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RESEARCH-ARTICLE

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Abstract

Oceans, lakes and rivers, dynamic and vital ecosystems, face increasing threats from climate change. To ensure its sustainability, there is an urgent need for technologies that promote responsible and sustainable human-water interactions. Water sports engagement fosters mental and physical health benefits, as well as environmental care when responsible practices are encouraged. Although prior work has investigated how interactive technology can support sports practice to make it sustainable, water sports are less explored due to the unique technical challenges they pose. Hence, there is an opportunity for human-computer interaction (HCI) to explore how interactive technology can be adapted to the dynamic, unpredictable nature of outdoor water sports to foster water conservation and ocean sustainability. We argue that by exploring the design of interactive water sports experiences through a soma design lens, we will better understand the intricate synergy between our bodies and the felt and lived body of water, hence, supporting meaningful body-water interactions. We aim to engage researchers in exploring the potential of soma design in the context of water and water sports guided by preliminary posthumanist water frameworks. The

workshop outcomes include a design framework supporting engagement in outdoor water sports to foster sustainability through soma design. Insights from the workshop will be documented in a future academic publication to advance the WaterHCI field.

CCS Concepts

• **Human-centered computing** → **Interaction paradigms.**

Keywords

Water sports, Ocean sustainability, Soma design, Interactive technology

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1 Background and Motivation

In recent years, there has been increased interest in designing interactive systems for water activities, drawing attention to the field of WaterHCI [25, 35]. A notable challenge, as suggested by prior work, lies in designing interactive systems that support users' enjoyment while in or on water [24, 25]. This is particularly true when designing interactive devices for outdoor water sports since designers often prioritize using technology to improve an athlete's performance over holistic experiences that support their motivation,

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Figure 1: People performing water sports with encounters that highlight a specific aspect of sustainability awareness. A) A scuba diver is seen rescuing a whale entangled in a fishing net. B) Two people are paddleboarding over crystal-clear waters with vibrant coral reefs visible beneath them. C) A person is kayaking in a river filled with pollution.

social interactions and psychological states [8]. However, many people participate in outdoor water sports such as diving, kayaking, and stand-up paddling, for their gains in the holistic experience, such as well-being or ecotourism [14, 33]. A striking example of this transition is how surfing has gained popularity as a type of therapy [21, 22]. Practising water sports in water bodies enables “revitalization and re-storing”, allowing submergence in the leisurely sensory and emotional experience of being in water that leads to a sense of care for the place, a co-identification and emotional connection with the natural environment [26, 33] (Fig. 1). For example, SCUBA diving in the ocean is a fundamentally richer experience than training to dive in an indoor pool. Associated prior work has also shown how practicing water sports for well-being also fosters environmental care [2, 9, 11] since, beyond the close contact with water, many times athletes have encounters with wildlife [33], encouraging athletes to create conservation groups to support ocean sustainability [1]. Although prior WaterHCI work has explored sustainability through augmented reality games in pools [6, 27], there is limited knowledge on how to design interactive technologies for outdoor water sports that foster water conservation, such as rivers, lakes and ocean sustainability.

Hence, we argue that designing interactive devices to support the holistic experience of outdoor water sports showcases the potential to foster sustainable practices in water since humans’ natural attraction to water aesthetics could facilitate conscious practices around water [11, 26, 33]. However, designers need to avoid a technology-first approach and focus on the aesthetics of aquatic interactions, as prior WaterHCI work has pointed out [23, 25], thus suggesting the need for a paradigm shift when designing interactive experiences for water sports.

1.1 Soma Design for Outdoor Water Sports

In this workshop, we aim to take a somaesthetics design [12] approach for engaging with water sports in interactive ways. Soma design approach was leveraged to design interactive experiences

for different sports, inviting intimate reflections between our bodies and the world [17, 19, 34]. This aligns with recent WaterHCI work pointing out that soma design has the potential to bring our bodies closer to the body of water [23, 24]. This somatic approach leverages the designer’s bodily awareness while moving in the water to recognize water affordances and create novel experiences with the use of interactive devices [23]. Recognizing water affordances for novel interaction places the body of water as an active interactor and not merely as the medium in which experiences are developed. In other words, the water has the ability to “touch us back”. For example, children playing in the sea can splash water, at the same time, a wave can wash someone out. This back and forth of touch and being touched [32], and move and get moved [13, 15], could facilitate the emergence of meaningful body-water interactions.

