavior of friends could help me change. I know I should try and change, but if I'm busy or sometimes lazy, I won't do it (and then I'll feel guilty). If our government, education system, and our peers mentioned this topic more and more, we'd become aware and care about our behavior. If the environment changes (by recycling bags and utensils), I'll change myself. Paying for using a bag is ok. Also, maybe if they raised the price of bags, people would change their behavior.

Students suggested a step-by-step process, starting with introducing more classes and research related to this topic in schools and, if that does not work, more discussion groups

[2] Reflection by the interviewer: we seem to shift this problem and responsibility for action from generation to generation.

and debate—and, if this still does not work, then actions such as cleaning the coastline and increasing the price of utilities.

One participant agreed with the statement above and added that other forms of education and learning are not as effective as action. That participant suggested that only action will change the mindset. Therefore, schools should have a mandatory trip to clean the beach together. This activity would help students stop throwing trash away and increase awareness about sustainability.

Another interviewee shared that, from his point of view, self-awareness about a problem is the most important aspect. He explained further that *when it affects my self-interest—if I need something and do not have it because of bad management—that will increase my self-awareness about a topic*; no outside activities will help. Another participant had a similar opinion, suggesting that *when we face a problem about a shortage, we will gain awareness about the shortage. Now we take things for granted. Difficulties will change this perception.*

In addition to this, university-level female and male interviewees stated that watching a movie about people that live with shortages triggers their thoughts about the problem and thinking about how to help them. Based on movies, they started appreciating the lifestyle their parents enabled them to have. They mentioned that in some lessons at the university they talked about sustainability, and this made them reflect on it.

Based on the answers obtained and in relation to the literature (Bezjak 2017), it should be underlined that pro-environmental behavior may result from hands-on-participation and from the contextual experience of getting involved.

To create appropriate interventions regarding sustainability, we further inquired what would motivate students to change their opinion and behavior regarding food, water, and energy consumption.

Self-understanding and awareness of this topic would raise effectiveness toward implementing such behavior in everyday life. Society can influence actions in various ways— for example, by increasing the costs of utilities—but changing your heart comes from interest in the topic. Sustainability can be implemented through individual interest.

One of the interviewees stated that there is a possible lack of awareness about the problem related to environmental issues because the consequences are far from people's eyes. He does not believe that carrying out a project would help increase his own interest in the topic. To make a change, people need to be genuinely interested in this area. However, how one can spark such interest remains unclear.

One female participant stated that in some areas, due to specific circumstances (e.g., drought), the water supply could be limited and daily water cuts could be applied, *so you realize that you have to do something to save it. And elsewhere you see that others still use things without limitations.*

Another participant, a male, suggested that the *best motivation would be to fine me if I do not recycle, or give me something if I recycle—like a reward, as acknowledgement of my effort. That would be the best motivation to start recycling.*

Others in the student group suggested solutions, stating that having access to more practical problem-solving situations and concepts (i.e., good-practice solutions) relating to influencing sustainable behavior would be needed. More public discussions on this topic could help people better understand the concept of sustainability, and in schools one could watch documentaries as the best alternative to traveling the world, to see how different people in different countries solve similar problems.

THE CO-CREATION WORKSHOP

As noted by Sanders (2008), design research is shifting from a user-centered approach to co-designing with users, thus creating new domains of collective creativity. In their description of the design choices framework, Lee et al. (2018) focus on a systematic understanding of key dimensions and design choices in co-creation projects. This helps explain what kinds of dimensions co-creation projects are built on and what informs the selection and development of appropriate methods.

In their action research project related to reducing carbon emissions, White and van Knoten (2016) included a variety of methods to mobilize knowledge exchange between different stakeholder groups. In addition to ethnographic methods, they employed participatory and co-creation methods, and they concluded that the concept of "socio-ecological innovation" would be more useful in designing for sustainability.

Co-design is a richer, more tangible understanding of the diverse and creative ways in which researchers and non-academic partners jointly develop research projects and find answers to research questions in a pragmatic way (Moser 2016). Further studies (Pink 2014; Cerinšek et al. 2019; Podjed 2019) describe changing design practice and fruitful collaboration between design and anthropology in interdisciplinary projects, especially the added value of ethnographic approaches and interdisciplinary analysis for understanding and influencing human behavior, which have resulted in unique innovations in technology and services.

