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A Tool to Bridge Design Innovation Research and Practice: The Project Experience Map

Clementine THURGOOD[2] [a], Matthew O'DONNELL [a], George PEPPOU [a], Rohan LULHAM [a], and Sam BUCOLO[a]

[a] University of Technology Sydney

Design is reaching out to business and society as an approach to innovation. Consequently, there is a need for collaboration between research and practice: if we want to assure quality of design practices and to build knowledge in these new domains, we need to be able to conduct research into their application and trace these processes as they unfold through longitudinal research. The outcomes from these collaborations are often documented in formal reports or other deliverables for partner organizations, and scholarly publications for the researcher; however, the speed and nature of design projects and research processes means critical learnings and opportunities for new knowledge are often lost. Thus, there exists a need for high-quality, reliable knowledge capture and transfer methods for the establishment of design practice and research in these new domains. In this paper we offer a new tool, the Project Experience Map (PEM), to assist in this process. The PEM shares the visual layout and principles of an existing design tool, the customer journey map; however, instead of depicting the story of a customer interacting with an organization, we argue that the PEM can be put to an entirely different use: collating data and insights from design projects.

Keywords: Design research; design practice; customer journey map; data-capture; design thinking

Introduction

Design is increasingly reaching out to non-traditional design domains and disciplines as an approach to innovation. For instance, design is now widely recognised as providing significant value to business (Brown, 2009; Bucolo,

[2] Corresponding author: **Clementine Thurgood** | e-mail: **clementine.thurgood@uts.edu.au**

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2015; Verganti, 2009) and society (Dorst, 2015b). And, within organizations, design has moved from fulfilling the role of styling through to being implemented at much higher levels of operation such as within the process levels and even in the setting of strategic vision (Danish Design Centre, 2003). Outside of the individual organization level, design is also now being used for multi-stakeholder problem solving involving a number of different organizations within sectors, or across multiple sectors, and within "eco-systems". These developments are in direct response to the understanding that today's problems are becoming increasingly open, complex, dynamic, and networked (Dorst, 2015b). In the face of such challenges, traditional attempts at problem solving often fall short. Through the application of design principles and practices, problems or opportunities can become amenable to solution with novel outcomes often arising; hence, the appeal of design in these new domains.

The use of design practices for innovation in other domains is often referred to as design thinking, design-driven innovation, and a variety of other terms that can be broadly categorized under *design innovation*. Popular design thinking, or design innovation, approaches have been developed by, for example, Stanford Design School (D.School, 2011) IDEO (Brown, 2009), Philips Design (Gardien, 2006), and Rotman Business School (DesignWorks, 2014). These methods or approaches involve the reframing of problems to encourage innovation and can typically be described by process models characterized by features such as empathizing, ideation, prototyping, testing, and so on. Often there are supporting tools or "toolkits" for these methods which are readily available online (see also, the "Development Impact and You" toolkit; Nesta, 2016, and the "Service Design Toolkit"; Namahn, 2014).

The adoption of such methods and approaches in non-traditional design contexts is happening fast, and it is happening to the extent that many successful designers are moving out of traditional design altogether and into other professions; while at the same time, an increasing number of non-designers are taking up design practices and applying them in their own line of work (e.g. see Dorst, 2015a). While this opens up many new and exciting possibilities, if we want to assure the quality of design practices and assess their impact in these new domains, we need to be able to conduct research into their application and trace these processes as they unfold through longitudinal research. To develop design in non-traditional design contexts, practice and research needs to happen in concert.

Design practice in these new non-traditional areas involves a range of activities including observations, workshops, interviews, experiments, consulting, and so on. These activities are conducted in order to develop insights about the specific problem the organization is seeking to address, whereby the information captured is fundamental to developing solution directions and assessing their viability. From an academic research perspective there is also interest in these ideas and insights, but more particularly *how* and *why* these insights came about. This information is essential for creating new knowledge that will improve practice in the future. For this new knowledge to feature in journal articles and other publications it needs to be based on solid, reliable information and data; however, collecting solid, reliable information is often difficult in fast-paced "real world" practice projects. Critical insights and learnings can therefore be lost without appropriate tools and processes for their documentation.

