Are Conferences Sus?: Fostering Conversations on the Sustainability of HCI Conferences Through Data Physicalization

Sarah Hayes
sarah.hayes@mtu.ie
Munster Technological University
Ireland

Martin V. A. Lindrup
mval@cs.aau.dk
Department of Computer Science,
Aalborg University
Aalborg, Denmark

Rebecca Noonan
rebecca.noonan@mycit.ie
Munster Technological University
Ireland

Lisa Zimmermann
Lisa.Zimmermann@mtu.ie
Munster Technological University
Ireland

Denise Heffernan
Denise.Heffernan@mtu.ie
Munster Technological University
Ireland

Kim Sauvé
khps22@bath.ac.uk
University of Bath
UK

Nathalie Bressa
nathalie.bressa@telecom-paris.fr
Télécom Paris, CNRS i3 (UMR 9217),
Institut Polytechnique de Paris
France

Samuel Huron
samuel.huron@telecom-paris.fr
Télécom Paris, CNRS i3 (UMR 9217),
Institut Polytechnique de Paris
France

Trevor Hogan
trevor.hogan@mtu.ie
Munster Technological University
Ireland

Figure 1: In our sustainable data physicalization workshops, we have explored the use and environmental impact of a selection of materials, such as those pictured.

ABSTRACT

Against the backdrop of a climate crisis, HCI researchers and designers are reflecting upon, reconsidering, and re-imagining the work that we do through the lens of sustainability. In this Studio, we propose to adopt this critical perspective to Sustainable HCI through an examination and reflection on the environmental impact of research conferences. Our Studio builds upon our prior work that explored sustainable methods and toolkits for facilitating data physicalization workshops. We apply the tools and strategies developed through this prior work within a Studio in which participants are facilitated to engage with, reflect upon, and create with data relating to the sustainability of HCI conferences such as Tangible, Embedded and Embodied Interaction (TEI). Through the creation of data artefacts that can be displayed, worn, or shared throughout the conference beyond the Studio, we aim to spark wider conversations about the environmental sustainability of TEI2024, as well as HCI conferences more generally.

KEYWORDS

Sustainability, Data Physicalization, Environmentalism

1 INTRODUCTION

Given the growing climate crisis across the world, sustainability has come to the fore as one of the key challenges faced by Human-Computer Interaction (HCI) research community (cf. [4, 12]). Our activities as designers and researchers have a direct impact on the environment, through the waste we produce and the resources we consume. However, an area that remains under-explored is the sustainability of academic conferences, such as Tangible, Embedded and Embodied Interaction (TEI). In-person conferences necessitate the large-scale use of resources and production of waste in ways that, we argue, must be seriously considered by academia at large. There have been movements within the HCI community towards this - for instance, TEI2024 will be the first iteration of this event to have a Sustainability Chairing Committee since the inception of

the conference. We propose to capitalise on this momentum and interest in environmentalism within the conference to initiate a discussion via a Studio around the sustainability of HCI conferences, including the activities that must occur for these events to take place, such as international travel, the production of artefacts, and in-person gatherings.

Our Studio builds upon previous work we have completed around exploring and developing more sustainable ways to host data physicalization workshops via an investigation of zero-waste practices for creating physical artefacts [6]. In this Studio, we will facilitate participants of TEI2024 to engage with and reflect upon the sustainability of the conference they are currently attending. We will do so through hands-on activities in which participants will create physical data displays using data relating to the environmental impact of TEI2024, such as carbon footprints caused by travel, waste production, and energy usage. We aim to build upon the ideas formed through these activities to open up wider conversations around how academic conferences might be adapted or re-imagined in line with the goals of environmentalism.

Given the overall subject matter of TEI (i.e. embodied interaction and tangibility), we are motivated to adopt the practice of *data physicalization* (i.e. the representation of data through geometric or material properties [11]) as a medium for opening this discussion with TEI attendees. Alongside this, recent criticisms of the sustainability of Tangible Interaction as a field [8] herald the need for us as a community to reflect upon the impact of our practices upon our planet.