The international field research activities culminated in a short international symposium in conjunction with a co-creation workshop titled Gamifying Sustainability—Intercultural and Interdisciplinary Solutions, which took place on May 8th, 2019 at FH Joanneum, Institute of Design and Communication in Graz. These solutions were designed for the idea of convening people to design more sustainable ways of living in the future, and so master's students from different countries were brought together to voice their opinions and points of view, and to express their specific needs.

The symposium part started with a talk by Jane Lu Hsu, a visiting professor from National Chung Hsing University in Taichung, Taiwan, who spoke about nonverbal communication in Asia. This was followed by Dan Podjed from the Research Center of the Slovenian Academy of Sciences and Arts in Ljubljana, Slovenia, who presented the

need for people-friendly and environmentally responsible design solutions. The next talk was given by Darragh Coakley from the Cork Institute of Technology, Ireland, on the gamified approach to Promoting Green Skills through Games project. This completed the introductory lecture part.

According to Lee et al. (2018: 27), types of co-creation activities consist of step-by-step activities for articulating experiences, building mutual understanding, and generating future ideas together. At the beginning of the co-creation workshop, ten-minute group presentations of the students' field research results were used for articulating experiences, as conversation starters, and as input for the brainstorm session. The workshop fact sheet and related data are presented in Table 1.

Category	Description
Challenge	Design solutions to increase green skills in a playful way and motivate sustainable behavior(s) in everyday life
Materials	Flip charts and pens, computers with wifi access
Time	Three hours available for ideation and prototyping
Participants	Design students (design methods, community members); ethnology students (ethnographic methods, community members); content input providers (experts, mentors)

Table 1. Workshop description.

The students' challenge was tackled in groups of up to six people in mixed intercultural and interdisciplinary teams that included students of anthropology, media, and interaction design from Austria and Slovenia. In their creation process, the groups followed stepwise activities, as shown in Table 2.

Step	Description of workshop activities
1	Agree on and define a topic you want to gamify (invent a playful activity); fifteen minutes.
2	Brainstorm possibilities.
3	Decide on either physical or digital activity (or a combination of both).
4	Research existing solutions.
5	Develop a concept for a solution (paper drafts, prototypes, sketches) and create an innovative presentation (you can combine any possible media).
6	Present your topic, problem, and solution in five minutes.

Table 2. Suggested steps for group work.

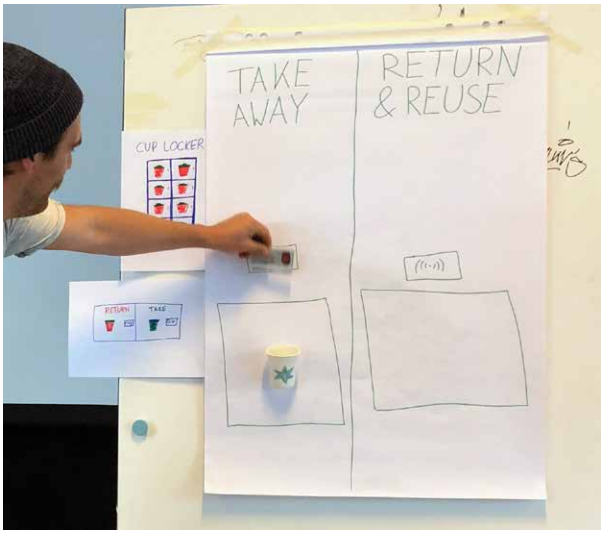

Figure 1: A sustainable coffee cup service.

Figure 2: The Fair Clothing concept.

