

Work recovery through virtual and real nature experiences: Employee perspectives

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Abstract

While nature is known to support employee wellbeing, virtual leisure activities can also be utilised for work recovery. The study examines the role of virtual and real nature in employee recovery by using the experience economy framework. In this randomised crossover trial, with a qualitative approach, 57 employees visited real and virtual nature. The virtual visits in different types of nature environments were described as providing escapism, while in real nature, it was more difficult to detach from duties. However, in virtual nature, the breaks in immersion disturbed the recovery experience and most participants preferred real, multi-sensory nature. While virtual nature does not provide a similar sense of place to real nature, its special escapist attributes, such as new and accessible travel experiences, could be further utilised to enable recovery experiences. Therefore, this study calls for further assessment of how comprehensively virtual nature tourism supports recovery from work when compared to the benefits of visiting real nature and, furthermore, how the root causes of recovery needs should be addressed in tourism and experience industry.

Keywords: virtual nature tourism, nearby nature, work recovery, employee wellbeing, experience industry

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1. Introduction

Access to nature is important for human wellbeing and maintaining the human-environment relationship (Browning *et al.*, 2020; Leung *et al.*, 2022). However, when access to nature is restricted, for one reason or another, virtual tourism can provide nature experiences without the need to travel to destinations or nature sites (Guttentag, 2009; Lu *et al.*, 2022). In this regard, virtual tourism can provide more accessible tourism services and it can also extend the implementation of tourism. Hence, it holds potential for managing different socially and ecologically sustainable tourism impacts. At the same time, virtual tourism needs to be critically approached by acknowledging its limitations and potential pitfalls. According to Marcieszewska and Wanagos (2024), the value of a tourism product is rooted in the experience it provides, with the experience economy serving as the theoretical foundation for its development (Pine & Gilmore, 2011). Within this framework, the design of the experience economy focuses on creating memorable, emotionally engaging, and personalised experiences that transcend traditional goods and services. Pine and Gilmore (2011) identify four strategic dimensions, known as the experience realms, which include entertainment, education, escapism, and esthetics.

Moreover, virtual tourism needs to be studied through multidisciplinary research approaches that comprehensively consider the different sides of virtual reality. For instance, it has been recently noted that further studies on the wellbeing effects of virtual tourism are needed (Frost *et al.*, 2022). Yet, critical studies on tourism and the information and communication technology are relatively rare (Gössling, 2021). This article combines these perspectives and examines virtual reality in a work recovery context while acknowledging its potential pros and cons.

Exposure to nature and nature experiences have been widely remarked to support wellbeing and recovering from work (see, e.g., review by Korpela *et al.*, 2017; de Bloom *et al.*, 2017; Hyvönen *et al.*, 2018), and digital nature experiences can provide wellbeing effects as well (see, e.g., Mayer *et al.*, 2009; Ojala *et al.*, 2022; Walters *et al.*, 2024; Wang *et al.*, 2019). Yet, while virtual nature and its benefits for wellbeing have been studied to some extent, studies on more immersive virtual reality environments are still limited in number (Browning *et al.*, 2020). Furthermore, some studies indicate that real nature environments enhance wellbeing more than virtual ones (Browning, 2020; Mayer *et al.*, 2009).

This research contributes to filling gaps on the experience economy product of virtual nature tourism, especially when compared with real nature visits, by examining whether and how virtual tourism is considered to enhance work recovery. The research is a part of a larger research project, which involved participants who do hybrid or remote work. The participants visited real nature and virtual nature after their workday, and their recovery was studied through physiological measurements, surveys and focus group interviews for examining their experiences on virtual and real nature visits. This article introduces the findings from the qualitative group interview data; hence, as mentioned, focuses on the participants' experiences (see Hyvönen *et al.*, 2026, for the other results of the study).

It is studied how the visits differ from each other and how especially the virtual visits could be further developed for enhancing recovering from work. In the discussion, the results are elaborated against the wider needs for responsible virtual tourism development. The research question is as follows: How do employees experience virtual nature visits and nature visits for work recovery?

2. Literature review

2.1. Virtual nature tourism

While nature tourism and visits to nature have been widely noted to enhance wellbeing and recovery, the current forms of (mass) tourism and leisure are not sustainable in terms of planetary wellbeing (Cave & Dredge, 2020; Sharpley, 2022). Tourism causes 8% of global greenhouse gas emissions, especially through transportation emissions (Lenzen *et al.*, 2018). Tourism can also damage vulnerable

nature environments and harm biodiversity. The ecologically harmful impacts of tourism call for decarbonization strategies and initiatives (Higgins-Desbiolles *et al.*, 2019; Higham *et al.*, 2021). This requires finding eco-socially sustainable leisure activities. In this respect, technology-based solutions are often brought up when discussing travel options that are less damaging for the environment and can, consequently, help to manage the negative impacts of tourism (Dewailly, 1999). Virtual tourism can be seen as a form of proximity tourism that does not require physically travelling from one place to another (Cave & Dredge, 2020; Hoogendoorn & Hammett, 2021), which, thus, causes less emissions from the transportation perspective.

