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A Collaborative Case Analysis

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Abstract The case presented here was the center of the 11th Design Thinking Research Symposium (DTRS11) and concerns extensive in situ collected video-based data of everyday design team activity traced longitudinally in a professional team of designers working with user involvement. The DTRS11 dataset was shared and analyzed by 28 international design research teams, who approached the data with each their preferred methodology and theoretical interests. In addition to the case description, the current paper also identified themes for distinct analyses conducted by individual design research teams: co-creation, cross-cultural design, design thinking within organizations, and design tools and materials, each of which stem from particulars in the present case, but at the same time serve as hints to developments that are taking place in design practice more broadly.

Keywords
Design practice
Design process
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Cross-cultural design
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Introduction

Design research has a rich history of using in-depth case studies to develop and inform theory. Case studies usually revolve around descriptions of individuals, organizations, or events that are contextually bounded in time and space. For example, design case studies range from the detailed work of renowned designers such as Gordon Murray[1] and Philippe Starck[2] to studies of expert behavior in creative design[3] and expert-novice comparisons related to the structure of their cognitive actions;[4] studies of client-designer interaction[5] and tool usage;[6] and longitudinal studies of specific design or architectural processes.[7] Many protocol analysis studies in design fall into the case study category – for example, protocol video data stemming from naturalistic longitudinal tracings of events in a specific design team.[8] One such set of protocol case studies that have had an immense impact on design research emerged from the Design Thinking Research Symposium (DTRS) series, which brings together international academics with a shared interest in design thinking and design studies coming from a diversity of disciplines including psychology, anthropology, linguistics, philosophy, architecture, and design studies. On several occasions, DTRS organizers have utilized a video dataset capturing designers and their practices, which they then share with symposium participants for distributed analysis and publication as the framework for the symposium.[9] This data-sharing approach was initiated in the seminal "Delft Protocol Workshop" (now also labeled DTRS2), which was organized by Kees Dorst, Nigel Cross, and Henri Christiaans at Delft University of Technology in 1994.[10] At DTRS2, the verbal protocol data was collected from professional designers in a controlled context. Subsequently, two more DTRS events have involved shared protocol data of practicing designers. DTRS7, organized by Janet McDonnell and Peter Lloyd, involved professional designers (architects and engineers) working in their natural habitats,[11] and DTRS10, organized by Robin Adams, involved design review conversations in a design education setting.[12]

The case presented here was at the center of the 11th Design Thinking Research Symposium (DTRS11). The case methodology concerns video-based data of design team activity collected *in situ* and traced longitudinally, which was shared with multiple international design research teams for distributed analyses. The dataset and the frame for DTRS11 were open-ended – the researchers were not restricted to addressing a single, definite research question or particular theme. This allowed inductively oriented researchers to study possible new theoretical perspectives and deductively oriented researchers to test theoretical design models against a real-life design case. The principle that guided the data collection was to take a deep dive into actual situated design practices that extend beyond the timeframes and boundaries that had been previously studied in cases using shared design data, by focusing on a design team traced over time and in context, in all of its complexities in the wild.[13] As articulated by Dorst,[14] the complexities of the resulting dataset embrace radical realism. Box 1 provides the information describing the data collection and data distribution methods applied for the DTRS11 symposium.

A total of twenty-eight research teams took part in the analysis of the case. They analyzed the common dataset from their disciplinary perspectives using a variety of both quantitative and qualitative methods. This resulted in twenty-eight symposium papers, an edited book with thirty chapters,[15] and forthcoming special issues of Design Studies[16] and Co-Design.[17]

Here we set forth some of the prevailing, exemplary characteristics of the case as observed through the analytical lenses of different research teams at DTRS11. One might call the current case write-up a themed case analysis review, drawing in case data – primarily observations of interactions, and interviews – and connecting it to analyses themes. The purpose here is not to suggest novel theoretical

1 Nigel Cross and Anita C. Cross, "Winning by Design: The Methods of Gordon Murray, Racing Car Designer," *Design Studies* 17, no. 1 (1996): 91–107, DOI: https://doi.org/10.1016/0142-694X(95)00027-O.

2 P. Lloyd and D. Snelders, "What Was Philippe Starck Thinking of?," *Design Studies* 24, no. 3 (2003): 237–53, DOI: https://doi.org/10.1016/S0142-694X(02)00054-6.

