Physical Journey Maps: Staging Users' Experiences to Increase Stakeholders' Empathy towards Users

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Figure 1: Xpressia is a physical and interactive journey map, staging the experience of railway passengers

ABSTRACT

Customer Journey Mapping is a widespread service design tool that synthesizes and communicates user research insights to stakeholders. In its common form, a journey map is a synthetic (typically non-interactive) visualization of the key steps of the users' experience with a service or product. By decomposing the elements of a journey map and staging them under the form of a physical and interactive installation, we intend to leverage the power of journey mapping to break silos and prompt employees within an organization to discover end-users journeys in a compelling and empathic way. This aims to support the user-centered maturity of the organization by developing employees' curiosity and empathy towards users. We illustrate this approach through a case study on railway passengers' experiences. We explore the value of richer transfers of user research insights through physical journey maps and discuss design processes and mediums enabling journey maps to come to life.

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CCS CONCEPTS

• **Human-centered computing** → Human computer interaction (HCI); HCI design and evaluation methods; User studies.

KEYWORDS

Experience mapping, Customer journey mapping, Data physicalization, User research method, Empathy

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1 INTRODUCTION

A journey map visualizes the experience of a person (often the customer of a service) over time [23]. It unveils all the key steps of the experience and can take many forms, varying in their scale or scope depending on the purpose of the map in the design process. In its traditional form, a journey map is a synthetic visualization, on screen or on paper, focusing on a main actor (often represented by a *persona*). Amongst other uses, it allows communicating user research insights to stakeholders in a synthetic yet compelling way. It encourages people across the organization to consider the user's experiences, feelings and needs. It forms a "boundary object" that

allows diverse teams to work together efficiently and creatively with the customer's experience as the common denominator [11, 23].

As few academic publications investigates journey maps as a design tool, the numerous benefits attributed to mapping experiences are mainly documented by practitioners. Surveying 48 user experience professionals in 2016, Kaplan [11] emphasizes key benefits of journey mapping. By synthesizing user research, maps uncover hidden truths and new insights. When co-created, they facilitate collaboration between groups. More importantly, over a third of respondents reported that journey mapping help align stakeholders around a common vision and shared goals, thus growing cross-department consensus. Journey maps support building empathy within an organization [1, 11, 12, 23]. They shift an organization's view "from inside-out to outside-in", give teams a common big picture and help break silos [10, 11]. As pointed by Kalbach [10], such a process should not be limited to frontline personnel only but rather every employee in a company must empathize with the end-users of their product or services. Journey mapping supports the involvement of everyone by creating personal connection [11]: it helps people within the organization to see the impact of their daily work on the customer experience.

In academia, the process of creating journey maps and the resulting impact are described for specific application areas (e.g., in healthcare [20]). Journey maps have also been documented as an inspiration tool to spot design research opportunities [18]. There is a limited amount of published work looking at journey mapping from a methodological perspective, and this body of knowledge is spread between several disciplines. Relevant studies including proposals to enrich customer journey maps as a design tools adopted a main focus on the source of data to be represented in the journey map [2, 8, 21]. Rosenbaum et al. [21] linked marketing research to the mapping process to leverage the power of journey maps as a strategic innovation tool. Alvarez et al. [2] developed a data-driven customer journey map that bridges insights from explicit (e.g., self-reported) and implicit user data (biophysiological reactions). Ismirle [8] suggests to use journey maps to consider individual user stories and overcome the issues of aggregating user research data into an "average user".

Closer to the concept we develop in the present contribution, a few research teams attempted to enhance designers' empathy for users by presenting user research data in richer formats. McGinley and Dong [17] studied how communicating rich user data in many forms could enhance designers' empathy with end-users. They staged user research using a 10-min documentary film based on video clips compiled during the research phase, an interactive dashboard of insights, and experiential artefacts aims at letting the design team experience the sensations involved in a bar setting (e.g. broken glass). The authors emphasize a "need to move away from the dry representations that exist in conventional anthropometric resources, and to bring human information to life through presenting user insights as fuller stories, conveying liveliness through visual material, and giving scope for the design audience to complete the interpretations, allowing a level of coownership. Presenting more than just data when trying to understand the lives of real people, a variety of strategies and techniques need to be deployed in order to get closer to a true understanding." (p.193, [17]). Finally, Neubauer et al. [19] introduced technology-enabled empathy mapping. During a workshop, they used Virtual Reality (VR) as a tool to support designers in developing a better sense of empathy for the users and the context. Their scenario, designing for the International Space Station, was an unprecedented challenge designers have not experienced. Their preliminary results indicate that new technology such as VR can be leveraged to develop empathy within the early stages of the design process.