In this paper we offer a new tool, the Project Experience Map (PEM), as one possible means to facilitate the knowledge-capture and learning from collaborations between research and practice. Our map shares similar properties to regular customer journey maps (CJM), which are typically used to visually depict the story of a customer in interacting with an organisation. However, we argue that CJMs, or PEMs, can be put to an entirely different use, namely, to provide a standardized method to document the activities of design innovation projects and collate their corresponding data and insights.

Our tool is in the early stages of its development and subsequent iterations are currently being prototyped and tested within our centre, the Design Innovation research centre at the University of Technology Sydney (UTS). In our centre, we study innovation practices and develop design innovation methods for use in both the private and public sector. In the sections to follow, we will introduce our tool, the Project Experience Map (PEM), and illustrate its iterative development to date with examples of real design thinking projects with our partner organizations. We finish by describing our proposed next steps and possible directions for future research.

The Project Experience Map (PEM)

In the next sections, we describe our new tool, the Project Experience Map (PEM). We begin by explaining its origin in terms of a comparison to customer journey maps, and then we present our tool and demonstrate the opportunities and challenges we have experienced through its initial

applications to industry projects. We finish with suggestions for how we see the tool being used, together with our rationale for its use and proposed advantages.

Customer Journey Maps

The PEM shares similar visual features and principles with a commonly used existing design tool, the customer journey map (CJM). Modern day CJMs are visual representations of scenarios used to document, or map, the experience or story of a customer interacting with the offerings of an organization (Marquez, Downey, & Clement, 2015). They have their initial origin in scenario-based design and were developed for users within the field of human-computer interaction and software development (Rosson & Carroll, 2002). Scenario-based methods are grounded on the premise that descriptions of people using technology are essential in understanding how the technology is, or could be, re-shaping their lives (Rosson & Carroll, 2002). In a similar vein, when CJMs were later translated into use within product and service design by academics (e.g. van der bijl-Brouwer & van der Voort, 2013) and practitioners (e.g. Fulton Suri & Marsh, 2000), they were intended for the purposes of exploring possible future uses, and/or evaluating solution proposals. These purposes are afforded by the visual layout and characteristics of the CJM. Typically, events/activities and accompanying customer thoughts and feelings are depicted along a timeline in info-graphic form, making it possible to assess whether the user experience is being adequately met as well as to spot opportunities for addressing unmet needs. For example, by considering “pain” or “gain” points and empathizing with customer needs, it is possible to envisage what activities or actions could be put into place in order to improve the customer experience. A simple hypothetical example of a possible CJM depicting the common experience of air travel is presented in Figure 1.

Figure 1 A hypothetical customer journey map depicting the experience of air travel. Customer activities and touch-points with the organization are represented sequentially together with their corresponding thoughts and feelings.

The Project Experience Map

In the preceding section we showed how a customer journey map can be used to identify opportunities for improving the offerings of a business. In this paper we argue that CJMs, in the form of Project Experience Maps (PEM), can be put to an entirely different use: to collate data and insights from design projects to enable the integration of practice and research. The fields of a standard CJM can be modified so that instead of pertaining to the activities and emotions of a customer interacting with an organization, they are used to represent the activities and accompanying data and insights in a design project. The data can include notes, observations, quotes, transcripts, photographs, sketches, and so on from workshops, activities, interviews, meetings, focus groups, presentations, prototyping, testing, and any other stages of design transformation. Thus, it is possible to visually document a design project for subsequent analysis. Afterwards, information can be drawn from the PEM to compile client reports and academic papers, as well as for internal communications to discuss and evaluate design programs.

A mock-up of the layout of a potential Project Experience Map is presented in Figure 2. Any relevant type of data could potentially be recorded on a PEM. In this particular example, "Activities" refer to the tasks that our industry partners might perform during, for example, a design

thinking workshop (e.g. detailing the persona of their customer). "Participant Quotes & Insights" refer to the accompanying thoughts, feelings, and concerns that might be expressed in response to each activity or task. This field could also contain project data such as details regarding the insights from the actual design tool itself (e.g. for a persona, *who is the customer? What are their problems?*). In the field, "Researcher Q & A", conversations or interviews can be documented between the researcher/facilitator and participants from the partner organization. At each point of data collection, participants can be assigned a unique numerical or letter code to preserve their anonymity while allowing for the researcher to assess any type of progress, or change, over time.