3 Seda Yilmaz and Colleen M. Seifert, "Creativity through Design Heuristics: A Case Study of Expert Product Design," *Design Studies* 32, no. 4, (2011): 384–415, DOI: https://doi.org/10.1016/j.destud.2011.01.003.

4 Manolya Kavakli and John S. Gero, "The Structure of Concurrent Cognitive Actions: A Case Study on Novice and Expert Designers," *Design Studies* 23, no. 1 (2002): 25–40, DOI: https://doi.org/10.1016/S0142-694X(01)00021-7.

5 Arlene Oak, "Performing Architecture: Talking 'Architect' and 'Client' into Being," *CoDesign* 5 no. 1, (2009): 51–63, DOI: https://doi.org/10.1080/15710880802518054; Janet McDonnell and Peter Lloyd, "Beyond Specification: A Study of Architect and Client Interaction," *Design Studies* 35, no. 4 (2014): 327–52, DOI: https://doi.org/10.1016/j.destud.2014.01.003.

6 Ben Jonson, "Design Ideation: The Conceptual Sketch in the Digital Age," *Design Studies* 26, no. 6 (2005): 613–24, DOI: https://doi.org/10.1016/j.destud.2005.03.001.

7 N. Morelli, "Product-Service Systems, a Perspective Shift for Designers: A Case Study: The Design of a Telecentre," *Design Studies* 24, no. 1 (2003): 73–99, DOI: https://doi.org/10.1016/S0142-694X(02)00029-7; G. Lee, C. M. Eastman, and C. Zimring, "Avoiding Design Errors: A Case Study of Redesigning an Architectural Studio," *Design Studies* 24, no. 5 (2003): 411–35, DOI: https://doi.org/10.1016/S0142-694X(03)00002-4.

8 Stefan Wiltschnig, Bo T. Christensen, and Linden J. Ball, "Collaborative Problem—Solution Co-evolution in Creative Design," *Design Studies* 34, no. 5 (2013): 515–42, DOI: https://doi.org/10.1016/j.destud.2013.01.002; Bo T. Christensen and Christian D. Schunn,

development beyond what was included in individual DTRS11 publication outcomes, but rather to group, relate, and organize these insights in new ways. This article will not describe all twenty-eight papers from DTRS11, but will explore points and observations that reveal some important nuances and complexities inherent in the design case.

The case covers a longitudinal study of the everyday design activities of a professional team of designers employed in a User Involvement unit (UI) at a worldwide manufacturer within the automotive industry. The design team was working on a design task during 2015 and 2016 that involved deliverables for both the Accessories and Service departments.

Below we will present the case in tandem with selected DTRS11 analyses. The original case findings and the analyses highlight how today's design practice often (1) can take a user driven approach to product and service development; (2) takes on a cross-cultural perspective; (3) unfolds at an organization where design practices have spread beyond a specialized design unit; and (4) develops the range of uses – old and new – for design tools and materials.

Box 1. DTRS11 symposium dataset collection method.

We began the data collection for the DTRS11 dataset[i] in September 2015 with the design team in Scandinavia, travelled with the team to China in December 2015, and continually attended meetings until the end of January 2016. We collected all data *in situ* in the design team's natural environment rather than in a controlled environment or an experimental set-up. A DTRS11 student research assistant took on the role of a participating observer during the data collection period, gaining firsthand experience and familiarity with the characteristics of the work routines of the team and the different work settings.[ii] We recorded over one hundred and fifty hours of footage of the design team's daily routines in their natural environments with the intent to provide high quality video of interactions among the designers in their ongoing design process, and in interaction with stakeholders and lead users. We made a concerted effort to follow the natural design process and not interfere with normal work routines in order to maximize the quality of the data.[iii] We were attentive to collecting data from a longitudinal design process as it unfolds naturally in a design team.

We sampled recorded sessions from different stages in the design process and from different meeting set-ups—stakeholder meetings, meetings with external consultants, core-team meetings, workshops, sprint sessions, brainstorming sessions, spontaneous idea generation, and briefing sessions—to provide multiple entry points for analysis, allowing the researching teams a wide range of analytic options regarding their methodological approaches or theoretical interests. We included videos of collaborative design activities at various stages of the team's design process, including planning, ideation, designing, and executing two co-creation workshops with lead users. We selected over fifteen hours of video recordings and about two hours of audio from two qualitative interviews to round out the DTRS11 dataset. This final dataset included twenty sessions from different stages in the design process, supplemented by a background and a follow-up interview with the design team leader, Ewan, resulting in twenty-two sessions. The videos were each thirty to ninety minutes in length. In addition to the videos and interviews, the dataset included full-length transcriptions of the videos and interviews, additional written documents such as project briefs, field plans, and moderation guides, along with photos of meeting walls and whiteboards with sticky notes and other artifacts generated by the team. Finally, the dataset included parts of the design team's original project brief and delivery report, which contained mock-ups and wireframes exemplifying the proposed new line of accessories, events, and digital products.