Our contribution is twofold. We introduce the concept of physical journey maps and illustrate this approach through a first industrial case study. We reflect on our design process and discuss relevant considerations when translating a traditional visualization of the experience into an interactive physical installation, thereby paving the way for future work.

2 DESIGN PROCESS

Our research and design process started by defining the goals and expected benefits of a physical journey map. What is the purpose of physicalizing a rather successful and so widespread service design tool? What benefits do we expect? We then conducted an expert ideation session to explore the design space and creative potential of this idea. Based on a generic storyboard of what such an installation could look like, we finally applied the concept of the physical journey map to an industrial use case, in collaboration with a national railway company. We report insights from a preliminary user study.

2.1 Goals and Expected Benefits of a Physical Journey Map

We define physical journey maps as physical installations staging user research data and insights through various mediums and sensory modalities to represent the journeys of the users of a service or a product. The goal we envision for physical journey maps is to bring customers' stories to life in a compelling and empathic way in order to break down organizational silos and unite employees around a common vision. It aims to be an onboarding tool into service design, raising employees' interest in the user experience at every level of the organization. If successful, it should trigger conversations, engage and support employees to co-create solutions to improve the service experience. Factors of success include: (a) the installation gives employees a deeper understanding of the end-users and their experiences (b) it triggers social curiosity for users and basic forms of empathy, and at a higher level (c) it inspires people to take ownership and action to improve the service experience. By staging the customer journey as an interactive experience, we deploy a traditionally visual service design tool in physical space and time. The physical journal map supports a multi-sensorial embodied experience, which aims to be memorable and to resonate with employees at every level of the organization.

2.2 Expert Ideation Session

We conducted a brainstorming session with designers in order to generate ideas on how to translate the elements of a journey map into physical representations. Ten designers (4 men, 6 women) participated in the ideation session, all having several years of experience in the field of design (Min=5 years, Max=16 years). All

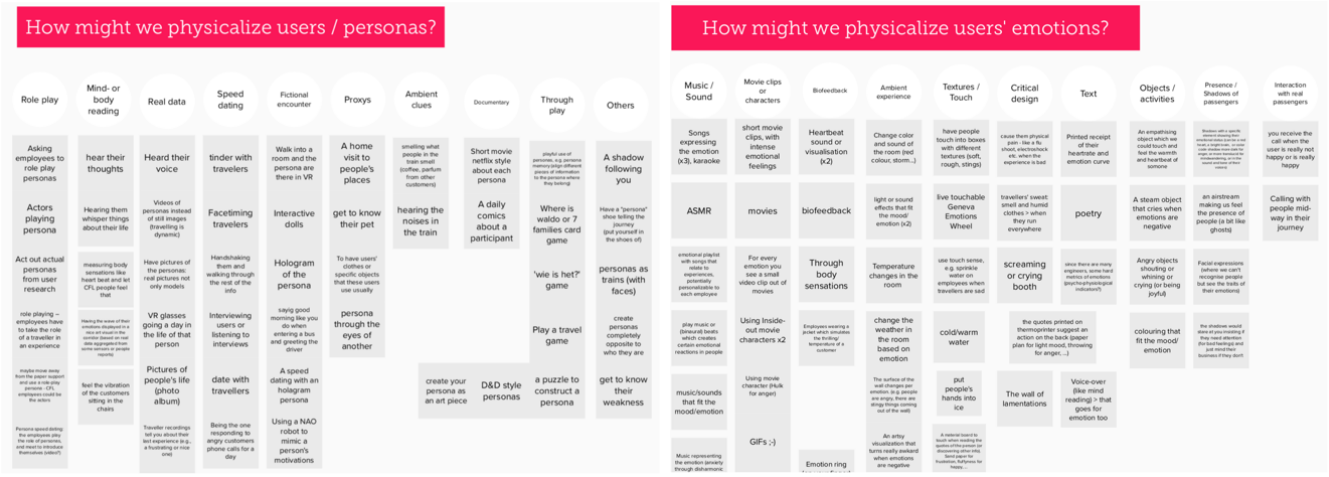

Figure 2: Extract of the affinity diagram synthesizing the outcomes of the expert ideation session

participants were trained and knowledgeable in user research, and specifically customer journey mapping.

