Game Jams and 'Heavy' Topics: Navigating anxiety through game creation

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ABSTRACT

This study investigates the prospect of integrating sustainability issues into game development education by reporting experiences from two Nordic Alliance for Sustainability in Gaming (NASG) events. The paper highlights the importance of offering a social, creative environment in which the process of jamming is emphasized over results. We unpack the potential of game jams to be used for teaching subjects other than game development itself, particularly in relation to complex, anxiety provoking topics such as sustainability. Based on data consisting of participant reflections on their own moods and gained insights throughout the course of the jam, the research reveals a clear change in attitudes among the participants as they move on in their creative process. The study concludes that game jams, as activities defined by high levels of creativity and social engagement, is a powerful educational tool for approaching heavy topics while still letting participants cope with, and even empower them to address such complex issues.

Keywords

game jams, games education, pedagogy, sustainability, game design, game development, serious games

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INTRODUCTION

Teaching about sustainability in relation to games – playing and developing them – is an urgent, yet still underexplored challenge. Going beyond 'green/pink washing' and instead meaningfully engaging with sustainability, based on the recommendations of the UN (United Nations Environment Programme 2021), requires a systemic approach that aims at tangible impact in the material world, including the economic system (Böhm, Misoczky and Moog 2012). At the same time, digital games as digital media carry with them the original sin of carbon emissions (cf. Aslan 2020, Mills et al. 2019, Lönnqvist 2022). Firstly, colonialist exploitation of rare natural resources is needed to produce the necessary hardware. Secondly, fossil fuels are widely used to power these devices, with game hardware and software being notorious for their high energy consumption. Thirdly, aspects of cultural and social sustainability are often insufficiently addressed in the game industry, which continues to grapple with issues ranging from social inclusion to workers' rights and corporate responsibility.[1]

Based on our teaching experience, game development students of today are often aware of the social and environmental issues associated with the medium that they are learning to work with. Students want to be part of a possible solution and to make a positive impact on the world instead of contributing to an industry complicit in destroying the planet. Unsurprisingly, some of them experience 'eco-anxiety' (Pihkala 2020). This means that there is a need as well as a demand to better address sustainability in relation to games education — and do so in a way that is genuine and has a real-life, tangible impact (Ferreira 2019, Ferreira et al. 2013). Here, as the reader will learn, the impact is not directly on environment but towards students' capacities to cope with the related uncertainty and their ability to build sustainable solutions throughout game development without being overwhelmed by anxiety.

One attempt to explore what teaching about sustainability in game development might look like were the 2022 and 2023 game jams for the Nordic Alliance for Sustainability in Gaming (NASG). *NordEcoJam* (that was later known as *NASG Un-Jam*) has been organised as a Nordplus-funded intensive course and game creation event. The events involved students from six participating universities in five Northern European countries. The first jam was held at the Tallinn University in Estonia in June 2022 and the second iteration of the event took place at the IT University of Copenhagen in Denmark in June 2023. The third jam of the same kind is planned for the University of Skövde in Sweden in June 2024. During the first event, 28 students were grouped into six teams and created game prototypes on the topic of sustainability. 23 participants joined the second jam creating 5 games. Both events spanned five days, combining development with workshops and expert talks. This paper reflects on both jams as a case study, while discussing the challenges we encountered and suggesting possible solutions to apply in the future. By sharing our experience with game jams, we hope to contribute to the emerging body of knowledge around sustainability and game development education.

Our contribution to this nascent field is twofold. First, we reflected on our experience of integrating learning considerations with those relating to participant well-being. Second, we discuss a context where the focus of the game jam is directly relevant to the design and implementation of the event itself. In other words, our concern is how to do a game jam about sustainability in a way that is sustainable (both from an environmental and cultural perspective), while also affecting lasting changes in game creators' understanding of the topics they design their games around.

THEORY AND BACKGROUND

Game-Making, Game Jams and Learning

At the heart of our approach to games and sustainability education lies the recognition of game creation as a potentially transformative process. Game-making is a task that can be engaging and motivating, while also requiring focus and attention to detail, as well as promoting interdisciplinary cooperation and creativity (Pirker et al. 2016). As games are fundamentally rule-based models of reality, creating them also invites learners to investigate the dynamics and underlying logic of real-world processes. This can facilitate deep learning and a more systemic understanding of such processes (Vos et al. 2011, Kafai and Burke 2015). Engaging in game creation this way can also facilitate critical literacy skills, which learners can then apply to analyse the biases and implicit messages in other games, and more broadly, in any other digital media more broadly. (Thumlert et al. 2018, Hung et al. 2020).