Stages	**Workshop 1: Understanding the Current Business**		
Activities	**Customer Persona**	**Business Model Canvas**	**Customer Journey Map**
Participant Quotes & Insights	**A:** "Lorem ipsum dolor sit amet" **F:** "Consectetuer adipiscing elit. Aenean commodo ligula eget dolor. Aenean massa" **D:** "Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus"	**A:** "Nullam dictum felis eu pede mollis pretium. Integer tincidunt. Cras dapibus" **C:** "Vivamus elementum semper nisi. Aenean vulputate eleifend tellus"	**B:** "Aenean leo ligula, p consequat vitae, eleifer **A:** "Aliquam lorem ante, dapibus in, viverra quis, feugiat a, tellus" **D:** "Phasellus viverra nulla ut metus varius laoreet"
Researcher Q&A	***Q: "Donec quam felis, ultricies nec, pellentesque eu, pretium quis, sem?"*** **B:** "Donec pede justo, fringilla vel, aliquet nec, vulputate eget, arcu" **E:** "In enim justo, rhoncus ut, imperdiet a, venenatis vitae, justo"	***Q: "Quisque rutrum. Aenean imperdiet?"*** **A:** "Etiam ultricies nisi vel augue"	***Q: "Curabitur ullamcorper ultricies nisi?"*** **B:** "Nam eget dui. Etiam rhoncus" **D:** "Maecenas tempus, tellus eget condimentum rhoncus, sem quam semper libero"

Comments and group discussions are pre-fixed by a unique code letter to represent each participant

Conversations between researchers and participants can be documented

Figure 2 A hypothetical Project Experience Map depicting mock participant responses/quotes in response to activities characteristic of a typical design thinking workshop.

Early Conceptual Development and Initial Application

The idea of the PEM arose when the first author, an academic researcher, observed a design innovation industry project in which data needed to be recorded for academic research as well as for the partner

organization. The project entailed a series of design thinking capability-building workshops with participants from a Peak Body Institution together with one of their own partner organizations (their "customer", a small-to-medium enterprise within the manufacturing sector). This type of engagement is typical of the projects we participate in through our research centre: our design expertise from research is imparted to our partner organizations to teach them new ways of innovating, and, in return, we have access to real world projects to study and build new knowledge. The specific intention of this particular project was to build capability in design thinking principles and practices to assist our industry partner in reconsidering the way that they engage with, and address the needs of, their own industry partners, or customers; their SMEs.

While attending the workshops, the researcher documented design activities and corresponding comments and discussions from the industry participants. All data were recorded live directly into word-processing software using verbatim quotes where possible. Individual conversations and question-and-answer sessions between the researcher and industry partners were recorded via pen and paper and then transferred into the word-processing document. After each workshop, key points were extracted and transferred onto a standard customer journey map template which was subsequently modified so that the fields reflected the true nature of the type of data collected and the purpose of data collection; that is, to collate data to document the design project. Relevant data and insights were then used to efficiently compile the report for the industry partner and to document the project internally for further research purposes.

Example PEMs from this design thinking capability-building project are presented in Figures 3 and 4. Figure 3 depicts an early workshop in which participants were first introduced to some standard design tools used for exploring customers and their needs – customer personas and customer journey maps. Figure 4 depicts a subsequent workshop in which they reflected upon their experiences with the aforementioned tools and their thoughts and concerns about their experiences in the program overall.

Stages	Module 2: Explore		
Activities	**Customer Persona**	**Customer Journey Map**	
Participant Quotes & Insights	**E:** Personas are taking a big risk. Values are important, personal background is not… Personas bring about stereotypes; you have to think about people as individuals **F:** This is why you should use personas – if you know someone personally you can know what they want rather than going to them with something and seeing if they want it **E:** Promotion of archetypes (useful, but dangerous). Too individualized… Useful for exploring a range of people, problem is you tend to pick one, which is dangerous… it's a tool, be aware if the limitations	**B:** How do we use this outside of the classroom? Right now we are basing these on hypotheses **D:** How do we use these tools meaningfully? **J:** Could it be used to discover that you really didn't know your customer? **E:** Lean Launchpad is all about validating **B:** This is an extension of Lean: elucidating the value proposition	***Insights into an opportunity or area for improvement:*** **A:** Surgeon has to be able to trust you **F:** Getting a customer to do something where they have to enter details into database (have to emphasize what the benefit is). Solution: assistance physically entering data **I:** Pain point: getting people to develop [these] skills. Solution: Meet with everyone beforehand and provide context. People don't understand why they need to be here. Solution: A service where we contextualize the course
Researcher Q&A			