We considered elements of a journey map separately and asked the designers to answer How Might We questions, such as "How might we physicalize users' emotions?" or "How might we physicalize pain points?". This prompt was repeated eight times, corresponding to the eight main elements of a journey map [15], namely: (1) the user/persona, (2) the timeline/stages of the experience, (3) the users' actions, (4) the users' thoughts, (5) users' emotional experience, (6) users' needs, (7) the insights or pain points discovered, and (8) the design opportunities or ideas for improvement along with the internal ownership. For generalizability purposes, the ideation was done on a generic basis, without relying on a specific case study or example. To encourage out-of-the-box thinking, participants were asked not to think about technical feasibility at this stage. The session was conducted online on an interactive whiteboard, first individually followed by a discussion phase.

Around 50 ideas were collected for each element, some being more or less original, feasible, or provocative. Not all ideas used technology to convey the message and participants evoked the necessity of combining tech and low-tech elements to create a compelling experience. Results were analyzed using affinity diagramming (Figure 2). Due to space constraints, we only mention here some idea categories evoked by the participants. Examples of ideas to physicalize personas were role play or speed dating, shadows, using VR experience to live a day in the life of a persona, or discovering them via proxy artefacts (e.g., virtual visit of their home, inventory of their handbag). The journey timeline was often thought of as a progression through the physical space in the installation but ideas around time displays, nature metaphors, or browsing interactions were also mentioned often. Participants proposed to physicalize emotions using ambient experience, artsy visualizations, biofeedback, movie clips or animated characters, textures, or an emotion booth.

Following the ideation session, we sketched several ideas and assessed them according to their ability to translate the user research data in a compelling way, their level of originality, their ability to trigger emotions and empathy, and finally their feasibility. We created a generic storyboard of a first physical installation including the ideas selected (Figure 3).

3 ILLUSTRATIVE CASE STUDY: STAGING RAILWAY PASSENGERS' EXPERIENCE

We illustrate our approach through an industrial case study in the context of a transportation service in Luxembourg. To support the passengers' experiences and offer a high-quality service, railway employees should empathize with the travelers and understand their needs and expectations. XPressia is a human-scale interactive journey map that stages travelers' experiences based on user research data (qualitative and quantitative) (Figure 1). It is designed in the context of employees' training. The experience is staged in a way that follows the temporal journey of the train passengers: walking through the installation, participants walk through the map *timeline*. Scan your ticket and embark on the journey of three passengers: discover their identity, follow their actions, hear their thoughts, feel their emotions and understand their pain points.

The experience starts by getting to know three passengers (representing *personas* on a traditional map) by looking at their travel bags (Figure 4a). These bags include personal items: their phones with a screenshot of a travel app with their planned journey, a wallet, a train ticket, and other items hinting at the person and their travel motivation. When scanning one of the three tickets (Figure 4b) equipped with an NFC tag, a projection on the wall shows the passenger waiting for their train to arrive. This is representative of one specific key *action* in the user journey. By approaching the wall, one can hear their *thoughts* in the form of whispers (Figure 4c). The participant then takes a seat in a simulated train compartment (another typical *action* in the map) and listens to relaxing music using headphones (Figure 4d). In the background, the participant will overhear conversations between nearby passengers about their *journey*, *pain points* and *feelings*. At the destination, we invite the participant to select which passenger(s) they would like to support