At the end of the workshop, five student teams presented their out-of-the-box holistic and gamified solutions. The presentations showed that in different countries the infrastructure of waste collection, separation, and recycling differs significantly, not only in color coding of waste separation, but also in where the bins are located (everywhere, or just somewhere remotely so as not to interfere with the visual aesthetics of the city) and in the details of the waste separation. Therefore, to a certain extent waste management infrastructure influences practices in waste separation and sustainable resource consumption, and some practices are also motivated by monetary incentives. For example, there is an economic incentive in Finland and Germany to collect plastic bottles and return them to supermarkets. On the one hand, such an approach increases the motivation of individuals to collect and recycle plastics, and on the other hand it also establishes a gray economy of a less-fortunate population collecting recyclables for additional income. However, as outlined in Bezjak (2017), although an economic incentive approach can be quick at encouraging people to act differently, it does not necessarily affect people's mindsets.

A further noticeable sustainable initiative within the city was food sharing. Donating food when people have too much through organized sharing points so others can take what they need creates socially responsible behavior on the one hand, and at the same time it helps reduce food waste. Another problem identified related to food was a lack of awareness that many products consumed daily travel thousands of kilometers.

In some cities, following the motto "one man's trash is another man's treasure," there is also a practice of putting discarded large items on the street so others can take them if they need them. It is also recommended that students look around and start by acting in their own environment; for example, by turning the heat down a degree, properly airing rooms, and turning the lights off in lecture rooms.

RESULTS OF THE WORKSHOP

Related to the daily environment of specific student life and under the motto "everybody wants coffee and nobody wants waste," one group designed a takeaway and return-the-cup service machine (see Figure 1). As a playful motivation for using this service, the group added incentives in games, treasure hunts, motivational quotes, quizzes, funny horoscopes, and facts about sustainability to randomly print on the ceramic cups. These random messages along with individual curiosity would also create information exchange as well as additional dynamics for exchanging the cups.

A fair clothing concept took advantage of the current trend of up-cycling and was partially inspired by the food-sharing solutions observed in some cities (see Figure 2). The fair clothing concept was centered around a festival (an alternative to a fashion show with elements of a Sunday market) and workshops (a mixture of talks, exhibitions, auctions, a fashion show, contests, and donations) in combination with drawing on alternative youth

culture and its use of social media, in particular Instagram. With the proposed hashtags #storybehindyouroutfit and #howoldisyouroutfit, the storytelling elements would mix with the social media presence, and this would increase the impact and raise awareness of vintage clothes.

The Trash Casino concept used repurposing of familiar casino games in combination with recycling. The Trash Casino could be a mobile fair, traveling from one city to the next, and remaining there only a specific amount of time. Entire families could go there to spend quality time together. Repurposed games, as presented in the Figure 3, could be "slot-o-bottle" (bring your recyclable plastics and play a slot machine, and the rewards would be related to sustainability; e.g., winning a glass water bottle), "grab a seed" (to later plant it either in one's own garden or in a specific designated area), "duck your luck" (in which players fish for ducks and could gain further rewards related to sustainability), and "elect-roulette" (in which players could bring their broken electric appliances and win free repair for them).

Two proposed solutions described in the following paragraphs were apps that people could use to shift to local and seasonal products and decrease the carbon footprint of their food consumption.

Super Fruiter—For a Fruitful Future is an app that facilitates better communication between local providers, supermarkets, and consumers. For consumers the app provides information about products, their origin, and their nutrition value. Based on consumer feedback, it helps supermarkets offer products with the quality that consumers want, and it shows that retailers can increase their profit by means of sustainability. A splash screen of the app along with further screen flow is presented in Figure 4.

Avo Plane is the second app, in the form of a plugin for existing digital shopping lists and receipt web sites. As outlined in Figure 5, the technical solution intentionally decreases the entry barrier for beginner users and integrates with people's established habits. The shopping list app Avo Plane offers local data and seasonal alternatives. For example, when you select a recipe for a meal you want to cook, you receive a shopping list of necessary ingredients. Avo Plane provides information on the carbon footprint for each of the ingredients as well as the seasonal availability for all of the ingredients. If a dish requires an avocado, for example, because it does not grow locally, the app provides you alternative local and seasonal ingredients for that dish.

CONCLUSION

Changing a society's behavior is a momentous and complex undertaking. This research offers new insights from the young generation in Taiwan and Europe, and it suggests that the younger population is aware of this necessity, is open to changing to more environmentally friendly practice, and is ready to tackle the problem in various ways.