i Bo T. Christensen and Sille Julie J. Abildgaard, "Inside the DTRS11 Dataset: Background, Content, and Methodological Choices," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 19–40.

ii Jennifer Mason, *Qualitative Researching* (London: SAGE Publications, 2002).

iii Christian Heath, Jon Hindmarsh, and Paul Luff, Video in *Qualitative Research: Analysing Social Interaction in Everyday Life* (London: SAGE Publications, 2010).

The Case

Background: The Organization, and the Project

It was late fall of 2015 in a Scandinavian city when we first met Ewan and his design team. They were beginning the second phase of a development project targeting

"The Relationship of Analogical Distance to Analogical Function and Preinventive Structure: The Case of Engineering Design," *Memory & Cognition* 35, no. 1 (2007): 29–38, DOI: https://doi.org/10.3758/BF03195939.

9 Bo T. Christensen, Linden J. Ball, and Kim Halskov, "Introduction: Shared Data in Design Research," in *Analysing Design Thinking: Studies of Cross-Cultural Co-Creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 1–18.

10 Nigel Cross, Henri Christiaans, and Kees Dorst, eds., *Analysing Design Activity* (Chichester, UK: Wiley, 1996); Kees Dorst, "Analysing Design Activity: New Directions in Protocol Analysis," *Design Studies* 16, no. 2 (1995): 139–42, DOI: https://doi.org/10.1016/0142-694X(94)00005-X.

11 Janet McDonnell and Peter Lloyd, eds., *About: Designing—Analysing Design Meetings* (London, UK: Taylor & Francis, 2009); Janet McDonnell and Peter Lloyd, eds., "Analysing Design Conversations," special issue of *CoDesign* 15, no. 1 (2009); Janet McDonnell and Peter Lloyd, eds., "Values in the Design Process," special issue of *Design Studies* 29, no. 2 (2009).

12 Robin S. Adams and Junaid A. Siddiqui, eds., *Analyzing Design Review Conversations* (West Lafayette, Indiana: Purdue University Press, 2016); Robin S. Adams, Shannon McMullen, and Michael Fosmire, "Co-designing Review Conversations—Visual and Material Dimensions," special issue of *CoDesign* 12, no. 1-2 (2016): 1–5, DOI: https://doi.org/10.1080/15710882.2016.1135577; Robin S. Adams, Monica Cardella, and Şenay Purzer, "Analyzing Design Review Conversations: Connecting Design Knowing, Being and Coaching," special issue of *Design Studies* 45, part A (2016): 1–8, DOI: https://doi.org/10.1016/j.destud.2016.03.001.

13 Christensen, Ball, and Halskov, "Introduction: Shared Data in Design Research."

14 Kees Dorst, "Epilogue," special issue of *Design Studies* (forthcoming).

the Chinese market for their organization.[18] In the coming months, his team would be starting a new phase of the project: developing a "concept package" for car accessories and services intended to appeal to the target market. This phase of the project included a field trip to China, sessions with Chinese lead users, and a "collaboration bridge" between the Accessories Department and the User Involvement Department.

Ewan, the team leader, had agreed to meet us to provide background details about the project that we could use to supplement our forthcoming field observations with the design team. That interview marked the beginning of a four-month data collection phase involving Scandinavian and Chinese collaborators. We followed his team to China, where we collected data during two co-creation sessions – conducted in Chinese with simultaneous translations – saw the design team produce hundreds of ideas and concepts on sticky notes, and observed the interactions between the team, Chinese lead users[19], and other key stakeholders.

The organization's User Involvement (UI) Department – which included the design team – was going to be working with stakeholders in the automaker's Accessories Department to drive their design concept and user-centered approach "further into the system," as Ewan explained in the first interview. In the sections to come, the quotes by Ewan derived from the two interviews in the DTRS11 dataset (see Box 1). Ewan explained, "Through 2015 and the start of 2016, we will explore, develop, and co-create the 'concept package' – that is what we're calling it – for the Accessories department. We want them to then acquire the package and try to push it further into the system. The concept package basically means everything you need to make a product or a service work – the product itself, the communication tools, and the business stream."