Figure 3 A PEM containing data from a design thinking capability-building program between researchers and industry. This example shows participant reactions to the various design tools and methods, together with project-specific insights such as customer pain points and their corresponding early solution directions.

Stages	Module 3: Explore		
Activities	**Reflection: Customers**	**Reflection: Personas**	**Brainstorming Solutions**
Participant Quotes & Insights	**A:** Within [organization] we are often our own customers. I'm curious to know how this can be used to entice new customers to do business with us in the first place **F:** Good to offer technology: gets you in the door **A:** This class is another reason they should let us in the door; this course can help get new customers **A:** My intent was to make things better for current customers **A:** If someone knows they want something, but not sure what, this course is great	**E:** Personas are not a bad idea, for new customers, to try and figure out what their incentives are. It's a toolkit; everyone needs to have it A: If you know a very specific customer that you want to go out and get, you can have a good value proposition to get them	**Group 1's Project** **Pain Point:** Issue is the unknown; concern for both patient and surgeon…. **Solution: …***
Researcher Q&A			

*Figure 4 A PEM containing data from a later design thinking workshop in which participants reflected on their experiences with common design tools and their thoughts and concerns regarding the program generally. *Solutions are omitted in this map to preserve private information.*

As can be seen in both Figures 3 and 4, the PEM has potential utility for collating the different types of data required to meet the immediate needs of both design practice and design research. That is, some of the data in

these particular maps provides insights into the specific project or design problem, while other data provides insights into the design process and broader research context.

With regards to using the PEM to study the specific design problem, Figures 3 and 4 illustrate ways in which the PEM can be used to collate data directly relevant to the problem at hand, such as latent customer needs. In these particular examples, the PEMs in both Figures 3 and 4 provide insights into what might be a problem for customers ("pain points"), and in some instances, how these problems could be addressed ("solutions").

With regards to using the PEM to study design processes and broader research questions, Figures 3 and 4 show examples in which it is possible to use the PEM to assess participant progress, as well as to alert researchers to potential areas for improvement in the delivery of future programs. For the former instance, participant change or progress, we were able to find some indications of an increased receptiveness to design in the form of a change in mind-set or attitude. How to change mind-set is a particular focus of the broader theoretical research at our centre when considering how to improve design capability in industry. As can be seen from Figure 3, at the beginning of this program, there was some resistance regarding the usefulness and appropriateness of some design thinking tools and practices. For example, some participants initially felt that customer personas posed a big risk in terms of promotion of stereotypes and archetypes, and that picking one could therefore be limiting: e.g. "Personas are taking a big risk… Personas bring about stereotypes; you have to think about people as individuals" – *Participant "E"*. Despite these initial concerns, the industry participants warmed up to the idea of personas as the program progressed, whereby we witnessed comments in later workshops such as, "Personas are not a bad idea… for a new customer, to try and figure out what their incentives are. It's a toolkit, everybody needs to have it" – *Participant "E"* (Figure 4).

The PEM was also used to identify areas for future improvement: we were able to document specific areas or activities that we would consider refining or revising in the delivery of our future programs. For instance, some participants raised concerns about how to contextualise their learnings in their day-to-day work outside of the course; e.g. "How do we use this outside of the classroom? Right now we are basing these on hypotheses – *Participant "B"* (Figure 3), and, "How do we use these tools meaningfully?" – *Participant "D"* (Figure 3).

Having the aforementioned types of information documented and clearly accessible on our PEMs enabled the researcher to efficiently extract relevant information in order to prepare the final report for the partner organization. It was also possible to use the maps internally to communicate with other researchers in our centre regarding the efficacy of the program generally.