1.2 Posthumanism and Postphenomenological Views on Performing Water Sports

Social science researchers investigating the practice of water activities have started to advocate for a posthumanist approach [7, 10], including more-than-human [4, 5, 29] and postphenomenology [16, 18, 28] theories to understand the role of technology when people are in water. While posthumanism design de-centers humans from the design and assigns agency to non-human actors (e.g., plants, sea, microbes) [3, 10, 20], postphenomenology allows an understanding of human interactions mediated by technology [31]. In our case, this means the fluctuating and multidimensional body-water interactions, as well as our aquatic bodies (our bodily changes while in the body of water) [23]. We believe posthumanist theories will help us design interactions that better capitalize on outdoor water sports’ potential to create water stewardship since these theories propose a view of the water bodies as active interactions. This is exemplified by Peters [30]: “We need to understand and explore ways in which the sea is not a material or metaphorical void, but alive with embodied human experiences, more-than-human agencies and as well as being a space in and of itself that has material character,

shape and form”. As HCI moves towards posthumanist design and postphenomenology theories, we believe these approaches also have the potential to influence the development of the emerging WaterHCI field, and recognize the potential of interactive technology in the design of outdoor water sports that foster rivers, lakes and ocean sustainability.

1.3 Workshop Contribution

With this workshop, we seek to redefine the role of technology in water sports to foster ocean sustainability and cultivate a deeper connection with different water environments. By exploring soma design principles, participants explore how water affordances shape interactions, allowing for more immersive and ecologically aware experiences. Hence, participants of the workshop will be first sensitized to the water aesthetics and affordances for interactions by submerging hands and feet in buckets filled with water, and exploring the use of water pumps and props in water. After this water sensitization, participants will be able to paper prototype water sports experiences by discussing how soma design and posthumanist design principles can be adapted to the agency of the ocean. Finally, participants will explore the role of technology in these body-water interactions, to propose systems in which the resulting experiences can foster rivers, lakes, and ocean sustainability.

This workshop will serve as an exploratory step toward a formalized framework to design interactive water sports that foster engaging water experiences and simultaneously sustainability of natural bodies of water such as rivers, lakes, and ocean. Hence, the outcomes include a framework mapping the design implications to supporting engagement in water sports to foster sustainability through soma design and posthumanist theories. Moreover, we will invite participants to write a joint paper about the results of the discussions and the envisioned design framework to submit to DIS2026 or related special issues. Overall, our workshop explorations contribute to advancing the field of WaterHCI and the current HCI efforts to shape a more sustainable world.

2 Goals of the Workshop

For this one day workshop, we propose the following goals:

- Create a community for collaboration between researchers, practitioners and designers interested in water sports.
- Discussing state-of-the-art in designing interactive experiences for water sports as well as exploring the potential of soma design practices and methods.
- Engage in paper and low-tech prototyping using soma design methods, from somatic explorations in water to dynamic explorations of digital devices while simulating water sports.
- Generate new knowledge in the form of insights, practical strategies, and methodological approaches to design interactive experiences in water sports guided by posthumanist theories.

3 Topics of interest

The topics of interest for the workshop include theories, technologies, and applications related to the potential of interactive water sports experiences to foster environmental engagement and ocean sustainability: a) How interactive technology can boost water sports

participation to enhance connection to water ecosystems, b) The role of soma design in enhancing the holistic athlete experience in water sports, c) Recognizing and designing for water affordances through embodied interaction, d) Wearables and interactive devices for skill development, motivation, and enjoyment in aquatic environments, e) Ethical and sustainability considerations in designing interactive technologies for natural water spaces.

4 Anticipated outcomes

We will offer participants the opportunity to co-author an article to communicate the results of the workshop. A selection of academic publications will be considered based on the outputs of the workshop (e.g. an ACM Interactions report or a DIS paper based on the discussions). Additionally, the overall workshop session will be communicated to a larger audience through the workshop website. The workshop activities and the insights from the facilitators and participants will be articulated into a toolkit designed to engage practitioners in the interactive water sports design space, aiming to further develop the WaterHCI field.

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