This was not a design project with hard deliverables or prototypes as a final product. Instead, Ewan and his team had a more complex agenda. Not only did they have a soft delivery target, they also aimed to enact cultural changes in the organization's general approach to product development and highlight the user perspective. As Ewan noted at the end of the first interview, the soft side of a deliverable is important, but "the process itself is an important part of our delivery, and you could say that in UI one of our main tasks is actually to work as change agents for the organization."

The automotive organization that employs the design team is European, and the design team is headquartered at a regional office in Scandinavia. The automaker targets several different market and customer segments by offering a wide range of products and services under a number of different brands. Out of respect for present and future economic and social trends, the organization is investing in new technology with a special focus on sustainability that does not sacrifice their focus on performance and service. In addition, in their latest mission and vision statement, the organization had made plans to shift daily decision making closer to the customer, and is seeking a more decentralized management structure. This change of strategy is a radical departure from the traditional, centralized decision making structure found elsewhere in the automotive industry. By seeking to bridge silos and co-create more efficient and appropriate business models, the organization is becoming part of a growing business counterculture that is using design to innovate its internal and external operations.

If we look back at how the UI Department – and hence the design team – came into existence, and how it functions in relation to organization, there is a clear connection with the organization's mission and vision statement. They established UI at the beginning of the 2010s as a mix of highly educated specialists who would work side by side with the rest of the firm. The new department quickly became a "satellite site," as Ewan explained in the first interview, "working very much like

15 Bo T. Christensen, Linden J. Ball, and Kim Halskov, eds., *Analysing Design Thinking: Studies of Cross-Cultural Co-creation* (Leiden: Taylor & Francis/CRC Press, 2017).

16 Linden J. Ball and Bo T. Christensen, eds., "Designing in the Wild," special issue of Design Studies (forthcoming).

17 Kim Halskov and Bo T. Christensen, eds., "Designing across Cultures," special issue of *CoDesign* (in preparation).

18 The organization and the participants in the case remain anonymous in all publications and other public material stemming from the DTRS11 case.

19 The term "lead users" is the design team's own descriptive term for the group of users they engaged with, and is not related to von Hippel's concept of Lead Users. The users referred to here were selected by the design team, among other things, for being in the premium user category (see also theme 1: Co-creation), but not for whether they were ideating or creating their own car solutions (as would be the case in von Hippel's terminology).

external consultants for the rest of the organization." The employees in the new department were engineers, product developers, graphic designers, software designers, and researchers with a shared interest in incorporating user perspective and user experience into their designs of products, accessories, services, or interfaces. This particular design project aimed to elicit the user experience perspective in two ways: through different exercises and techniques intended to establish a shared understanding between the users (both lead users and organizational stakeholders) and the designers, and through co-creation sessions and a variety of ideation and concept development sessions.

At the time of Ewan's interview, the design team were well aware that their design project was part of an ongoing cultural change in the organization – design and design thinking were evolving beyond methods and practices applied to create a single design project (service or product) into a mindset and way of working more generally.

Around two years before, three employees from UI – Abby, Kenny, and Ewan – had begun a design project aimed at Chinese users. The first phase of the project – which was completed at the time of our first interview with Ewan – sought to understand why there were such low uptake rates on car accessories in China. Through user experience methods, the design team conducted research in Scandinavia and field research with lead users in China. Through car user journeys and in-house interviews with selected premium lead users, the design team collected data to map current habits and user needs, which helped them establish an understanding of the Asian premium car user's everyday needs and aspirations. After collecting user insights in the quest to understand *why* the car accessory uptake rates were low, a year later the design team was tasked with understanding *how* to increase those rates in the Chinese market. This is where the second phase of UI's project began, and it is also the take off point for the case presented here.

To collect sufficient data to develop and refine the deliverables, the design team set out to explore user profiles and future contexts for car accessory use and services in the Chinese context. During this second phase, the design team planned to draw on their experiential, cultural knowledge, and they would also gain support and perspective from their extra-departmental colleagues and a trio of consultants specializing in Asian culture.

The purpose of the design project was to investigate, develop, and create – in dialogue with lead users – a concept package that would redefine what, how, and where the organization would offer accessories to lead users in China. The package ultimately comprised a combination of tangible and soft deliveries including scenarios, mock-ups, and wireframes exemplifying and describing a new line of accessories, events, services, and digital products that they hoped would stimulate uptake of the organization's automotive accessories in the Chinese market.