Figure 3: The Trash Casino.

Figure 4: The Super Fruiter app.

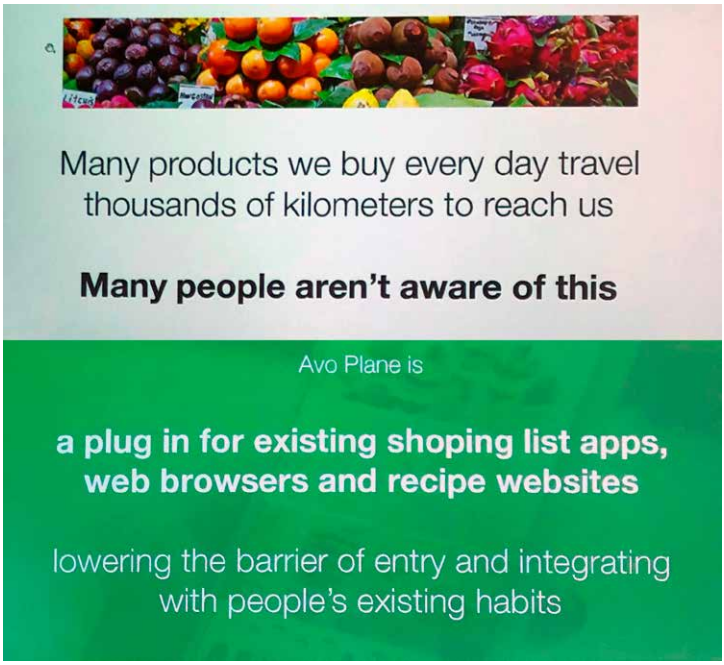

Figure 5: The Avo Plane shopping app for a lower carbon footprint.

Whereas children mostly learn from direction and instruction, young adults consider new and novel solutions. However, they also highlight the problem of how to create genuine interest in a topic and the difficulty of understanding the consequences of individual poor behavior due to a lack of seeing immediate consequences of individual actions. The immersive quality inherent in games and gamification can be used as a means to create learning environments in which learners as players can begin to think from the "inside out," gaining understanding and, ultimately, "environmental morality" (Tragazikis & Meimaris 2009).

An expressed need for access to a comprehensive collection of best practices of problems and solutions seems to contribute to a shift in existing paradigms and to introduce more responsible and sustainable behavior. As can be observed from the results of the co-creation workshop, many participants in the study identified and documented good practice cases that can be transferred into various contexts,[3] and parts of different solutions can be successfully patched together to create new innovative and meaningful solutions.

This article has documented ideas and suggestions from students that participated in this research and the associated workshops. These ideas may never be realized but, if nothing else, these students are very much aware of the systemic problem of creating

[3] Reported food sharing concept that inspired fair clothing festival idea; collecting the plastics and getting remunerated for it practice is the underlying mechanism of returning the cup solution.

sustainable behavior and sustainable consumption, and they are calling for more public discussions on these problems and related solutions, as well as for the introduction of a sustainability-driven economy.

The research reported is an example of interdisciplinary collaboration between three universities, a research center, and several research projects. It shows that the important topic of sustainability and changing behavior can be tackled only by talking, working together, and considering different perspectives.

REFERENCES

Arora, Payal, and Sorina Itu. 2012. Arm Chair Activism: Serious Games Usage by INGOs for Educational Change. *International Journal of Game-Based Learning* 2 (4): 1–17. DOI: https://doi.org/10.4018/ijgbl.2012100101

Bajuk Senčar, Tatiana. 2017. Researching the Culture of Comfort: The Use of Interviews in Ethnographic Studies of Mobility. In: Dan Podjed and Simona Bezjak (eds.), *Research on the Road*. Ljubljana: Založba ZRC, 43–61.

Bezjak, Simona. 2017. Greening Society: Social Science Approaches for Encouraging Pro-Environmental Behaviors and Lifestyles. In: Dan Podjed and Simona Bezjak (eds.), *Research on the Road*. Ljubljana: Založba ZRC, 169–190.

Bryman, Alan. 2016. *Social Research Methods*. Oxford: Oxford University Press.