Given that game creation is an inherently collaborative and interdisciplinary process, it stands to reason that game jams – time-limited, typically team-based game creation events that often feature a specific theme – are becoming a prominent tool in education, both in and outside of game development education (Meriläinen et al. 2020). Indeed, research on game jams often views them as events that focus on learning and personal development during the jam rather than on the actual game or prototype that jam participants end up producing (Kultima 2015). At the same time, Kultima (2015, 7) defines a game jam as 'an accelerated opportunistic game creation event where a game is created in a relatively short timeframe exploring given design constraint(s) and end results are shared publically [sic]'. This definition does not cover the rationale, purpose, or intended effects of a game jam, apart from the creation of a game or several games. Therefore, Lai et al.'s (2021) proposal for a game jam taxonomy, which consists of seven categories, is useful as it affords a more granular view of the phenomenon and can help position NordEcoJam and NASG Un-Jam in relation to other game jams. The taxonomy includes the following types – which are not mutually exclusive – based on their focus and goals:

1. Games Industry Commentary, Meta: focus on critiquing and reflecting on the game industry, as well as the concept of game jams itself
2. Commercial Game Jams: focus on promoting a product or company
3. Challenge: focus on the game creation process and added creative constraints
4. Regional Affiliation: focus on fostering a game developer community in a given region
5. Experience Economy, Part of Other Events: focus on creating an engaging (and often novel) community experience
6. Purposeful Game Jams, Teaching & Learning: focus on developing skills and conceptual knowledge
7. Technology: focus on exploring specific software and hardware tools

The game jams discussed in this article mainly fall under the sixth category of 'purposeful' game jams, i.e., those that include an educational approach and a learning goal. While Lai et al. (2021) do not expressly define this category of game jams, they give a range of examples and also use the somewhat narrower term 'serious game jams'. This refers to the concept of serious games, originally proposed by Clark C. Abt, who defined them as games that 'have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for

amusement' (Abt 1970, 9). Since then, the term has been widely adopted and is used in relation to both digital and non-digital games today. Serious game jams, i.e. those focusing on the creation of serious games, have also become a subject of study in recent years (Ramzan and Reid 2016, Aibara et al. 2022, Abbott et al. 2023). It is important to point out, however, that the goal of NASG jams was not only (and not primarily) to produce 'serious games', but also to encourage broader reflection and discussion around the implications of sustainability for game development and play, and to encourage participants to incorporate these considerations into their future practice. Therefore, the jam can also be seen falling into the first category by Lai et al. (2021): Games Industry Commentary, Meta. As such, while the events were certainly 'purposeful' and educational in purpose, they were not purely 'serious game jams'.

Prior studies have investigated game jams' use for both formal and informal learning. Meriläinen et al. present a literature review on educational game jams and conclude that 'there is considerable potential in game jamming as a method and tool for developing a wide variety of skills and competences, especially related to game creation, design, and development' (2020, 64). Kolek et al. (2022) follows up on this study, focusing on the learning outcomes for game jam participants from the game industry, as well as their motivation for taking part in jams. Through a combination of a literature review and an industry survey, they demonstrate that game jams offer value to the game industry and its professionals, providing both educational and non-educational benefits. The latter include talent acquisition, networking, PR, and the way in which jams function as a way of generating new ideas for future products. The educational benefits that game jams offer to industry professionals strongly overlap with those highlighted by Meriläinen et al. (2020) in the context of educational game jams. This includes communication, teamwork, creative problem-solving, as well as practical game creation skills.

The value of game jams is not limited to fostering skills and fulfilling educational objectives. Game jams may also provide networking and collaboration opportunities with game companies and industry professionals. Mikami et al. (2010) report on how game jams can be used in a game education curriculum to bridge students with the industry. Interestingly, this networking aspect does not appear to entirely fit into any of the categories outlined by Lai et al. (2021). But for the purposes of NASG game jams, this aspect is a crucial consideration. After all, our broader ambition is to prepare game industry professionals who can exert a transformative impact on the game industry and its practices in relation to sustainability. This also necessitates collaboration with the industry itself and a recognition that efforts aimed at making games more environmentally and culturally sustainable are also taking place there. Further, the networking potential of game jams makes it possible to also involve other important stakeholders, whether it be environmental scientists, policy-makers, local non-profits, etc. — even if in practice their collaboration may be challenging due to the parties vastly different agendas and priorities (Fizek et al. 2023).

Another, less researched, area where game jams – and game creation more broadly – hold potential lies in the therapeutic effects afforded by making a game about a sensitive, personally relevant topic. This links to a field rarely evoked when discussing digital games: art therapy. While the potential of using serious games for therapy is well-established (Eichenberg and Schott 2017), as is the therapeutic value of crafting and creating at a general level (e.g. Collier 2011, Smith 2021), little research exists into the therapeutic effects of the act of game creation itself. There are some accounts of art therapy practitioners incorporating game design into their work (e.g., Austin 2015)

— yet the therapeutic potential of game creation need not be limited to institutional therapy. Fiadotau (2022) discusses how hobbyist games that explore their creators' personal experiences with mental ill-health often place much emphasis on artistic expression and appear to be (self-)therapeutic in intent. Danilovic argues that game design can not only be therapeutic, but "has something unique to offer" in terms of stimulating reflection and self-understanding that "writing and other forms of 'art therapy' may not be able to offer" (2018, 58).