In general, information and communication technologies have drastically impacted tourism by providing digital tools to visit places, plan trips and share knowledge on destinations (Frenzel *et al.*, 2022; Gössling, 2021). In recent years, especially virtual tourism has been noted as a promising area of digital tourism development (Griffin & Muldoon, 2022), and virtual tourism has been particularly connected to recovering from the changes brought by Covid-19 (Lu *et al.*, 2022). Yet, the opportunities of using virtual reality in tourism have sparked discussion for a relatively long time. For example, in 1999, Dewailly suggested that virtual tourism can work both as a tool for tourism promotion and as a destination itself. Indeed, virtual reality can be used in various ways in tourism, for example in “planning and management, marketing, entertainment, education, accessibility, and heritage preservation” (Guttentag, 2010, p. 637). Importantly, virtual tourism can provide accessible travel options for people whose mobility is restricted (Iftikhar *et al.*, 2023), although it is also important to remember that not everyone has access to digital devices (see Frenzel *et al.*, 2022; Minghetti & Buhalis, 2010).

While virtual tourism clearly provides benefits, it is central to ask how it affects the relationship between the individual and the tourist space in terms of sensing the virtual place, as virtual tourism is not necessarily able to provide similar sensory experiences as the actual reality (see Dewailly, 1999). Marciszewska and Wanagos (2024) stated that the value of a tourism product arises from the consumer’s experience during consumption – not just from the product’s attributes. Therefore, the focus in the relationship between a consumer’s experience and its context is relevant. Tourism research has long revolved around the question of authenticity, which refers to finding a place – a context or experience product in this matter – somehow true or genuine. Authentic representation in tourism is true to the original characteristics of a place, rather than presenting the place in a way that feels unconvincing or fake. Authenticity can be seen as the baseline for sense of place: whether the place is sensed and felt as real (Dewailly, 1999). Then again, authenticity has been noted as a problematic term because of the challenge to absolutely define what is genuine or not, as sensing a place is socially constructed and perspective dependent, while also entangled with complex power relations.

However, authenticity can be seen to hold new importance when discussing virtual tourism experiences. In virtual trips, the person is not physically visiting the place, which poses the question of how authentic experiences the tourist gets in virtual reality (Mura *et al.*, 2016). Virtual tourism can struggle with immersion and providing visually high-quality, multi-sensory experiences for visitors (see Newman *et al.*, 2022). This calls for further understanding of how to develop more accurate and satisfying virtual tourism experiences for supporting leisure and (work) recovery. Moreover, understanding the wellbeing aspects of virtual visits is important for virtual tourism service providers who need to provide responsibly produced visits to avoid possible safety issues or other harm for visitors.

2.2. Needs for work recovery

This research originated from the idea that short visits to nature can serve as restorative breaks during and after the workday. At the age of digitalisation, especially expert work has in many ways moved into digital environments and remote working. While remote and hybrid work enhance employee wellbeing

in many ways, understanding ways to recover from the cognitively demanding working life is urgently needed. For recovery, it is necessary to have regular breaks during the working day as well as physically and psychologically detaching from work-related tasks after work. During the working day, daily 15-minute park walks during a lunch break can promote vitality, reduce fatigue and blood pressure in the afternoons (de Bloom *et al.*, 2017; Torrente *et al.*, 2017). Also, approximate 20-minute walks near blue nature can increase the self-rated health of employees and reduce negative emotions immediately after the walk, although no changes in heart-rate variability or blood pressure was found (Vert *et al.*, 2020). Nature experiences during non-work time have also connected with employees' vitality and stress recovery (Korpela *et al.*, 2017; Korpela & Kinnunen, 2011). The occupational wellbeing was rated highest among those employees who visited natural environments during their working day as well as almost daily during leisure time (Hyvönen *et al.*, 2018).