Cerinšek, Gregor et al. 2019. Boosting Affordability, Acceptability and Attractiveness of Deep Energy Renovations of Residential Buildings—A People-Centred Ethnographic Approach. In: *E3S Web of Conferences 111* (CLIMA 2019 Congress). Available at: https://doi.org/10.1051/e3sconf/201911103026.

Coakley, Darragh, Maja Pivec, and Anika Kronberger. 2019. Hacking the Compulsion Loop for Sustainability Education in Game Based Learning. In: Jutta Pauschenwein and Robert Gutounig (eds.), *Tagungsband 18: E-Learning Tag der FH Joanneum*. Graz: FH Joanneum Gesellschaft mbH, 14–26.

Feng, Ling. 2012. Teacher and Student Responses to Interdisciplinary Aspects of Sustainability Education: What Do We Really Know? *Environmental Education Research* 18 (1): 31–43. DOI: https://doi.org/10.1080/13504622.2011.574209

Huber, Martina, and Lorenz Hilty. 2015. Gamification and Sustainable Consumption: Overcoming the Limitations of Persuasive Technologies. In: Lorenz Hilty and Bernard Aebischer (eds.), *ICT Innovations for Sustainability: Advances in Intelligent Systems and Computing* (Vol. 310). Cham: Springer, 367–386.

Kelly, Shawna, and Bonnie Nardi. 2014. Playing with Sustainability: Using Video Games to Simulate Futures of Scarcity. *First Monday* 19 (5). DOI: https://doi.org/10.5210/fm.v19i5.5259

Kollmuss, Anja, and Julian Agyeman. 2002. Mind the Gap: Why Do People Act Environmentally and What Are the Barriers to Pro-Environmental Behavior? *Environmental Education Research* 8 (3): 239–260. DOI: https://doi.org/10.1080/13504620220145401

Lander, Lorraine. 2017. Education for Sustainability: A Wisdom Model. In: Walter Leal Filho, Mark Mifsud, Chris Shiel and Rudi Pretorius (eds.), *Handbook of Theory and Practice of Sustainable Development in Higher Education* (= *World Sustainability Series*). Cham: Springer, 47–58.

Lee, Jung-Joo et al. 2018. Design Choices Framework for Co-Creation Projects. *International Journal of Design* 12 (2): 15–31. Available at: http://www.ijdesign.org/index.php/IJDesign/article/viewFile/2782/810

Metia Interactive. 2018. Interview with Dame Maru Nihoniho, CEO.

Moser, Susanne C. 2016. Editorial Overview: Transformations and Co-Design: Co-Designing Research Projects on Social Transformations to Sustainability. *Current Opinion in Environmental Sustainability* 20 (June): v–viii. DOI: https://doi.org/10.1016/j.cosust.2016.10.001

O'Brien, Karen. 2018. Is the 1.5 °C Target Possible? Exploring the Three Spheres of Transformation. *Current Opinion in Environmental Sustainability* 31 (April): 153–160. DOI: https://doi.org/10.1016/j.cosust.2018.04.010

Pink, Sarah. 2014. Digital-Visual-Sensory-Design Anthropology: Ethnography, Imagination and Intervention. *Arts and Humanities in Higher Education* 13 (4): 412–427. https://doi.org/10.1177/1474022214542353

Podjed, Dan. 2019. Razvoj etnografsko utemeljene tehnološke rešitve. *Glasnik Slovenskega etnološkega društva* 59 (1): 39–48.

Podjed, Dan, Sara Arko, and Tatiana Bajuk Senčar. 2019. *Four Steps for the People: People-Centred Development Toolkit*. Ljubljana: PEOPLE Project. Available at: http://people-project.net/wp-content/uploads/2019/12/M2.4_Toolkit.pdf.