This therapeutic potential is evident in several game jams publicised in recent years. Danilovic (2018) positions game design as a form of art therapy and 'self-therapy' by reflecting on participants' experiences in the Autopathographical Game Jam — an event that focused on mental health. Chen et al. (2021) build on Danilovic's work in their discussion of Mental Jam: an online game creation workshop designed for young people with lived experiences of anxiety and depression. Their study concludes that the event was not only helpful in terms of introspection and self-insight, but also because it fostered a sense of belonging to a community of people sharing similar experiences. In a similar vein, Wirman and Jones (2018) suggest that, in the context of Hong Kong Global Game Jam, many of the games created during the event addressed problematic topics in young people's everyday lives in Hong Kong. Designing games provided participants with an opportunity to explore solutions and offer alternative readings of such topics, often with humour. This illustrates game jams' potential as a means of processing and coping with challenging social issues, as they can 'provide a safe, authority-free environment for addressing difficult aspects of young people's lives' (Wirman and Jones 2018, 3).

To sum it up, existing research on game jams points to game jam participation holding much potential for participants' skill acquisition and professional development (e.g., Law and McDonald 2015, Mikami et al. 2010), motivation towards learning (e.g., Reng et al. 2013), and confidence-building (Kennedy 2018). It also touches on game jams' capacity to produce games that address serious societal issues, including those related to sustainability (Ramzan and Reid 2016, Laiti et al. 2020). Further, a new avenue of research is opening up that explores game jams' potential to provide transformative, deeply personally meaningful experiences (Kennedy 2018) and create safe and therapeutic environments for participants (Danilovic 2018) that seek to do away with the pressure and unsustainable work patterns associated with the conventional game jam format (Abbott et al. 2023). Our study draws particular inspiration from the latter, emerging thread in game jam research, aligning more broadly with the body of work that adopts a processual focus rather than focusing on game jams' end results (Grace 2016).

Games Education and Sustainability

Education for sustainability has emerged as a field relevant for education at all levels, from primary schools (Green and Sommerville 2015) to universities (Moore 2005, Argento et al. 2020), with its key aim being to prepare learners to actively and productively confront such issues as 'global justice, environment, survival, human rights, and citizenship' (McFarlane and Ozagon 2011, 81). As such, a core consideration in education for sustainability is to integrate aspects related to both environmental, as well as social and cultural sustainability (Argento et al. 2020). Another pivotal aspect is that sustainability education is seen less as a distinct subject to study and more as a transdisciplinary approach that should be incorporated into existing syllabi and curricula, as it holds relevance for all fields and disciplines (Moore

2005). Importantly, education for sustainability is not a concept limited to formal classroom education: rather, it can, and has been, productively engaged with in informal education as well (Gramatakos and Lavau 2019).

In recent years, there have been several other initiatives that addressed sustainability within the framework of a game jam experience. For the most part, these have focused on environmental sustainability. Perhaps the most visible among these is the annual Green Game Jam organised since 2020 in collaboration with the UN's 'Playing for the Planet Alliance'. However, even prior to that, similar interventions are known to have taken place, such as the one-month long Climate Jam 2018, hosted on Itch.io, which is a popular platform for game distribution and creation. This 'slow jam' focused on science-based climate change communication in educational games and was specifically designed to be inclusive towards participants with demanding personal schedules (Foltz et al. 2019). Such sensitivity to other aspects of sustainability related to games' potential impact in the surrounding world, as well as the process of game development itself, seems to be a growing concern for many ecologically oriented game jams. Other game jams organised around the topic of sustainability include IndieCade Climate Jam, Eko Game Jam[2], International Sustainability Game Jam 2020[3], Abertay's Serious Game Jam 5[4], and "A Game to Save the World" Game Jam[5], among others. A direction for future research could be to provide a systematic historical review of such initiatives and their interrelatedness with the many facets of the UN Sustainable Development Goals framework.

NordEcoJam and its follow-up events builds on these game jams but also provides a distinct perspective. First, it expressly focuses on higher education students who have an interest in game development or, in some cases, game-based learning. As such, its central premise is not just to explore the issues of sustainability through the medium of games — but to contextualise them within the realities of today's game industry and gaming culture, thus adding an aspect of meta-reflexivity. Second, our aim is to incorporate considerations related to both environmental and cultural sustainability and highlight how interrelated the two are (cf. Argento et al. 2020, Fizek et al. 2023).

The game jams organised by NASG in 2022 and 2023 started with a lecture that stressed the need for a systemic perspective on the topic. This was to provide a counterpoint to the individual-centred discourses often promoted by corporate groups, which frame environmental issues as the individual responsibility of the consumer, whose 'job' it is to recycle their waste, pay for carbon offsets while travelling, and so on. Yet, individual action outside of a broader framework is not only largely futile, but might even contribute to the exhaustion of the potential for systemic change by exclusively stressing the role of the individual (Maniates 2001, Andersen 2013, Supran and Oreskes 2021). Thus, the talk offered a framing that would highlight the importance of collective action and holding corporate and institutional powers accountable, challenging and deconstructing common discursive tactics of polluting corporations, such as greenwashing (Delmas and Burbano 2011).