However, not all employees have access to nature environments during the workday or even after the workday, for instance due to distances, schedules or accessibility issues. Here, virtual nature tourism can provide options for recovery. Studies indicate that virtual nature visits positively change self-reported measures of attention restoration, stress relief and affect (Ojala *et al.*, 2022); forest resting environments viewed through virtual reality can relieve stress (Wang *et al.*, 2019), and virtual blue spaces can enhance worker wellbeing and concentration (Walters *et al.*, 2024). Mayer *et al.* (2009) have found that a virtual trip to nature can enhance wellbeing at the time of the visit, as well as the visitors' abilities to reflect on problems. Yet, in their comparative study, real nature environments enhanced wellbeing more than the virtual ones. Similarly, Browning *et al.* (2020, p. 11) found that virtual nature exposure produced similar effects as outdoor nature exposure, "although only the outdoor nature condition showed measurable increases in positive affect." Thus, the question rises as to whether virtual tourism can provide as meaningful recovery experiences as real nature and, furthermore, how the virtual experience is sensed by the visitor.

3. Methodology

This study is part of a larger, unblinded, randomised crossover trial comparing virtual nature visits to real nature visits after work. In this study, we utilised qualitative interview data collected after the three-week measurement period. Participants' recovery from work was examined using surveys and physiological measurements in the first week of the control period and then in two one-week intervention periods, during which participants undertook virtual nature or real nature visits after work on three days (Tuesday, Wednesday, and Thursday). Focus group interviews were conducted during the fourth week (see Figure 1). The study was conducted in the spring season 2023.

A total of 57 employees took part in study interventions and focus group interviews. Their mean age was 43 (SD=10) years, and 84% of them were women. Altogether, 88% of them had a higher education degree, and 23% worked in managerial tasks. The participants in this study were 18 years old and over, working remotely or in hybrid jobs. They had to be able to communicate in Finnish. Participants gave written informed consent before taking part in the study. The ethics committee of Jamk University of Applied Sciences gave their approval to the study prior to recruiting (20.1.2023, number 411193). We registered the trial with ClinicalTrials.gov (NCT05830656) before the end of recruitment.

The study examined recovery in participants' homes and workplaces with an aim for gathering data that were accurate in real-life situations (see Ojala *et al.*, 2022). For the real nature visits, the instructions were to spend a suitable amount of time outdoors, preferably at least 20 minutes, at a nearby nature site identified by the participant and to focus on nature (Salonen *et al.*, 2020). The participants were allowed to move around in nature or stop at their own discretion.

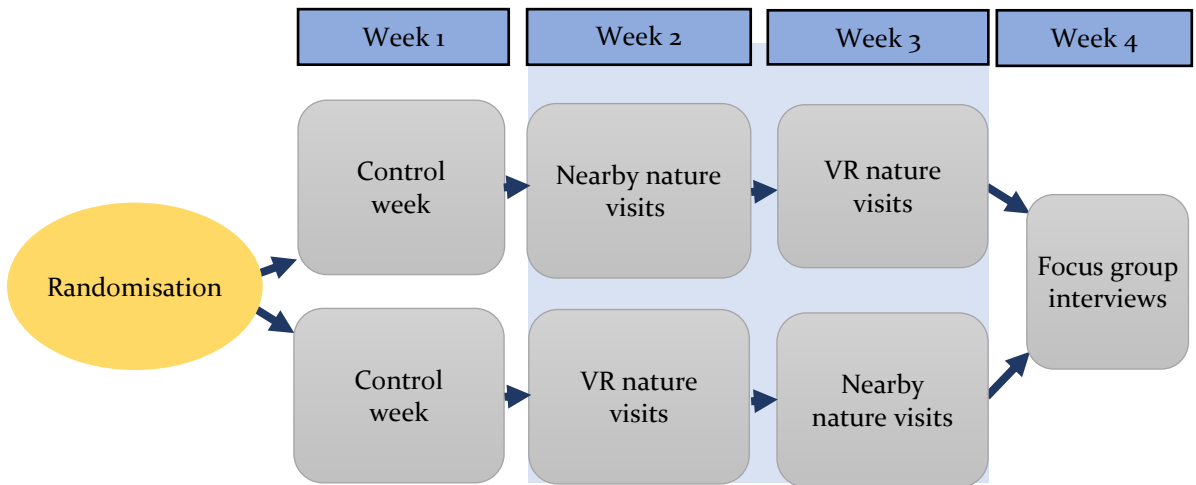


Figure 1. Overview of weekly interventions and measurement phases in the crossover study

The virtual nature tour took place using a head-mounted display (HMD) (PICO 4, Pico Immersive Pte. Ltd, Singapore) after the working day. Participants were instructed to select their preferred virtual environments from 11 different options and immerse themselves in them using their visual and auditory senses. The video environments were a variety of nature tourism destinations from Austria, Germany, Mauritius, the Philippines and Australia. Destinations were chosen based on accessibility and fit with the HMD in use. Ten of the videos featured 360-degree views, with varying perspectives from land, air, above water and underwater. The videos varied from having only nature sounds or music or a combination of both. The sounds could also be muted. The median duration of the videos was 4.5 minutes (range 1–20 minutes), and the virtual nature experience was advised to preferably last at least 20 minutes at a time. It was recommended to start watching the videos in a sitting position and to try standing if no dizziness or other unpleasant symptoms occurred in the sitting position (see also Hyvönen *et al.*, 2026).