In this Studio, we will adopt a sustainable approach to data physicalization via the use of our ZeroWaste PhysKit (see [6] and Figure 2). By providing attendees with the opportunity to select, sort, make sense of, and represent data related to the sustainability of the TEI2024 conference, our goal is to (1) facilitate conversations about what sustainability means in the context of HCI conferences, (2) provide a space for reflecting and imagining what the future of sustainable conferences might look like, and (3) produce a set of data physicalization artefacts that capture and present data narratives about sustainability issues, wins, and opportunities at TEI2024. Our intention for these artefacts is that they will be shared with the rest of the TEI2024 attendees via their display in the conference common spaces. Although we aim to take a critical view of the sustainability of HCI conferences, our goal is not to diminish the benefits of such events for attendees, nor is it our intention to 'blame and shame' participants for their attendance. The positive impact of conferences such as TEI for the research community should not be understated, including opportunities to share one's work, forge collaborations, and socialise with one's peers in a highly engaging, motivational environment. Our focus is on opening this conversation with TEI participants in a way that acknowledges the importance and benefits of HCI conferences, while simultaneously finding opportunities to improve the sustainability of such events into the future of HCI research.

2 BACKGROUND

In this section, we offer an overview of Sustainable HCI (SHCI) research and practices, as well as identifying the gap that this Studio aims to fill in terms of initiating discussions around the environmental impact of HCI conferences. Additionally, we provide a short discussion on the field of Data Physicalization and how its associated research areas and practices intersect with sustainability.

2.1 Sustainability Concerns in HCI Research

HCI has seen a growing interest in sustainability over the past several decades, with Sustainable HCI (SHCI) and Sustainable Interaction Design (SID) being identified as areas of scholarship and research in themselves (e.g. [1, 9, 20]). Research from across the broad field of HCI has explored different ways of addressing this, including exploring sustainability as a value for design [16], developing strategies and tools for addressing sustainability in design [1], designing for climate change communication [4], and the organisation of Special Interest Groups and workshops to raise awareness of this issue [9, 15]. However, an under-explored area remains the environmental impact of in-person conferences. Despite the rise in hybrid formats for HCI conferences, initiated by the Covid-19 pandemic [3], in-person conferences remain desirable. Our aim for this Studio is to initiate a discussion on the sustainability of this format through reflection and engagement with real-world data.

2.2 Sustainability and Data Physicalization

Over the past decade, data physicalization has emerged as a key area of interest for HCI researchers exploring data representation practices. Data physicalization has been defined as the practice of designing physical artefacts *"whose geometry or material properties encode data"* [11]. Within HCI research, data physicalization has been explored in many different areas, including learning and cognition [21], design [2], and fine art [19]. To date, an area of data physicalization research that has lacked exploration is the environmental impact of data physicalization materials. While environmentalism and sustainability have been addressed by physicalization practitioners, this has typically been done through the data or topic being represented (e.g. [18, 22]), as opposed to a critical reflection on practices or material usage [14]. While there are examples of materials being used within data physicalization workshops that might be considered to be sustainable (e.g. biodegradable materials such as food [13] and reusable materials such as building blocks [10]), environmentally-friendly physicalization practices remain largely unexplored.

The work on sustainable data physicalization approaches that this Studio builds upon emerged from the work of the authors across a number of previous workshops. The issue of sustainability within the field of data physicalization specifically was recently raised via a Conference on Human Factors in Computing Systems (CHI) workshop [17]. As part of this workshop, the concept of zero-waste data physicalization for more sustainable workshops was introduced by an attendee position paper [5]. This concept has since been elaborated upon via an Information+ conference workshop aimed at investigating the opportunities and limitations of such a zero-waste approach to data physicalization workshop delivery [6]. The organisers of this workshop, in collaboration with HCI researchers with a strong background in conference organisation and Sustainability, will utilise the outputs and findings from these workshops and activities to apply the ZeroWaste PhysKit

Figure 2: The current version of the ZeroWaste PhysKit, which includes a mixture of reusable, upcycled, and biodegradable materials, as well as tools for shaping, connecting, and labelling the produced physicalization designs.

within a TEI Studio to facilitate data-representation activities that will address sustainability both *in* and *through* design [15].