To support conversations around the environmental impacts of gaming, Ben Abraham's (2021) work and IGDA's *The Environmental Game Design Playbook* (Whittle et al. 2021) were presented early on during the jam. The IGDA Playbook is a particularly topical and important resource, due to its integration of environmental considerations with game design practice. Talks offered during the event focused on different ways in which games can lead more directly to climate action. The conventional approach to creating serious games that address sustainability (cf.

Shawna and Nardi 2014, Wu and Lee 2015) was presented as a viable starting point, among many others. Taking a somewhat experimental stance, the instructors also discussed if games that, e.g., limit playtime or are designed to minimise energy consumption could provide a much-needed critical perspective on sustainable game development. At the same time, one of the talks focused on introducing the concept of sustainability and the connections between the various 'pillars' of sustainability, including social and cultural sustainability, and their implications for games (cf. Garda et al. 2020). This was an important topic given the event's commitment to a more holistic view of sustainability that is not limited to 'purely' environmental considerations. The idea of including domain-specific educational components in our jam is in line with some of the earlier approaches to organising sustainability-themed game jams (e.g., Foltz et al. 2019).

METHODOLOGY

This paper builds on participant reflections collected through two surveys from the two game jams (NordEcoJam in 2022 and NASG Un-Jam in 2023): daily, end-of- day reflections during the jam and a post-event survey that was filled several weeks after the jam. Additionally, the organisers themselves filled in questionnaires both during and after the jam. In total the material covers 27 participants, 10 teachers, and their total 143 responses in the first round (2022) and 23 participants, 9 teachers, and their total 103 responses in the second round (2023). The following observations are largely based on the daily student survey for which the participants reported on what they learned that day and what their mood was (87 and 63 responses respectively). The participation in game jam was voluntary, but students were not informed about the study before signing up for the jam. The universities did not include the game jam as part of their courses nor graded the students but gave ECTS points for participation. The participating students gave informed consent to participate in this study during the jam and their reflections were given anonymously through Google Forms. At the beginning of the game jam, participants could refuse to participate in the survey and data collection. This was done in writing, which reduced peer pressure from other participants.

The survey results were analysed qualitatively, and significant themes were identified. This paper focuses on two of the themes that emerge most prominently from the data. We applied a form of "investigator triangulation" (Carter et al. 2014), since up to 9 people were involved in analysing and discussing the different survey results thus leading to stronger interpretations though the reduction of individual's personal biases. An early analysis of the participant reflections indicated that the eco-anxiety provoked by the grievous nature of the game jam's topics was mitigated by the experience of participating tin cooperative work and the creative process of developing games that addressed sustainability issues. We have organised our initial findings in two groups related to: a) personal mood and b) learning experience.

Personal mood

The jam participants' – jammers' – reported mood changes over the course of the event. After the first day, several participants felt pessimistic and anxious. This can be partially attributed to social anxiety related to new team-mates and an unfamiliar setting. For the most part however, the negative mood seemed to stem from the topic and content of the jam itself, with several participants characterising the first day talks as 'overwhelming' and 'very depressing'. It is notable that these experiences were

highlighted even though everyone joined the jam fully voluntarily and knew the theme of the jam. The purpose of the talks that day was largely to outline the scope and urgency of the climate crisis, as well as to problematize deceptively simplistic solutions such as carbon offsets in favour of genuine systemic change. One student wrote that "it was a little hard to start the event with the doomsday talks". Interestingly, the talks were simultaneously experienced as 'inspiring' and 'insightful', often by the same people. While some students had no prior game jam experience and others had a lot, there was no notable variation in the experiences of anxiety and stress caused by the heavy topic (or teamwork) between them.

Both the optimistic and the pessimistic moods persisted throughout the event complemented by participants increasingly bringing up feeling tired, but the balance between them shifted and the educational impact was largely appreciated. One participant suggested that: "the lectures triggered some eco-anxiety, but I definitely know more about sustainability than before". Another participant wrote that "These topics aren't new to me but they're still heavy and its easy to feel like anything we create will have too little impact...so what's the point?" Towards the end of the jam some hope surfaced yet the serious acceptance of the global situation prevailed: "Meh, let's try but it's the end of the world anyway." Other excerpts highlight the mixed feelings as students were "satisfied, frustrated, both hopeful & hopeless" or experience the topic as "scary but hopeful". One noted how the topic is "overwhelming, scary and important". Participants found possible solutions and alternatives to challenging situations through and in the games they made. The games tangibly simulated real-life scenarios with differing outcomes.

Delving into daunting and complex issues during the early stages of the game jam did not seem to stifle the participants' creative mindset: "It is a daunting topic because it seems almost impossibly complex. At the same time I really want to make a game about it. If anything, today's session has motivated me even more to do so, and given me a lot of ideas." In response to how they would summarise their thoughts in relation to sustainability on the second day of the jam, one participant responded that they had been thinking of "how to disseminate the message to the public appropriately; and what could be the prroper ways/tools to send a strong influential message", showing that they maintained an ambitious focus in regard to the creative work ahead of them.