Interview data were collected as 12 group interviews – altogether 57 informants – and the session, led by two researchers, lasted approximately an hour. The raw data consisted of 245 pages of transcribed text which was analysed by the two researchers. The interview quotes were selected among the transcriptions in a distributed manner for avoiding citing the same person multiple times and for representing the data comprehensively. Two researchers with different scientific traditions conducted the coding stage independently and then compared the categories. The analysis processes were inductive, using a typical qualitative approach and stages (Archer, 2012). According to Bazeley (2013), classifying simplifies topics or themes in which the similarities take a lead as the main categories. Following Glaser's (1978) logical frame, the characteristics under each main categories revealed the differences between the employees recovery-focused experiences in virtual and real nature. These differences highlighted the importance of presence and momentum, which were closely linked to recurring themes of broken immersion, escapism in virtual reality and processing thoughts in real nature, and the preference of multi-sensory experiences. In other words, these are the elements under experience economy framework for product development that will be illustrated in the following section.

4. Results

4.1. Escapism in virtual reality

It has been suggested that virtual reality can be more effective in providing nature experiences compared with other virtual channels, such as videos, because of the high level of immersion that virtual reality provides (Browning *et al.*, 2020). Also in our study, virtual reality was described to capture the attention of participants, as they experienced bodily sensations and feelings of physically visiting the place. Memory-based feeling in the quotation below supports the idea of natural symbiosis between the experience and the product expressed by Marciszewska and Wanagos (2024).

"The beach by the sea took me back to my holiday memories, and there, I got mostly these kinds of physical memories of how it feels to have sand in your toes or the heat of the sun on your skin or --- the wind."

"At some point, I realized that I sat in a way as if I was sitting on a rock on a beach. I got a feeling of really being there."

It was also mentioned that seeing the places from a perspective one could not otherwise get (such as flying in the air) is a special benefit of virtual tourism. Many participants suggested that virtual reality holds great potential in providing visits to places one would not otherwise go. Some mentioned that they chose the virtual experience by following their idea of a dream destination.

In general, the virtual nature visits provided more positive experiences than the participants expected. The visits were described as fascinating, meditative and interesting. Especially the first time to visit the place felt unique for the participants. The visits provided new ways to recover and enabled dreaming. Importantly, it was noted that virtual visits directed thoughts away from work, and this escapism helped with recovering. It was even described as hard to leave the virtual world and return to reality. Many said that in virtual reality, the continuous stimulation provided a relaxing experience, which helped with redirecting thoughts away from work or daily tasks. It was mentioned that this was mostly recognised long after the experience. Some participants wondered whether virtual tourism had the same escapist effect as TV series or podcasts, for instance. Interestingly, the virtual reality appeared both as relaxing and activating.

"It felt, to some extent, meditative, yet in [meditation] it is usually the goal to remove thoughts and concentrate on the moment. This was like reverse [meditation], there was continuously some stimulation, which kept it interesting."

"Somehow it felt violent to leave the place and notice that oh no, it's raining sleet and I am in a different sphere than while in [virtual] nature."

4.2. Processing thoughts in real nature

The real nature visits, on the contrary, were not perceived to provide as much stimulation and escapism as virtual reality. Even though the nature visits were generally noted to be very positive for recovery, some experienced difficulties with stopping and focusing while in real nature. This was described, for example, as pressure to exercise while outdoors, as a need to take the dog out, or as difficulty to stay still.

"I walked by the shore of a pond and sat there for as long as I could, which is three minutes, until I continued walking, then sat again for three minutes, then took my [phone] from my pocket – I must not take a phone ---- When you wear the [virtual reality] glasses, you cannot do anything but [be there]."

"I think that the stressful thoughts were more in my mind [in the nearby nature], maybe because you are thinking that soon I should cook, now the kid is home alone, and I have a bad conscience because I could not bring the kid with me, even though the kid is fine, of course."