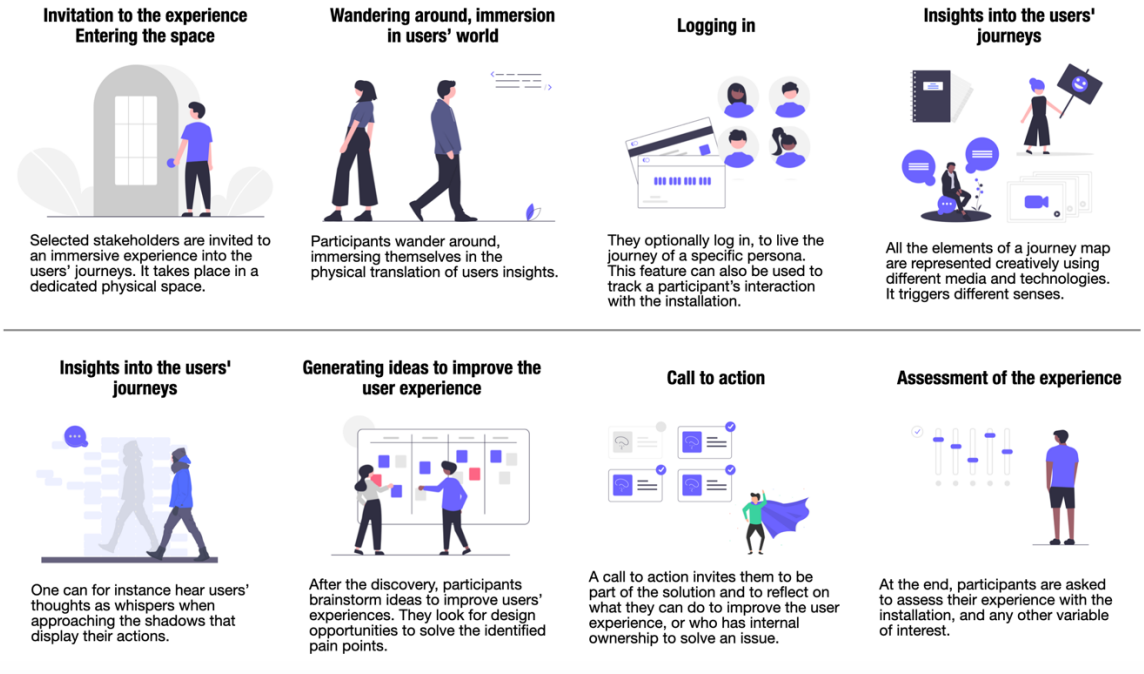

Figure 3: Storyboard of a Physical Experience Map Installation

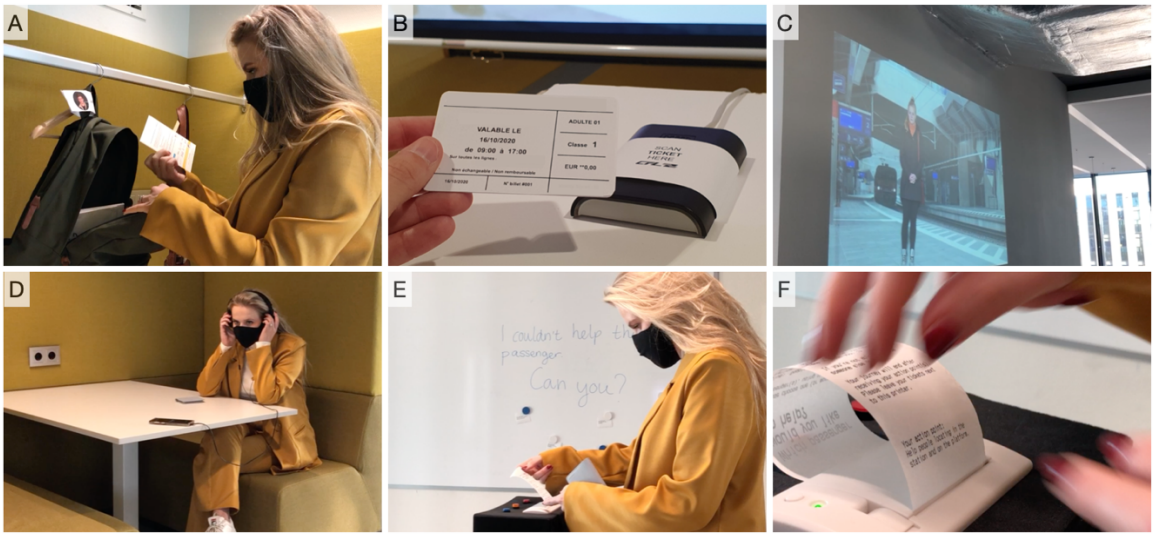

Figure 4: A participant experiencing the physical experience map prototype

and to press the corresponding button on a thermal printer (Figure 4e). The participants receive a printed receipt including an *action point* related to the needs of the chosen passenger(s) (Figure 4f). They can decide to quickly brainstorm *potential solutions*, take this action point with them to work on it or to give it to someone else who they think might be able to act upon it. Behind the printer is a whiteboard with the question "I couldn't help the passenger, can you?". It features printed action points that colleagues, who previously participated in the experience, left for others to solve.

3.1 Exploratory User Study

We conducted a preliminary user study of the physical journey map. Five employees of a railway company (1 man, 4 women), aged 18-52 years old, participated in this study (convenience sampling).

After obtaining informed consent, the employees were invited to discover and interact with the installation individually. Participants were free to spend as much time as desired in the installation. The material presented was designed for a 20-30 min tour. At the end of the experience, the participants were asked to fill in a questionnaire about (a) their overall experience with the physical journey map, (b) what they could recall regarding each of the three personas passengers introduced throughout the installation, (c) to what extent they felt connected to the passengers, and (d) which one (if any) they would feel like helping and why.

Our results show that participants did see potential in XPressia. One participant appreciated the experience for it "allows you to know how everyday customers are feeling and to understand their feelings". For another one, the added value is in breaking the silos between frontline personnel and other employees, by "allowing colleagues who are not on the train to see the issues faced by customers". According to that person, "XPressia can help build empathy" and support employees in looking for improvements for their customers. Regarding the format of the experience, participants mentioned that they enjoyed being able to experience what the passengers actually thought and said (as collected during user research). They also appreciated that the passengers were described in great detail, which helps to build empathy. One participant encountered some difficulties navigating through the installation or understanding its purpose: "I felt like I had to pay attention to everything because I didn't know exactly what to do next."