The People Involved

Ewan, Abby, and Kenny formed the core of the design team, and all were working full-time on the project. The three colleagues had been working on this project since it began and had worked together on many earlier projects for the organization, and even worked for the same employers before their current roles. They know each other well and have established a certain way of working together. Between the three of them, they have educational backgrounds in communication design, graphic design, multimedia design, informatics, and engineering, and each of them has eight to ten years of professional experience with a variety of design projects. For this project, they would be teaming up with three external consultants – Rose, Amanda, and Will – who had specialized knowledge of Asian markets, Asian consumers, and Asian culture. Two of these consultants are design thinking

experts, and they all have backgrounds in user and market research. The three consultants would only be full-time on the project during the field trip to China, where they would participate in all meetings on equal terms with the design team members. Prior to the field trip, they occasionally checked in with the design team via videoconference to discuss the design and execution of the co-creation sessions. Rose, Amanda, and Will would be handling the Chinese to English interpreting and would also be monitoring the two co-creation workshops with the Chinese lead users. Most importantly, the three consultants would be acting as cultural translators in an effort to help the designers bridge the gap between Scandinavian and Asian culture. On the whole, the consultants played an important role in the project.

For this project, the design team would be working closely with two internal company stakeholders: Tiffany and Hans from the Accessories Department. Tiffany and Hans form an important link between UI, with its satellite-like status, and the established, specialized, core departments of the organization – Sales and Marketing, Product Development, and R&D. During the project, Tiffany and Hans presented the organization and dealership perspective, and acted as representatives for the rest of the firm. They offered feedback about the design team's work and approach, and often provided context to the design team about their organization's history and pointed to potential implications for the design team's ideas. To sum up, the entire portfolio of participants in this project consisted of (1) a core group of three designers from UI, representing a user-centered approach; (2) three external consultants brought in to moderate the relationship to the lead users and present and translate Asian cultural perspectives and information about the Asian market; and (3) two stakeholders from the Accessories Department within the organization, who serve to represent the organization's values and demands.

Four Key Themes

This case offers us the opportunity to explore design practice from several perspectives: (1) the co-creative, (2) the cross-cultural, (3) the organizational, and (4) the tools and materials.

Co-creation

The design team was faced with a rather open-ended task: design accessories, concepts, a story, and/or a service that could be added to or sold in conjunction with the company product, (a car) and specifically targeted the Chinese market. With reference to the co-creation sessions, Claudia Eckert and Martin Stacey point out that the "main goal is not to generate concrete ideas for accessories … it is to gain a deeper understanding of the values that motivate car purchasing decisions in the Chinese market in the context of the values that drive Chinese society."[20] In this case, the design team collected user insights – stories, anecdotes, and notes from the users and from their own knowledge about the users – and used these to help them design concepts that they felt would attract Chinese consumers to their products and services.

Choosing the appropriate lead users for the co-creation workshops was a central topic for discussion during the project. The design team found it challenging to narrow down whom they actually wanted as participants. They chose an external recruitment bureau in China and handed over a list with specifications such as relatively high income, one or two cars, aged between twenty-five and thirty-five. They also wanted candidates to be social media and wearables (and health related monitoring) users, and online shoppers.

When designing the two co-creation workshops, very early on the design team knew they needed to create conditions that would enable all the participants

20 Claudia Eckert and Martin Stacey, "Designing the Constraints: Creation Exercises for Framing the Design Context," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 439.