Achieving restoration may require a sense of fascination and being captivated by nature (see Kaplan, 2001). Interestingly, several participants noted that pausing and focusing on real nature was more challenging than compared with the virtual nature visits. This aligns with Marciszewska & Wanagos (2024) who emphasised that context in which an experience occurs is a relevant factor to consider. In real nature, participants described it hard to redirect thoughts away from work or daily tasks. This was because there were less stimuli than in virtual nature and because of the novelty value the virtual reality held for the participants. The real nature visits were conducted without any audio content, whereas the virtual reality provided more captivating experiences for some.

"[In virtual nature] you did not have time to think about anything else other than how to turn the glasses on, which videos to play, and when the video starts, you just very carefully observe what happens and go there. It is a bit different. You could observe what happens around you faster, and you are not so much in your own thoughts."

4.3. Broken immersion in virtual nature

The virtual experiences also had several weaknesses in terms of recovery and visitor satisfaction. Specifically, while the immersive nature of virtual reality was noted as a benefit, the participants in many ways criticised the level of immersion. Immersion was broken due to technical difficulties, such as physical problems with the headset and low-quality videos, but also due to unsatisfying content and virtual reality sickness.

First, for some, the virtual reality headset felt heavy and did not fit their faces well, especially if a person was wearing glasses. In addition, it took some time to get the headset adjusted, and technical problems prevented fully enjoying the visits. In some instances, the quality of the videos disturbed immersion. In virtual reality videos, high quality is often the key for positive affective and serenity responses (Newman et al., 2022).

"... maybe the virtual technology is not ready yet. The [virtual reality] glasses felt a bit heavy, especially while wearing glasses inside them. Due to technical reasons, I couldn't relax. And because I haven't used something like that before, it was a bit of a mess, the view was blurry and things like that."

"Every now and then, I felt like I was watching [the video] through a magnifying glass --- the view was not clear. Then I changed the position of the glasses, and then, aha, now it is clearer again. Perhaps that made reaching a full immersion a bit difficult for me. It was as if I was watching a tube television from the 80s, 90s."

Second, the content of virtual videos did not always satisfy the visitors. Seeing people or cameras in nature environments was irritating for some, as they were expecting to see plain nature. Generally, the participants had very differing preferences over the content of the virtual videos. Some preferred the still videos and found them calming, while others found them boring and wanted to move within the landscape. Some liked the background music, others did not. Some considered that the videos were unsatisfying and hoped for more versatile nature environments, such as visits to familiar nature and snowy landscapes from Finland, while others specifically enjoyed the possibility to see distant places. Hence, any preferred types of videos could not be found from the data.

Third, a few participants suffered from virtual reality sickness, which prevented them from enjoying the visits. Specifically, the videos with motion caused sickness. Some had headaches, pain in the neck, or pain or dryness in the eyes, especially after looking at a screen the whole day. Some noted getting a surreal, sluggish or dizzy feeling and for some, the feeling continued also after the visit. It was also mentioned that the nature visits gave more energy for the rest of the day than the virtual visits.

"After watching the virtual reality videos, I felt a bit dizzy. Going out and getting fresh air is definitely a fresher feeling when you come back inside [compared with the virtual visit]."

"I had a sluggish, relaxed feeling even after [the visit]. It was even like a sick feeling, a strange feeling in my stomach. --- I was relaxed but did not feel refreshed to do something else. So yeah, feeling a bit sleepy and sluggish."

4.4. Preference for multi-sensory experiences in real nature

In general, many participants noted a feeling that something was missing from the virtual reality experience. The visits to real nature provided something for multiple senses, while virtual tourism was noted to heavily rely on visual content. It has been previously noted that "perceptions of authenticity may be activated by experiences that involve all the different senses of the body" – in other words, while the visual content is important, it is not often enough for creating authentic experiences (Mura *et al.*, 2016, p. 151). Hence, virtual tourism may lack authenticity because of its heavy reliance on mostly the visual elements and its lack of interaction with the environment, as one participant put it:

"I wrote down what I was missing [from the experience]. A breeze, variation in temperature, scents, smells, exercise in undulating terrains, being committed to uneasy moments when you have to cross your comfort zone and push it through to get home. To observe the environment, how the season varies and changes the environment. Occasionally encountering with the neighbours and the overall good feeling you get when you have sweated and made it happen and then you come home with red cheeks, and you have been outdoors. This was the most important thing for me and all that was missing [from the virtual visits], even though the landscape was beautiful."

As a participant described, in real nature, the visitor was more active; while in virtual nature, they were rather passively following the content. Even though the nature visits were stressful for some because of processing the thoughts related to work and daily tasks, it was also considered a benefit that the nature environment activated thinking. In addition, many wanted to get some movement after a workday, which was possible in real nature. Then again, for some, the nature visits were calming.