All participants were able to recall something about the different passengers and their experiences. "All passengers have a completely different experience while traveling by train. They also reacted very differently." Three participants could recall a passenger being "cold on the platform". Four were able to recognize that one of the passengers was "visually-impaired" and encountered issues while traveling. Three participants described the third passenger as "more relaxed". None of the participants recalled one of the passengers being a mother with a toddler. Some participants only wrote down some vague observations such as: "she was waiting for the train" or "3 different experiences". All participants answered "yes" when asked whether they would like to help the passengers, yet no participant chose more than one passenger to help. All participants took the printed action point with them but did not take an extra action point from the whiteboard.

4 DISCUSSION

By physicalizing a journey map, we intended to make customers' stories accessible to employees who are not familiar with design tools nor feel involved in the improvement of end-users experience. According to Jansen et al. [9], "physical interaction with data can increase user engagement, facilitate understanding and learning and make data more accessible". Despite its simplicity, our prototype XPressia was described as immersive and insightful. It seemed effective in supporting a diverse audience of non-designers in exploring user research data to understand customers better. The physicality of the experience aimed to trigger empathy through embodied cognition as discussed by [4, 6, 7]. Understandably, the current contribution is a work-in-progress, and only provides first insights about the success criteria established in section 2.1.

Our experience of designing XPressia showed the flexibility of such a tool. There are endless possibilities in the type and granularity of data represented, as well as the medium used to translate user insights into a physical journey. Potential scenarios of use are equally diverse. Besides the current state of the customer experience, one could stage and trigger debates on the future vision of the organization [23]. Another scenario came from a stakeholder who challenged us to develop users' empathy towards employees rather than the opposite. Perturbations in traffic are often outside of employees' control yet they face travelers' frustration. As a physical journey map is more attractive than textual information, we can create an employee-focused map for customers to empathize with employees, by refining the mental model of the service.