Co-Design with Design Innovation Practitioners

Following the promising initial application of the PEM in the project just described, informal discussions were held with other design innovation researchers and design innovation practitioners within our research centre regarding its potential utility in the broader picture of our research. During the discussions, the practitioners, who in our research centre deliver design thinking programs to partner organizations, were asked to consider the feasibility and usefulness of the PEM from their perspective. They were asked to indicate what, if any, advantages they saw to the map; how they would use it in practice; and what, if any, changes they would make to its design. In terms of changes to the design, both practitioners indicated that they would like the opportunity to record the intent, or purpose, of each activity on the PEM, in order to assess why certain changes were made (during workshops), or why the program took a different course. There was also the suggestion to include details regarding timing of activities in order to monitor progress and keep the program on track. Paper templates of new PEMS were then created based on their suggestions.

Since having these discussions, two design practitioners have had the opportunity to trial the pre-made paper versions of the PEM in two industry projects – one with a large multinational engineering firm, and the other with a cohort of SMEs from within predominantly the manufacturing sector. The templates included the activities of the workshop program together with pre-determined research questions to the industry participants embedded throughout. In both instances it proved difficult to facilitate the program and simultaneously keep up with the data recording on the map. From further discussions it became apparent that the PEM should be amalgamated with and integrated within the practitioner's other workshop materials to facilitate asking questions to participants at the right times. This is particularly salient if they are tasked with the responsibility of collecting data for academic research on top of their usual running of the program and collating of project-specific information for the partner organization. It was

also very apparent that there should be a second person present – a researcher or an assistant – who is solely dedicated to data collection for the PEM. Another interesting revelation relates to the earlier discussion about the different types of information or insights in design projects: while the practitioners could see the value in using the map for broader research purposes, apart from the fact that they were struggling to keep up with data collection, they also found it hard to make it a priority, as they would normally be focused on collecting different types of information for their own purposes in compiling client reports. That is, they would normally need information regarding insights for the specific project and organization. It was decided that it is essential to have a discussion upfront about the research needs of all parties involved and co-design purpose-built PEMs together, per project, each time.

Proposed Set-Up and Usage

In the previous sections we described the initial concept and early application of the PEM by the design researcher, and then the subsequent iterations of the PEM with design practitioners. In the first instance, the researcher documented all data into word-processing software and then transferred key points into a modified customer journey map directly after each workshop took place. The design practitioners, on the other hand, used pre-made paper templates based on their own chosen refinements to the initial design, and in which activities and questions/prompts from the researcher were already embedded. We do not wish to be too prescriptive with how we see the concept of the PEM being used, or what it should look like. It may be that in some instances, such as when a dedicated researcher is present, data will be transferred into a PEM after the point of its collection. In other cases, a pre-determined template is likely to be helpful for ensuring that the right data gets collated at the right time, especially if the design researcher is not present. From reflecting upon our experiences and discussions, we offer the following suggestions and recommendations that may be helpful in designing and completing the PEM:

- The PEM should comprise a map per session/data collection exercise. Each workshop, meeting, and so on, should have its own (or multiple) maps so that it is possible to study trends over time and across projects
- The PEM should have an agreed format and potential pre-embedded questions decided upon by researchers and practitioners

beforehand to ensure all necessary types of research data are collected

- Ideally there should be a dedicated assistant or researcher present to collate data in addition to the person administering the design programs
- The format should integrate the map within other materials of the program so that any questions or responses can be instantly documented in response to specific tasks, topics, and activities, and that no question or data points go unnoticed – especially when no dedicated researcher is present
- The PEM can be in digital or paper-based form, depending on the preference of the person collating the data. Either way it must allow scope to edit and change on-the-go

Rationale and Proposed Benefits of the Map

We have presented a very preliminary description of the PEM and its possible usage. We are still in the process of developing and refining our ideas and aim to continue prototyping our tool further; however, from reflecting on its development to date, we already see a number of potential benefits. We suggest that the PEM may offer the following advantages:

- Through a standardized method, it facilities the integrity of the data collection process. For example, it is possible to embed pre-determined questions for participants at specific points in projects
- It provides a longitudinal assessment of projects. By using PEMs of a similar format across data-collection sessions and projects, it is possible to track progress over time and pinpoint specific moments/events (e.g. changes in mindset)
- It enables gauging where changes happen, and why, through linking activities to comments/observations
- It can be used to test different research questions by experimenting with (and documenting) variables and activities and then registering participant responses and other data accordingly
- It provides a way of capturing participant progress and problems to assist with future refinement and improvements in the delivery of our programs
- It enables communication between researchers and practitioners within the workplace. Often there are lots of projects on the go, and little time to debrief. Critical details can get lost in this process but

the map provides a way to share events internally – even if it is some time after the fact, the PEM allows us to revisit workshops at a later date

- It provides one central source of data for different parties: researchers, practitioners, and partner organizations/clients
- Anyone (with sufficient training) can use it; the leading researcher does not have to be present to collect data at all times
- It provides a means of documenting a project unobtrusively; no cameras or other recordings are necessary
- It may increase the speed and precision of outputs by enabling the quick extraction of key points
- It appeals to the sensibilities of designers and people participating in design research: it provides a visual, info-graphic representation of data that is relatively easy to interpret and allows individuals to see the project at an overview (and to readily detect patterns across projects)
- The visual nature also makes it possible to communicate information in a way that is efficient and likely to be more user-friendly than extensive formal reports

General Discussion

In this paper we discussed the application of design principles and practices, or design thinking, in non-traditional design domains such as business transformation and social policy. We identified the need for strong collaborations between research and practice to trace the processes and assess the impact of design in these new domains. We explained that the speed of design projects together with the more reflective processes required for research means that without appropriate documentation and sharing of knowledge, critical insights and lessons are often lost. Thus, we identified a need for high-quality, reliable knowledge capture and transfer for communication between research and practice. For this purpose we offered a new tool, the Project Experience Map (PEM), which may assist in this process.

The PEM is based on the visual layout and principles of the common customer journey map; however, instead of depicting a customer's journey in interacting with an organization, we suggest the fields can be modified to enable the collation of research data from design innovation projects. We argued that the data could take any number of forms: quotes, observations, insights, photographs, and so on. Likewise, the data could come from any

number of research sessions and contact points: interviews, focus groups, workshops, and others. Pre-determined questions and prompts could be embedded throughout the maps to ensure consistency between projects for broader research purposes. We also suggest that the map could take either a digital or paper-based form, and that this might depend on the project and the individual preferences of the researcher. In our future research we endeavour to explore different formats and mediums for the map.

We trailed early versions of the map in real projects with industry partners. In its first application, we were able to efficiently extract key data and insights to compile our report for the partner organization. We were also able to use the PEM internally for discussions with other researchers and practitioners in our centre. This led to the speculation that the PEM could provide utility beyond that individual project, and could be used as a standardised method of data-capture for design projects generally. Subsequent applications of the PEM by our design innovation practitioners revealed a need for a researcher or assistant to be present and dedicated to the map to ensure quality and precision. We also found that individualised PEMs need to be co-designed between researchers and practitioners in advance of a project to ensure all necessary types of research data can be collated.

Upon reflecting on our group discussions and early prototyping of the PEM, we argue that it may provide a standardized method of data-capture with utility for both researchers and practitioners. It allows projects to continue to run at "real-world", industry-pace while also enabling slower, reflective processes necessary for research. The visual and sequential nature means progress can be tracked longitudinally, making it possible to pinpoint exact moments of impact or change. Importantly, it also enables consistent documentation and communication of projects internally, thus enabling us to improve our knowledge and refine our subsequent application to practice. Thus, we see it as a tool that may aid in strengthening the interrelationships between research, theory, and practice. The utility of the PEM in elucidating these relationships is a focus of our future research.

In this paper we demonstrated the PEM in the context of design thinking capability-building programs with industry partners. We intend to explore the map further in other types of engagements with industry, as well as with other domains altogether. For instance, we have recently collected data for a project in the domain of social policy aimed at the promotion of Wellbeing. We used different design approaches and methods in this project

– re-framing methods, interviews, workshops, co-design, and stakeholder feedback sessions – and we are in the process of transferring our data into a PEM. We intend to explore the utility of the map further in other projects and with other researchers and practitioners. Furthermore, we intend to extend its application to other types of design innovation methods and practices in our own centre and beyond.

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