Promoting Green Skills through Games. 2017. Erasmus+ project. Available at: http://greenskillsgame.eu

Sanders, Elizabeth B. N. 2008. Co-Creation and the New Landscapes of Design. *CoDesign* 4 (1): 5–18. DOI: https://doi.org/10.1080/15710880701875068

Steen, Marc, Menno Manschot, and Nicole De Koning. 2011. Benefits of Co-Design in Service Design Projects. *International Journal of Design* 5 (2): 53–60. Available at: http://www.ijdesign.org/index.php/IJDesign/article/viewFile/890/339

Sustainable Development Knowledge Platform. 2019. Available at: https://sustainabledevelopment.un.org/.

Tragazikis, Panagiotis, and Michael Meimaris. 2009. Engaging Kids with the Concept of Sustainability Using a Commercial Video Game—A Case Study. In: Zhigeng Pan, Adrian David Cheok, Wolfgang Müller and Maiga Chang (eds.), *Transactions on Edutainment III* (= *Lecture Notes in Computer Science*, Vol. 5940). Berlin: Springer, 1–12.

United Nations Educational, Scientific, and Cultural Organization (UNESCO). 2014. *UNESCO Roadmap for Implementing the Global Action Programme on Education for Sustainable Development*. Paris: United Nations Educational, Scientific and Cultural Organization. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000230514

Vaughter, Philip et al. 2013. Greening the Ivory Tower: A Review on Educational Research on Sustainability in Post-Secondary Education. *Sustainability* 5 (5): 2252–2271. DOI: https://doi.org/10.3390/su5052252

White, Rehema M., and Hamid van Koten. 2016. Co-Designing for Sustainability: Strategizing Community Carbon Emission Reduction through Socio-Ecological Innovation. *The Design Journal* 19 (1): 25–46. DOI: https://doi.org/10.1080/14606925.2015.1064219

Winter, Jennie, and Debby Cotton. 2012. Making the Hidden Curriculum Visible: Sustainability Literacy in Higher Education. *Environmental Education Research* 18 (6): 783–796. DOI: https://dpi.org/10.1080/13504622.2012.670207

MOTIVACIJA ZA SPREMEMBE: POIGRITEV KOT ORODJE ZA SPODBUJANJE TRAJNOSTNEGA VEDENJA

Avtorici predstavita uporabne raziskave, ki so namenjene iskanju rešitev za spodbujanje trajnostnega vedenja. Te rešitve so zasnovane na podlagi igralne mehanike in načel poigritve (angl. gamification*). Eno glavnih raziskovalnih vprašanj je, kaj motivira ljudi, da se usmerijo v bolj trajnostno vedenje in porabo.*

Za boljše razumevanje problema so raziskovalci in študenti preučevali zavedanje in drugačno sprejemanje in dojemanje trajnosti v različnih kulturnih okoljih, s posebnim poudarkom na ločevanju odpadkov ter porabi energije in vode. Poleg dokumentiranja podrobnosti o trajnostnem vedenju so raziskovali, kje in kako ljudje stopijo v stik s trajnostnimi koncepti in kako se teh konceptov učijo.

Mednarodno terensko raziskovalno delo so sklenili s soustvarjalno delavnico, na kateri so se študentje spoprijeli z izzivom, kako na igriv način izboljšati trajnostne kompetence in kako spodbuditi trajnostno vedenje v vsakdanjem življenju. Pet interdisciplinarnih študentskih skupin iz Slovenije in Avstrije, tj. študentov etnologije in kulturne antropologije, oblikovanja medijev in interakcij, je predstavilo svoje zamisli za oblikovanje rešitev, ki jim je osnova tehnika poigritve.

V članku so dokumentirane ideje in predlogi študentov, ki so sodelovali v raziskavi in delavnici. Čeprav njihove zamisli ne bodo v celoti uresničene, so pomembne, saj so se med delom študentje seznanili s sistemskim problemom spodbujanja trajnostnega vedenja in porabe. Med delom so tudi spoznali, kako lahko javno razpravljamo o okoljskih težavah in z njimi povezanih rešitvah ter kako lahko spodbujamo uvajanje trajnostno usmerjenega razvoja produktov in gospodarstva.

Na podlagi pridobljenih rezultatov lahko ugotovimo, da je nove idejne rešitve možno prilagoditi in prenesti v različne okolja in da je pomembno, da se te tematike lotimo v sodelovanju in z upoštevanjem različnih izhodišč.

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