4.1 Designing a Physical Journey Map: Initial Design Considerations

Many elements of choice in the design of a physical journey map are similar to the ones made by a design team to create a traditional journey map. The scope and scale of the map have to be adapted to the purpose and audience of the installation, which is a big challenge in journey mapping [11, 17]. Should the installation focus on a specific situation (e.g. perturbation of traffic) or on the generic travel experience? How much details should it include? Should it focus on a main actor or compare several personas? In Xpressia, we focused on the journey of three personas and used a combination of raw data (stories, verbatims) and aggregated data (personas), with ambiance sounds to reflect the atmosphere. Raw data was used to share rich accounts of experience [17] and avoid "averaging" the user [8]. If this setup was successful to catch participants' attention and trigger curiosity, the installation seemed too generic to pinpoint specific challenges which could resonate with employees beyond known issues such as unpleasant waiting time. It might be sufficient when a company aims at training new employees but might not fit innovation contexts. Bringing a sense of internal ownership to employees and breaking down organizational silos may require parts of the experience to be more detailed or specialized [23]. We should be careful though not to lose people's interest along the way. Visual journey maps are often used in collective setup like presentations or workshops. The design team walks the stakeholders through the journey before asking them to ideate solutions to specific pain points. For complex services, this might involve a phase of curation of the journey section to work on. If the sequence of the Xpressia visit followed the journey timeline, our visitors navigated freely through the installation until reaching the call to action part. A participant felt overwhelmed and wondered "what to do next?", most did not engage much with the ideation. We can thus question the need for a sort of guided tour or personalization of content based on someone's interest. This is a common requirement in museum technologies to account for the variety of visitors' motivations [3]. Yet, there is no single interpretation of users' experiences and the physical journey map approach also has the advantage to let employees engage with multiple narratives. As all of them walk through the same installation, each will see, hear and feel different emotions, identify different problem areas, and generate different ideas. A recommendation from the field of data physicalization is to introduce complex datasets through layered

multisensory interactions which support users to interpret the data in manageable parts [9]. Another way to support visitors in engaging with the material while making their own interpretations is to invite them to visit with a goal in mind. The study "Seeing with New Eyes" [22] for instance invited museum visitors to explore the collection by searching for objects to (virtually) gift to someone. Neubauer et al. [19] used a challenge in a VR simulation to actively immerse designers in the context of use.

4.2 Feasibility of the Approach

The efforts required to bring a journey map to live might look intense, especially to represent a high level of details. We can consider several elements here. First, service design tools do not aim at encompassing the entire complexity of a service system. Their power lies in their ability to "filter complexity in order to support the team in understanding the experience of even complex multichannel services, on a practical and a human, empathic level" ([23], p.47). Our approach does not aim to transform every employee into a designer, but rather to design a way to afford empathetic feelings to emerge [4, 7].

On a practical side, it is possible to balance the cost-benefit ratio of the tool (and design process) by using relatively inexpensive materials or technologies to support different lenses depending on the case study. The receipt printer is such an example: we used it as a call to action at the end of the installation, but we could have printed anything else, e.g. users' verbatims or statistics regarding the use of the service. In our process, we found out that what worked best was a balance between generic transferable elements that can be used in multiple case studies, and specific metaphors related to the context (e.g., scanning train tickets to access users' stories). It is clear that a physical journey map is harder to scale than a traditional document format that can be spread widely, or even a virtual immersive experience such as [19]. We however expect the benefits of this embodied experience (which are still to be investigated further) in terms of curiosity, multi-sensoriality, immersion, and memorability to outweigh the efforts.

Concretely, a physical journal map could be installed either at a company office or in a dedicated space provided by a service design agency. Our industrial partner was a company with enough resources and a workforce located in a single area, which was an optimal context. Other case studies are needed to better grasp the feasibility of such projects in other contexts. Another consideration related to feasibility is the fact of adjusting the physical journey map to reflect the evolution of the user experience across time. Indeed, a journey map is supposed to be a living document translating the experience over time as the context and service evolves [8, 23]. Yet even traditional journey maps are rarely updated due to the user research efforts involved, especially when the design work is outsourced. To bring a more lively touch to the experience and dynamism of the content presented, physical journey maps could for instance benefit from adding a layer of live data (e.g., from social media, online customer reviews, from traffic information or from sensors located in train stations).