Teaching about Sustainability in Game Design

The negatively perceived pressing mood at the jam may not be surprising in the face of eco-anxiety and confronted with a perspective that clearly states the necessity of broadscale systemic change. Here lies the difficulty of education about climate change: holding the balance between the need to include depressing systemic perspectives for valid education (Ferreira 2019, Ferreira et al. 2013) and mitigating eco-anxiety and a paralysing fear that makes it impossible to act (Pihkala 2020). However, as Eriksson et al. (2022) state, it is not possible to take care of all of the students' feelings as the highest priority all of the time. If this is foregrounded too much, then there is a real risk of a delivering a kind of therapeutic education that aims mostly at the students' feelings in the crisis and that goes too far towards de-emphasizing the need for actual, material change in the world to address the crisis that is causing the anxiety (Ojala 2020).

Merely focusing on students´ wellbeing would be at odds with the goal of the jam which was to address exactly these systemic and material perspectives. Feeling some degree of anxiety, and especially the mixed feelings that the students report here, could instead be seen as a valid reaction to the state of the world and possibly even as a motivation for change. The situation needs to be accepted, and as some say 'grieved' (Williams 2020), before serious, meaningful action can be taken. Williams suggests that "mourning needs to become re-ritualised, and some practices have emerged from the ecology movement that respond to these feelings in particular" (2020, n.p.). Could a humble game jam, too, serve as a ritual for mourning and then re-building?[6]

Recommendations from research about eco-anxiety in education broadly address both providing safe spaces for people to work through and experience their emotions and the possibility of embodied creativity so that anxiety can be channeled into making, creativity, and resistance (Pihkala 2020). However, as Eriksson et al. (2022) remark, the notion of a community to share these feelings is also highly relevant. Working in a team seem to have made a difference too as one participant notes how the jam "has made me excited to work together, and most of all made me feel less alone in working for these goals within games."

Using Game Jams for Teaching

In our case, the game jam and the group of students and teachers became this safe space of active hope. A teacher-student power dynamic naturally emerges in the educational game jam. This hierarchy was evident in this event, as it contained lectures on sustainability but also because students were encouraged to seek teacher assistance for their game projects. Organisers were present and observed the process without being active participants themselves. Organisers/teachers are facilitators and help the students solve their game development problems independently.

Students involved in game jams came from various stages of their academic journeys. There was a wide range of ages among participants, which differs notably across universities. Additionally, their ethnic backgrounds were diverse. Thus, the student body in these game jams was not uniform but a diverse and multifaceted group.

However, similarities can be observed in the students' answers. The students pointed out that their feelings were both hopeless and hopeful, and it is visible that their mood improved over the course of the jam as they got to engage with the issues of sustainability through the group-based and creative practice that is the game jam. Their games and activities did not dip into a therapeutic perspective either. The feelings of the students and the alleviation of their stress was not the main goal of their work. They also did not simplify or marginalise the climate catastrophe to feel better.

Instead, their work in most cases focussed on systemic perspectives, e.g. showing that the issue is not as much a bad or greedy CEO or manager but the economic system in which they also have to operate. The effect of feeling "excitement at last" was reached through their own shared and creative engagement with the issue. This really highlights the viability of game jams for this kind of education. The centrality of the process of making and active engagement that is at the very core of game jams is instrumental here. That said, there was also another relevant element to this: The jam and the group did create a safe space for discussing climate catastrophe and

sustainability also because of the selection of the students and teachers. All of us were participating because we already cared about sustainability. This meant that feelings of eco-anxiety were shared by the entire group and that nobody was stigmatised for expressing these feelings. This space of collective engagement with 'trauma'[7] may be a necessary element for the game jams to work that needs to be considered when recreating them.

Learning experience

During the jam, several student participants reported to have gained an understanding that cultural and social dimensions are also part of sustainability. These insights were made several days into the event which meant it was too late to apply them into game design as the ideation phase had passed and prototyping began. One participant stated: "I thought that the cultural and social sustainability should have been talked about on the first day so it could have been taken into account when finding game ideas. All my ideas were focused on environmental sustainability". Regardless of the tight schedule and numerous talks, some participants experienced the planning positively: "I think the scheduling and the layout of the work time were spot on." Yet, it was clear that in this regard participant experiences varied drastically, some students calling for more development time and others for more talks. Implementable feedback can be found from a comment that recalls sharing: "Playing others' games was very interesting and some were very successful in making you aware and reflective of their topics"

Addressing cultural and social sustainability in group work was strongly recommended by the organisers who discouraged 'crunch' – a phenomenon known in software development and currently also in game development that refers to an unhealthy working mode involving extended working hours to finish projects by a looming deadline. 'Crunch time' has received wide criticism in the games industry in the past years and some companies aim at reducing the existence of these periods.