"With the virtual reality glasses, you are always a bit an outsider, you kind of follow what the content follows (smiling). In nature, you can touch when you want, get up, go on a few steps or stop by in some situation. --- When there were those bushes swaying in the wind, somehow I felt like touching the fern or pull a branch (smiling). But, of course, you can't do that."

"[The real nature] made me think a lot more than virtual reality, which was relaxing but passive for my mind. The nature visit activated me."

"Many more emotions arose in the nature. I kind of accepted that as it is. I don't always need to feel light-hearted and to have a good spirit. If I sometimes feel irritated, that is part of my existence."

The intervention instructions emphasised sensing the surroundings and focusing on the environment, and some participants found the setting provided a new perspective for staying outdoors, compared with their previous style of rushing through the nature environments without knowingly sensing it.

During the real nature visits, a few participants said that they had found a deeper connection with nature after taking time to deeply sense the surroundings. Some noted that they should further consider how to make nature visits a habit, especially with the conscious presence that was attempted during the visits.

"When I want to think about something other than work, I play an audio book or something like that. Now I realised that oh damn, it was nice to really stop and wonder about the nature. Like absolutely amazing, I should... Like, why haven't I done this? It was a good wake-up call, why do I always need to rush."

"It was raining. I remember thinking that without the nature visit thing [as part of the research], I would not have gone out right after the workday. But it was kind of good, it was easy to breath, good to breath in the wet forest. And the trees were so beautiful, they had small raindrops hanging from the spruce needles, they were like diamonds. I took a long time admiring them."

In real nature, the participants also described minor disadvantages for recovery. Some participants found it distracting to run into other people or were worried how other people might view them staying still and wondering about the nature environment. Some considered that the nearby nature felt too familiar. The weather was considered to have both positive and negative effects on the nature visits, yet some also noted that it was a good idea to go out despite the bad weather. Still, despite these negative sides, and the fact that virtual reality seemed to provide a better way to redirect thoughts away from work, the vast majority of participants would choose actual nature for recovering from work. It was often noted that the positive sides of real nature well compensated for the minor negative sides of it.

Last, it was continuously agreed that the most optimal solution would be to use both virtual reality and real nature as a way to recover. Despite preferring real nature for recovery after the workday, the participants repeatedly suggested that virtual tourism could work as a tool for taking a break – as one participant stated, "an intermission escapism" – during a workday, because it provides an easy and fast way to pause the day. Indeed, virtual nature breaks have been found to restore employees in office environments, and due to time constraints, virtual visits can be the most convenient method of visiting nature during a workday (Ojala et al., 2022).

"But maybe I would choose (smiling) the real nature if I had a chance [to go there]. But then again, here in my workplace, if one could take a 15-minute break in the middle of the workday [in the virtual reality], it would be very welcomed as well."

"[Virtual reality] can quickly provide a space where you can direct your thoughts away from work, what you have been doing. Like, I think, in the middle of the day, during a coffee break (laughs a bit), you could get a totally different kind of a pause, like this could work as a, like... as an intermission escapism in the middle of the day."

5. Discussion

This study has identified several key elements in experiencing both virtual and real nature visits as methods of work recovery. Virtual reality offers an opportunity to escape from everyday reality, while real nature provides a context for reflection and processing. However, broken immersion in virtual environments can disrupt the recovery experience, a challenge that multi-sensory engagement in real nature may help overcome. Applying the experience economy framework (Marciszewska & Wanagos, 2024) offers valuable insights into differences in participants' experiences. To meet consumer needs, greater variety in offerings and attention to specific contexts, alongside product attributes, are essential.

5.1. Focus on the context

In real nature, some participants explained that they could not focus on their surroundings. For some, audio devices during nature visits usually provide ways to redirect thoughts away from work and daily tasks. However, during this study, the participants were asked to direct their attention to the nature surrounding and sense the surrounding with multiple senses. In line with Attention Restoration Theory (ART; e.g., Kaplan, 2001), restoration in natural environments is more likely to happen when the employee feels fascinated by their surroundings, and their attention is effortlessly captured by a natural element, resulting in attentional restoration. It is likely that fascination related to nature experiences support psychological detachment from work, which is seen as one of the key processes in psychological recovery from work demands connected to better mood, lower need for recovery and burnout (Siltaloppi *et al.*, 2009). Psychological detachment can be particularly important when working remotely in order for the mind to be present for nonwork-related experiences and interactions. It is possible that when employees are burdened, they have more difficulty psychologically detaching from work-related thoughts and sensing the nearby natural environment with familiar stimuli.