4.3 Limitations and Future Work

Our initial explorations on the concept of physical journey maps have several limitations. First, the choice of elements to include in the prototype XPressia and how to mediate them through technology was partially based on feasibility. We did not strive for an optimal design, but a minimal viable prototype to conduct preliminary studies. The prototype should be iterated on to create a more compelling experience. Second, we conducted the user tests on a small sample size and individually. A traditional journey map is often used in a collective setting. Studying how the installation triggers social dynamics between visitors is key in our agenda for future work. Finally, a debriefing interview with more precise assessment criteria related to our established success factors would have been more insightful than the use of a questionnaire after the user test, especially on a target population that has little experience with such situations.

In future work, we first aim to consolidate our research in the railway context. This includes testing Xpressia on different audiences and for different purposes, and iteratively improving the installation. Besides deploying at our client, we could exhibit the prototype at a professional event for railway industries in order to gather useful insights on our method [16]. Consolidation also requires adopting a more rigorous research protocol to understand the effects of the physical journey map on different stakeholders. Indeed, the current study setup does only hint at the success criteria established in section 2.1. We envision combining self-reported measures of social curiosity [13] and empathy with behavioral measures showcasing a potential increase in employees' engagement. Once validated, the empathy in design scale [5] could be an effective evaluation instrument in this context. Ideally, the impact of a physical journey map on the organization should be addressed in a long-term study, possibly using longitudinal methods [14].

Next, we intend to design physical journey maps in a variety of contexts to better understand how to design them effectively, and what their effect on different target audiences can be. We can learn from connected domains, e.g., museum design or art installations. Of course, there is no one-size-fits-all solution and many choices have to be defined by the design team. Creating a library of accessible technologies and mediums as examples to physicalize specific parts of an experience in a compelling and multi-sensorial way could be relevant to provide a quick start to professionals willing to create a physical journey map. We used the examples of the thermal printer or NFC tags earlier, as promising and flexible tools to be used in this context. In addition to easy low-tech techniques, which should not be neglected, numerous off-the-shelves sensors and actuators on the market could be listed as examples to serve a similar purpose. Scenarios beyond service companies are also worthwhile exploring. Think for instance of citizen participation in government-led projects.

To conclude, in this contribution we explored the idea of decomposing elements of a journey map and staging them under the form of a physical installation to bring customers' stories to life in a compelling and empathic way. These rich and multi-sensory transfers of user research insights aim at developing employees' curiosity and empathy towards the users of a product or service. We conducted a preliminary study, for which we designed and tested a physical journey map of railway passengers' experiences. With the concept of physical journey maps and the various scenarios of use it can support, we ultimately aim to support organizations in breaking organizational silos and improving their user-centered maturity.

REFERENCES

[1] Adaptive Path. 2013. *Adaptive Path's Guide to Experience Mapping*. San Francisco, USA.

[2] Juliana Alvarez, Pierre Majorique Léger, Marc Fredette, Shang Lin Chen, Benjamin Maunier, and Sylvain Senecal. 2020. An enriched customer journey map: How to construct and visualize a global portrait of both lived and perceived users' experiences? *Designs* 4, 3: 1–21. DOI:10.3390/designs4030029

[3] Liliana Ardissono, Tsvi Kuflik, and Daniela Petrelli. 2012. Personalization in cultural heritage: The road travelled and the one ahead. *User Modeling and User-Adapted Interaction* 22, 1–2: 73–99. DOI:10.1007/s11257-011-9104-x

[4] Paul Coulton, Jonny Huck, Andrew Hudson-Smith, *et al.* 2014. Designing interactive systems to encourage empathy between users. *DIS 2014 - Proceedings of the 2014 ACM Conference on Designing Interactive Systems*, Association for Computing Machinery New York, NY, USA, 13–16. DOI:10.1145/2598784.2602770.

[5] Luce Drouet, Kerstin Bongard-Blanchy, Vincent Koenig, and Carine Lallemand. 2022. Empathy in Design Scale: Development and Initial Insights. *Extended Abstracts of the 2022 CHI Conference on Human Factors in Computing Systems (CHI EA '22)*. DOI:10.1145/3491101.3519848

[6] Ann Heylighen and Andy Dong. 2019. To empathise or not to empathise? Empathy and its limits in design. *Design Studies* 65: 107–124. DOI:10.1016/j.destud.2019.10.007

[7] Jonny Huck, Paul Coulton, Davis Gullick, *et al.* 2015. Supporting Empathy Through Embodiment in the Design of Interactive Systems. *TEI 2015 - Proceedings of the 9th Conference on Tangible Embedded and Embodied Interaction*, Association for Computing Machinery New York, NY, USA, 523–528. DOI:10.1145/2677199.2687892.