3 STUDIO FORMAT

The Studio will consist of three main parts. In Part 1, we will present the Studio themes and engage in a short icebreaker activity. In Part 2, the facilitators will introduce the ZeroWaste PhysKit [6] and the physicalization activities. These activities will involve the participants building data physicalization displays and artefacts that can be shared with the wider TEI2024 community throughout the conference. These designs will communicate and/or collect data pertaining to the sustainability of the conference (e.g. international travel, recycling/reuse of exhibit materials). These data will be collected in one of two ways: they will be provided prior to the Studio by the Sustainability/ General Chairs of TEI2024, who have confirmed their ability to do so, or they will be collected by the participants themselves throughout the conference through the installation of participatory data physicalizations in the TEI2024 common spaces. By using the ZeroWaste PhysKit to facilitate these design sessions, we prioritise environmentalism as a value in the Studio format. Finally, in Part 3, we will facilitate a discussion and reflection session with the participants, in which they will present their designs to one another, and discuss their thoughts on the data and its meaning for conference sustainability.

3.1 Intended Schedule

The Studio will be comprised of a mixture of hands-on activities, in which participants will create their own zero-waste data physicalization designs, and reflective discussions, in which we will open the floor for conversations around the role of sustainability in conferences, and the environmental implications of the current model of HCI research dissemination. The planned schedule for the Studio is as follows:

Time	Duration	Activity
9:00 - 9:30	30 mins	Welcome and Introduction
9:30 - 10:30	30 mins	Participation Introduction/Icebreaker
10:30 - 10:45	15 mins	*Coffee break*
10:45 - 11:00	15 mins	Introduction to Activity
11:00 - 12:30	90 mins	Ideation and Design
12:30 - 13:30	60 mins	Data Physicalization Building
13:30 - 14:30	60 mins	*Lunch*
14:30 - 16:00	90 mins	Data Physicalization Building (continued)
16:00 - 17:00	60 mins	Reflection and Discussion

4 GOALS AND OUTCOMES

Our main goals for this Studio are (1) to initiate and support conversations within the TEI community about sustainability and HCI conferences, (2) to generate, explore, and critically reflect upon a collection of data related to the environmental impact of TEI2024, (3) to extend the reach of the Studio beyond the day of the workshop into the rest of TEI2024 via the production of data physicalizations that can be displayed and interacted with by attendees to support conversations and reflection, and (4) to identify future directions and foster potential collaboration opportunities between participants in the area of sustainable practices for in-person HCI events such as conferences, workshops, and studios. In terms of tangible outputs from the Studio, we expect to produce three main types: (1) data physicalization artefacts that can be displayed at the TEI venues when possible to collect or present data on sustainability, and permit participants to reflect on these data, (2) data that are generated through participants interactions with the TEI exhibits, which can be disseminated via future publications and/or online repositories, and (3) documentation outlining the data physicalization exhibits that are produced at the Studio, which will be shared online via our Studio website and via social media.

5 ORGANISATION AND PARTICIPATION

We will actively recruit from across HCI research, art, and design spaces to attract participants from a diverse range of backgrounds and disciplines to the Studio. We will invite participants to share

their background and motivation for attending the Studio with us prior to the event.

5.1 Submission Formats

We will invite submissions to the Studio via an online form. Applicants will be asked to provide a short introduction to themselves and their research/design/educational background. They will be asked to provide a short motivational statement for attending the Studio. Finally, applicants will be given the opportunity to attach links to any external work of theirs available online that may support their application (e.g. portfolios, projects, etc.). The call for participation will be distributed through email mailing lists in the visualization, design and Tangible Interaction communities, on the workshop website, and through professional networks.

5.2 Organisers

The organisers involved in this Studio have strong experience planning, organising, conducting, and facilitating workshops across a wide variety of settings, from academic conferences, to industry training (e.g. [7, 10, 17]). The organisation team is made of up of researchers exploring different areas related to this Studio's theme, including HCI, data physicalization practices, zero-waste data physicalization, Sustainable Design, Information Visualization, and playful practices for design. In this way, the expertise of the team is strongly aligned with the themes of the Studio. Alongside this, we will work collaboratively with the TEI Chairing Committee, in particular the Sustainability Chairs, to overcome the practical challenges of the proposed activities, such as accessing sustainability data for TEI2024 and organising the display of the data physicalization designs during the conference after the Studio.

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