While it might not be beneficial to constantly detach from reality and avoid processing thoughts, the results suggest that escapist experiences in virtual nature can help with directing thoughts away from work and daily tasks, which is often the goal of tourism products in general. Our results show that the virtual reality surprised many of the participants positively, also those who were a bit sceptic before the visits. Developing virtual nature experiences could be recommended especially if the target group is in need of recovery from work. The beneficial recovery experiences in virtual reality have been explained by its immersive elements (Browning *et al.*, 2020), and that could partly explain why our participants perceived the virtual reality as captivating. It can be argued that representatives of the experience economy may encounter a new consumer segment – employees seeking recovery from work. In this context, designing virtual nature experiences, including those suitable for staycations, becomes highly relevant. Meanwhile, some also wondered whether the virtual visits had a similar effect as various media forums, such as audio books, podcasts, music or TV series, for providing escapism. In fact, virtually produced nature environments have been noted to help with redirecting attention and to lead away from stress, even without using highly immersive technology (Ojala *et al.*, 2022).

Of course, it is also important to critically assess the root causes for the need for detachment from work. While work can be very rewarding, workplaces need to consider how to, first, organise the tasks to not overburden the employees, but second, to think about creative ways for supporting leisure activities after and during the workday. Based on the results, it is suggested that workplaces could encourage their employees to take nature breaks, be it via virtual or real nature experiences. Similarly, as Mura *et al.* (2016, p. 157) suggest, “virtual and non-virtual tourism are related and should not be regarded as exclusive categories”, and the results of this study encourage finding the benefits from both virtual nature tourism and real nature visits for supporting work recovery.

5.2. Towards the experience economy product attributes

Virtual reality tourists have been noted to emphasise the importance of naturalistic interaction, sensory immersion and graphical realism (Newman *et al.*, 2022). Furthermore, multisensory experiences have been found to reduce stress better than experiences that rely on only one sense (see Ojala *et al.*, 2022). Also, the participants of our study wished for more immersive and multi-sensory experiences. For enabling such experiences, the virtual reality technology requires further development, which could take place, for example, through producing better-quality lenses, lighter headsets, wireless options and more naturalistic interaction methods (Newman *et al.*, 2022).

In addition to the obvious disturbances for the recovery experience (such as virtual reality sickness and technical problems), it is also important to pay attention to the variety of the contents of the trips for

providing visitor experiences. For example, it is worth considering whether the trips are arranged without possibilities to construct a deeper understanding of the place which refers to experience realm of education by Pine and Gilmore (2011). Tjostheim and Waterworth (2022, p. 75) state that “The history of a place, what is it known for, events that have happened there or are going to happen there, is also part of the place construct”. This calls for paying attention to how the trip is scripted and what is told to the visitor about the place they visit. As our participants noted, the virtual visits felt rather passive, whereas in real nature they felt more active. Perhaps, experience economy representatives could provide more interactive options in virtual experience.

It is possible that virtual tourism may never fully replicate the sensory richness of real-world experiences (Dewailly, 1999). While virtual experiences often aim to mirror real-life encounters as closely as possible, one might question whether replication should be the sole objective. Instead, virtual reality could be leveraged to enhance experiences by adding unique layers – such as immersive soundscapes, advanced graphical elements or emotional content – that cannot be accessed in non-virtual environments (Marciszewska & Wanagos, 2024). In this sense, the traditional question of mimicking actual reality could be turned the other way around to ask what types of experiences virtual tourism can provide that the actual reality cannot. This is already the case with virtual games. Like our participants noted, with virtual tourism, one can visit distant places they might only dream of visiting, or one can see the places from a unique perspective.

Furthermore, while virtual nature does not provide a similar sense of place as the actual nature does, it does not mean it cannot mediate and deliver nature experiences that reinforce a sense of place to real nature. This might be critical especially for people whose access to nature is limited. In fact, virtual nature visits have been already noted to enhance connectedness to nature (Leung *et al.*, 2022). Through enhancing connectedness to nature, virtual nature tourism could contribute to enhancing wellbeing and health: as Leung *et al.* (2022, p. 2) state, “*disconnection from nature is an emerging public health concern*” (see also Browning *et al.*, 2020). For preventing this problem of disconnection, workplaces could support employee health by thinking about the role of nature in hybrid work and thinking about potential ways to provide nature experiences for employees during the workday, but also by supporting free-time activities in nature environments. Such nature breaks could also be in virtual form, as many of our participants suggested. Employers could support recovery, for example, by allowing worktime to be utilised for taking breaks in (virtual) nature. Such openings might require challenging the existing cultural conceptions of work and leisure and the concept of worktime.