[8] Jennifer Ismirle. 2018. Using experience maps to consider individual stories. *SIGDOC 2018 - 36th ACM International Conference on the Design of Communication*, Association for Computing Machinery New York, NY, USA, DOI:10.1145/3233756.3233954.

[9] Yvonne Jansen, Pierre Dragicevic, Petra Isenberg, *et al.* 2015. Opportunities and challenges for data physicalization. *Proceedings of the 2015 CHI Conference on Human Factors in Computing Systems*, Association for Computing Machinery New York, NY, USA, 3227–3236. DOI:10.1145/2702123.2702180.

[10] Jim Kalbach. 2017. *Rapid Techniques for Mapping Experiences*. O'Reilly.

[11] Kate Kaplan. 2016. Journey Mapping in Real Life: A Survey of UX Practitioners. *Nielsen Norman Group*, 1–7. Retrieved December 10, 2021 from https://www.nngroup.com/articles/journey-mapping-ux-practitioners/

[12] Kate Kaplan. 2016. When and How to Create Customer Journey Maps. *Nielsen Norman Group*, 1–7. Retrieved December 10, 2021 from https://www.nngroup.com/articles/customer-journey-mapping/

[13] Todd B. Kashdan, David J. Disabato, Fallon R. Goodman, and Patrick E. McKnight. 2020. The Five-Dimensional Curiosity Scale Revised (5DCR): Briefer subscales while separating overt and covert social curiosity. *Personality and Individual Differences* 157, January. DOI:10.1016/j.paid.2020.109836

[14] Carine Lallemand. 2012. Dear Diary: Using Diaries to Study UX. *User Experience* 11, 3: 18–20.

[15] Carine Lallemand and avec Guillaume Gronier. 2018. *Méthodes de design UX: 30 méthodes fondamentales pour concevoir des expériences optimales*. Eyrolles, Paris.

[16] Dan Lockton and Carine Lallemand. 2020. Meeting Designers Where They Are: Using Industry Events as a Research Venue for HCI and Design Methods Development. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, Association for Computing Machinery New York, NY, USA, 1–13. DOI:10.1145/3313831.3376206.

[17] Chris Mcginley and Hua Dong. 2011. Designing with Information and Empathy: Delivering Human Information to Designers. *The Design Journal* 14, 2: 187–206.

[18] Daphne Menheere, Carine Lallemand, Erik Van Der Spek, *et al.* 2020. The Runner's Journey: Identifying Design Opportunities for Running Motivation Technology. *Proceedings of the 11th Nordic Conference on Human-Computer Interaction (NordiCHI '20)*, Association for Computing Machinery New York, NY, USA, DOI:10.1145/3419249.3420151.

[19] Daniel Neubauer, Verena Paepcke-Hjeltness, Pete Evans, Betsy Barnhart, and Tor Finseth. 2017. Experiencing Technology Enabled Empathy Mapping. *Design Journal* 20, sup1: S4683–S4689. DOI:10.1080/14606925.2017.1352966

[20] Stephen D. Reay, Guy Collier, Reid Douglas, *et al.* 2017. Prototyping collaborative relationships between design and healthcare experts: mapping the patient journey. *Design for Health* 1, 1: 65–79. DOI:10.1080/24735132.2017.1294845

[21] Mark S. Rosenbaum, Mauricio Losada Otalora, and Germán Contreras Ramírez. 2017. How to create a realistic customer journey map. *Business Horizons* 60, 1: 143–150. DOI:10.1016/j.bushor.2016.09.010

[22] Jocelyn Spence, Steve Benford, Ju Row Farr, *et al.* 2019. Seeing with new eyes: Designing for in-the-wild museum gifting. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, Association for Computing Machinery New York, NY, USA, DOI:10.1145/3290605.3300235.

[23] Marc Stickdorn, Markus Edgar Hormess, Adam Lawrence, and Jakob Schneider. 2017. *This is Service Design Doing: Applying Service Design Thinking in the Real World*. O'Reilly.