The feedback from students of the NordEcoJam and NASG Un-Jam widely suggests that we succeeded in creating a healthy working environment through simple guidelines. The students for example reported that "We were asked not to crunch, so we didn't" and "We're all passionate about the project, but we're not crunching.". When comparing the NASG jams to previous experiences, many participants identify the former as more relaxed and less stressful. However, as addressed in this paper, a new type of stress resulted from the theme of the jams. We suggest that diversifying activities can help in balancing learning and mood: "In the future it might help to avoid burnout by including activities that excite and motivate me." Notably, student responses suggest that a rare opportunity to engage in a serious topic was welcome. The possibilities for seeking actual solutions for problems related to sustainability are limited in conventional education. Our results suggest that downplaying the complexity and vastness of climate catastrophe is not needed if there is space for processing new information through game making. We believe that this approach allowed for empowering experiences to emerge as there was time for reflection and negotiation.

CONCLUSIONS

Our study contributes to research on game jams by building on an existing emphasis on the process of jamming over the produced games and by addressing the

development of ‘serious games’ in a game jam. While our jam focused on cultural, social and environmental sustainability, the students’ reflections largely relate to the last mentioned. We established that a game creation event with an environmental focus is likely to provoke or exacerbate ‘eco-anxiety’ in some students. Topics relating to environmental and cultural sustainability may personally resonate with participants in a mentally straining way as we learned during the two NASG game jams. Being part of a group of people who share similar concerns can offer a way to cope with the stress associated with trying to tackle the climate crisis. However, to do so successfully, it is crucial to provide a stress-free environment where participants do not perceive a pressure to deliver a ‘quality’ end product within a very limited timeframe — which is an issue many game jams struggle with (Abbott et al. 2023).

Distinctively, our paper demonstrates how game jamming productively facilitates tackling personally significant and distressing topics and foregrounds jammers’ experiences over scrutinising messages embedded in the games created. Game jams are often considered to contribute to jammers’ skills development and game jams are widely accepted as learning spaces, but they also have potential in offering a space for ‘therapeutic’ engagement with specific topics. NordEcoJam and NASG Un-Jam, while dealing with a daunting topic, resulted in positive, potentially empowering experiences relating to the most critical challenges of the present day.

Experiences from the the game jams organised by NASG suggest that it is possible to teach about sustainability with an orientation towards systemic and material change and that the active, creative, and social engagement with the topic that is central to the game jam can mediate the eco-anxiety that is the result of these approaches. While more work is needed, this suggests that the game jams can be used to create positive excitement even when faced with the reality of a doomsday scenario. It remains a challenge for teachers in such events to further deal with their own anxieties while facilitating learning and care of students. Understanding organiser experiences and possibilities for addressing issues in relation to them is an important area of future research.

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REFERENCES

Abbott, D., Chatzifoti, O., Ferguson, J., Louchart, S. and Stals, S. 2023. “Serious ‘Slow’ Game Jam: A Game Jam Model for Serious Game Design”. In *Proceedings of the 7th International Conference on Game Jams, Hackathons and Game Creation Events*, 28–36. New York: ACM.

Abraham, B.J. 2022. *Digital Games After Climate Change*. *Palgrave Studies in Media and Environmental Communication.* Cham, Switzerland: Springer International Publishing.

Abt, C.C. (1970). *Serious Games*. Viking Press.

Aibara, M., Kawakami, S. and Masakazu, F. 2022. "Lessons learned from serious game jams organized by DiGRA Japan". In *DiGRA '20 – Proceedings of the 2020 DiGRA International Conference: Play Everywhere.* DiGRA.

Andersen, R. 2013. *The 'Crying Indian,' Corporations, and Environmentalism A Half Century of Struggle over Environmental Messaging.* Routledge Companion to Advertising and Promotional Culture, edited by M.P. McAllister and E. West. New York: Routledge.

Argento, D., Einarson, D., Mårtensson, L., Persson, C., Wendin, K. and Westergren, A. 2020. "Integrating sustainability in higher education: A Swedish case". *International Journal of Sustainability in Higher Education*, 21(6), 1131–1150.

Aslan, J. 2020. *Climate Change Implications of Gaming Products and Services*. [Doctoral Thesis], University of Surrey. https://doi.org/10.15126/thesis.00853729

Austin, B. 2015. "Technology, art therapy, and psychodynamic theory: Computer animation with an adolescent in foster care". In *Video and Filmmaking as Psychotherapy*, edited by J.L. Cohen, J.L. Johnson and P. Orr, 195–210. New York: Routledge.

Böhm, S., Misoczky, M. C., and Moog, S. 2012. "Greening Capitalism? A Marxist Critique of Carbon Markets". *Organization Studies*, 33(11), 1617–1638.

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., and Neville, A.J. (2014). "The use of triangulation in qualitative research". *Oncology Nursing Forum*, 41(5), 545–7. https://doi.org/10.1188/14.onf.545-547

Chen, H.W., Duckworth, J. and Kokanovic, R. 2021. "Mental Jam: A Pilot Study of Video Game Co-creation for Individuals with Lived Experiences of Depression and Anxiety". In *ArtsIT, Interactivity and Game Creation: 10th EAI International Conference*, 120–137. Cham: Springer.

Collier, A. F. 2011. "The well-being of women who create with textiles: Implications for art therapy". *Art Therapy*, 28(3), 104–112.