At the same time, it needs to be critically evaluated whether virtual tourism works as a tool that contributes to the wider trend of urbanisation, which distances people from nature. A future where nature visits mean visits to virtual reality sounds like dystopian yet might already be a reality for people whose access to nature is limited due to strong urbanisation (Leung *et al.*, 2022). In our study, the participants described finding a stronger connection with real nature while visiting it with an aim to deeply sense the surroundings. Similar notions about nature connectedness in virtual reality could not be found from the data, though. Moreover, the participants stated that virtual nature cannot provide everything that real nature does, because it leaves the visitor with a feeling that something is missing from the experience.

Thus, the results indicate that virtual tourism is not at the stage of replacing actual nature visits, and it is questionable how likely it can provide everything real nature does. Hence, it could be concluded that virtual tourism can be seen as an option for providing smaller-scale alternatives for nature visits, yet at this stage, cannot replace it in terms of recovery. As our participants noted: it is hard to find negative sides from visiting nature when thinking about recovering, while virtual reality was noted to hold several development points.

Finally, as our results show that virtual reality easily captures the attention of the visitors, utilising the captured attention wisely is important for providing responsibly produced tourism experiences. For example, virtual tourism could be used as a tool for hopeful and transformative tourism for educating tourists on environmental changes, such as climate change impacts, or biodiversity loss or to increase awareness regarding exclusion and inequity issues (see Griffin & Muldoon, 2022; Paiva *et al.*, 2022). Virtual tourism has been already noted to hold potential for increasing empathy and understanding towards the places visited; a study by Griffin and Muldoon (2022) on virtual slum tourism showed that the virtual visits rose participants' awareness and challenged their pre-existing attitudes towards slums. Moreover, in Paiva *et al.* (2023) study, users were placed in a mixed-reality game as members of a scientific expedition looking for extinct plants in the future. Their study participants' experiences led into reflections about nature conversation. Similar attributes and interactive elements should be incorporated when designing virtual nature trips for work recovery – not only to support restorative benefits but also to enable learning opportunities, in line with Pine and Gilmore's (2011) experience realm of education. In this regard, it is especially worth further studying how virtual nature not only relaxes but also how it could work as a source of creativity, inspiration and enthusiasm (Ojala *et al.*, 2022). Our participants described their experiences in virtual nature as serene and relaxing but simultaneously as exciting: *"It was really confusing that I felt excited and relaxed at the same time"*, as one person put it.

When making inferences based on these findings, it should be noted that this study is based on qualitative analyses of focus group interviews and does not aim to generalise findings to other employee populations. Experiences of virtual and real nature may vary across countries and climates, where weather conditions, accessibility, and perceptions of safety in actual nature differ. Additionally, the VR videos used in the study were diverse, and participants' experiences may have varied depending on their individual video preferences. At the time of planning, no consumer-ready Finnish nature videos were available, so local content could not be included. Furthermore, VR technology and related products evolve rapidly; therefore, some drawbacks reported by participants may reflect limitations of the specific videos and headsets used rather than the concept of virtual nature itself.

6. Conclusion

The participants experienced recovery in both virtual and real nature environments. In virtual nature, the participants had escapist experiences, whereas in real nature, some had difficulties with directing thoughts away from work or daily tasks. Thus, the results indicated that virtual reality was regarded as providing a more effective way to redirect thoughts away from work and other demands. Yet, in virtual nature, immersion was broken due to technical difficulties, problems with the video quality, content-wise issues and, in some cases, virtual reality sickness. Participants, however, generally preferred real nature over virtual nature because it engaged multiple senses, aligning with the principles of experience design. In contrast, virtual nature was perceived as lacking certain sensory elements, which diminished the overall experience.

The experience approach provides insights to workplaces for supporting employee work recovery through virtual options, for virtual tourism developers for designing virtual content and for employees who seek suitable recovery options. The results suggested that, although virtual nature cannot replicate the same sense of place as real nature, its unique features, such as enabling easy and more sustainable access to distant destinations or offering perspectives like aerial views, could be further leveraged in experience economy product development and marketing. The ability of virtual reality to offer escapism is an interesting opportunity for transformative tourism service developers but it needs further research. This study highlighted a potential new target group for experience economy providers, that is employees seeking recovery from work. Yet, it is important to note that recovering from work is highly dependent on the question of how the work is arranged in the first place and determining the root

causes for the need to recover. Finally, virtual nature tourism needs to be developed responsibly, as it cannot and, perhaps should not, replace real nature experiences.

Note: Trial registration ClinicalTrials.gov (NCT0583065)

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