Danilovic, S. 2018. *Game design therapoetics: Autopathographical game authorship as self-care, self-understanding, and therapy* [Doctoral dissertation]. University of Toronto.

Delmas, M.A. and Burbano, V.C. 2011. "The drivers of greenwashing", *California Management Review*, 54(1), 64–87.

Eriksson, E., Peters, A.-K., Pargman, D., Hedin, B., Laurell-Thorslund, M., and Sjöö, S. (2022). "Addressing Students' Eco-anxiety when Teaching Sustainability in Higher Education". *2022 International Conference on ICT for Sustainability (ICT4S),* 88–98.

Eichenberg, C. and Schott, M. 2017. "Serious games for psychotherapy: A systematic review". *Games for health journal*, 6(3), 127–135.

Ferreira, J.-A. 2019. “The limits of environmental educators’ fashioning of ‘individualized’ environmental citizens”. *The Journal of Environmental Education*, 50(4–6), 321–331.

Ferreira, J.-A., Keliher, V., and Blomfield, J. 2013. “Becoming a reflective environmental educator: Students’ insights on the benefits of reflective practice”. *Reflective Practice,* 14(3), 368–380.

Fizek, S., Fiadotau, M., Wirman, H. and Garda, M. 2023. “Teaching Environmentally Conscious Game Design: Lessons and Challenges”. *ACM Games: Research and Practice*, 1(1), 1–9.

Foltz, A., Williams, C., Gerson, S. A., Reynolds, D. J., Pogoda, S., Begum, T., and Walton, S. P. (2019). “Game Developers’ Approaches to Communicating Climate Change”. *Frontiers in Communication*, 4. https://doi.org/10.3389/fcomm.2019.00028

Garda, M.B., Nylund, N., Sivula, A. and Suominen, J. 2020. “From Cultural Sustainability to Culture of Sustainability: Preservation of Games in the Context of Digital Materiality”. In *DiGRA ’20 – Proceedings of the 2020 DiGRA International Conference: Play Everywhere.* DiGRA.

Green, M. and Somerville, M. 2015. “Sustainability education: Researching practice in primary schools”. *Environmental Education Research*, 21(6), 832–845.

Grace, L. 2016. “Deciphering hackathons and game jams through play”. Proceedings of the *International Conference on Game Jams, Hackathons, and Game Creation Events, GJH and GC 2016* (pp. 42–45). New York: Association for Computing Machinery. https://doi.org/10.1145/2897167.2897175

Gramatakos, A.L. and Lavau, S. 2019. “Informal learning for sustainability in higher education institutions”. *International Journal of Sustainability in Higher Education*, 20(2), 378–392.

Hung, H.T., Yang, J.C. and Tsai, Y.C., 2020. “Student Game Design as a Literacy Practice”. *Journal of Educational Technology & Society*, 23(1), 50–63.

Kafai, Y. B. and Burke, Q. 2015. “Constructionist Gaming: Understanding the Benefits of Making Games for Learning”. *Educational Psychologist*, 50(4), 313–334.

Kennedy, H. W. 2018. “Game Jam as Feminist Methodology: The Affective Labors of Intervention in the Ludic Economy”. *Games and Culture*, 13(7), 708–727. https://doi.org/10.1177/1555412018764992

Kolek, L., Mochocki, M. and Gemrot, J., 2022. “Review of Educational Benefits of Game Jams: Participant and Industry Perspective”. *Homo Ludens*, 1 (15), 115–140.

Kultima, A. 2015. “Defining Game Jam”. *Proceedings of the 10th International Conference on the Foundations of Digital Games*. June 22-25, 2015, Pacific Grove, CA, USA.

Lai, G., Kultima, A., Khosmood, F., Pirker, J., Fowler, A., Vecchi, I., Latham, W. and Fol Leymarie, F., 2021. “Two decades of game jams”. *Proceedings of the Sixth Annual International Conference on Game Jams, Hackathons, and Game Creation Events*, 1-11. New York: ACM.

Laiti, O., Harrer, S., Uusiautti, S. , and Kultima, A. 2020. “Sustaining intangible heritage through video game storytelling: the case of the Sami Game Jam”. *International Journal of Heritage Studies*, 27(3), 296–311. https://doi.org/10.1080/13527258.2020.1747103

Law, B. and McDonald, B. 2015. “Game jams: how can they influence software development curricula?” *Workshop Proceedings of the 10th International Conference on the Foundations of Digital Games*. June 22-25, 2015, Pacific Grove, CA, USA.

Lönnqvist, O. 2022. *Sustainable Game Development: Mapping the Climate Impact and the Negative Impact Reduction Actions in the Swedish Gaming Industry. Uppsala University*, Independent thesis. http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-483005

Macy, J. and Johnstone, C. 2012. *Active hope: How to face the mess we’re in without going crazy*. New World Library.

Maniates, M.F. 2001. “Individualization: Plant a tree, buy a bike, save the world?”. *Global Environmental Politics*, 1(3), 31–52.

McFarlane, D.A. and Ogazon, A.G. 2011. “The challenges of sustainability education”. *Journal of Multidisciplinary Research*, 3(3), 81–107.

Meriläinen, M., Aurava, R., Kultima, A., and Stenros, J. 2020. “Game Jams for Learning and Teaching: A Review”. *International Journal of Game-Based Learning (IJGBL)*, 10(2), 54–71. http://doi.org/10.4018/IJGBL.2020040104

Mikami, K., Watanabe, T., Yamaji, K., Ozawa, K., Ito, A., Kawashima, M., Takeuchi, R., Kondo, K. and Kaneko, M., 2010. “Construction trial of a practical education curriculum for game development by industry–university collaboration in Japan”. *Computers & Graphics*, 34(6), 791–799.

Mills, E., Bourassa, N., Rainer, L., Mai, J., Shehabi, A., and Mills, N. 2019. “Toward Greener Gaming: Estimating National Energy Use and Energy Efficiency Potential”. *The Computer Games Journal*, 8(3), 157–78.

Moore, J. 2005. “Seven recommendations for creating sustainability education at the university level: A guide for change agents”. *International Journal of Sustainability in Higher Education*, 6(4), 326–339.

Ojala, M. 2020. “Facing anxiety in climate change education: From therapeutic practice to hopeful transgressive learning”. *Canadian Journal of Environmental Education (CJEE)*, 21, 41–56.

Pihkala, P. 2020. “Eco-anxiety and environmental education”. *Sustainability*, 12(23).

Pirker, J., Economou, D. and Gütl, C. 2016. “Interdisciplinary and international game projects for creative learning”. In *Proceedings of the 2016 ACM Conference on Innovation and Technology in Computer Science Education*, 29–34. New York: ACM.

Ramzan, R. and Reid, A. 2016. “The importance of game jams in serious games”. In *Proceedings of the 10th European Conference on Games Based Learning (ECGBL 2016)*, 538–546. Reading: ACPI.

Reng, L., Schoenau-Fog, H. and Kofoed, L.B. 2013. “The Motivational Power of Game Communities - Engaged through Game Jamming”. *Workshop*

Proceedings of the 8th International Conference on the Foundations of Digital Games, May 14-17, 2013. Crete, Greece.

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

Smith, T.S. 2021. "Therapeutic taskscapes and craft geography: cultivating well-being and atmospheres of recovery in the workshop". *Social & Cultural Geography*, 22(2), 151–169.

Supran, G. and Oreskes, N. 2021. "Rhetoric and frame analysis of ExxonMobil's climate change communications". *One Earth*, 4(5), 696–719.

Thumlert, K., de Castell, S. and Jenson, J., 2018. "Learning through game design: A production pedagogy". In *Proceedings of the 12th European Conference on Game-Based Learning (ECGBL 2018)*, 704–714. Reading: ACPI.

United Nations Environment Programme 2021. *Making Peace with Nature: A scientific blueprint to tackle the climate, biodiversity and pollution emergencies.* Nairobi. https://www.unep.org/resources/making-peace-nature

Vos, N., van der Meijden, H. and Denessen, E. 2011. "Effects of constructing versus playing an educational game on student motivation and deep learning strategy use". *Computers & Education*, 56(1), 127–137.

Whittle, C., York, T., Escuadra, P.A. Shonkwiler, G., Bille, H., Fayolle, A., McGregor, B., Hayes, S., Knight, F., Wills, A., Chang, A. and Fernández Galeote, D. 2021. "The Environmental Game Design Playbook (Presented by the IGDA Climate Special Interest Group)". *International Game Developers Association.* https://igdawebsite.s3.us-east-2.amazonaws.com/wpcontent/uploads/2022/04/06100719/EnvironmentalGameDesignPlaybook_Alpha_Release_Adj.pdf

Williams, I. 2020. "An atmosphere of grief: Living with loss in the Anthropocene (Part 2)". Medium, Jan 14, 2020. https://ivorwilliams.medium.com/an-atmosphere-of-grief-18e0633def30

Wirman, H. and Jones, R. 2018. "On the Local Value of Game Jam Games: Beyond Learning from the Process". Paper presented at *Digital Games Research Association (DiGRA) Conference 2018*, July 25-28, 2018, Turin, Italy.

Wu, J.S. and Lee, J.J. 2015. "Climate Change Games as Tools for Education and Engagement". *Nature Climate Change*, 5, 413–18. https://doi.org/10.1038/NCLIMATE2566

ENDNOTES

[1] This also points to the importance of understanding the concept of sustainability in a broader and more holistic way, recognising that it comprises both environmental and sociocultural considerations (Argento et al. 2020).

[2] https://ekogamejam.webflow.io/

[3] https://itch.io/jam/sustainability2020

[4] http://steppingupnexus.org.uk/?q=content/abertay%E2%80%99s-serious-game-jam-5-battlesweather-support-sustainability-developing-game-educate

[5] https://taikai.network/taikai/hackathons/game-to-save-the-world
[6] The notion of “Active Hope” (Macy and Johnstone 2012) is one example here.
[7] None of the authors of the paper carries a qualification or a degree from a medical field. The use of seemingly medical terms, such as ‘trauma’, operates on a colloquial level only.