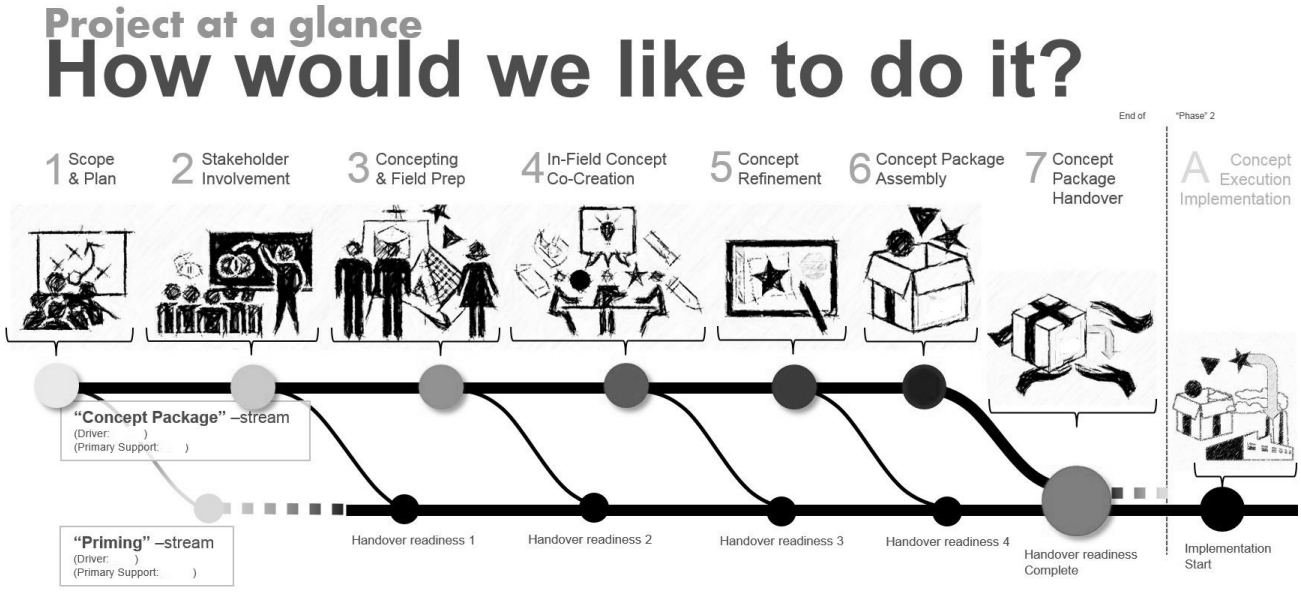

Figure 1 The seven steps in the project plan at a glance. Copyright © 2015, Ewan, Abby, and Kenny, the design team.

to share their needs and values. For the designers, this meant eliminating any (assumed) hierarchies that might exist among participants. This provision – for equality – was central to Peter Lloyd and Arlene Oak's analysis of the team's co-creation sessions,[21] who keenly observe that "creating egalitarian conditions under which the workshop participants will be comfortable enough to share their experiences is clearly an important aim of the designers and can be seen as an expression of co-design's collaborative, participatory, user-centered approaches."[22] During this formative part of the project, the team was concerned with what the lead users wanted and needed as car owners and drivers, but they were also interested in learning how best to involve them in the process of designing for these wants and needs.

The design team spent several weeks designing the co-creation workshops. They shared their previous experiences with co-creation and co-design and discussed their personal understanding of co-creation as a method and concept, all the while trying to arrive at a shared understanding of what co-creation is and consists of.[23] They planned to introduce different themes for the participants; key themes were "health" and "the good life." After several iterations, the design team decided on a workshop format that would entail some co-creation and some facilitated sessions over the course of two days. There are many different ways to involve users in a design process, and in this case the design team was focused on letting the users create a concept for an imaginary company based on a discussion of values related to health and lifestyle. The design team named this "concept co-creation," and later used the user insights that were generated plus the inspiration they found during the sessions to aliment their design process. In this way, the co-creation activity was not inviting lead users to design the actual concept package in collaboration with the design team. Instead, the design team was looking for cultural probes as input to their own design process later on in the process (steps 5 and 6, Figure 1).

Thus, the design team travelled to China to conduct what they called "in-field concept co-creation." Here they executed the two planned co-creation workshops and begins the "concept refinement" stage of the project (see Figure 1). They spent six days in China before conducting the first co-creation workshop, meeting and merging ideas with the external consultants – Amanda, Will, and Rose – so that they were in sync with the project and the plan. Seven Chinese lead users had been preselected to participate in the first co-creation workshop, and nine lead users would eventually participate in the second. Ewan, Abby, and Kenny were present

21 Lloyd and Oak, "Cracking Open Co-creation," 449–64.

22 Ibid., 453.

23 Christensen and Abildgaard, "Inside the DTRS11 Dataset," 19–37.

alongside Rose, Amanda, and Will.

The consultants took on the role of facilitators and moderators during the first workshop. Two external interpreters provided simultaneous translations from Chinese to English, which allowed the design team to follow what was being said and enabled them to ask the workshop participants questions.

Right after the first co-creation workshop, the design team met with Amanda, Will, and Rose to debrief and trade observations and notes. Will and Rose translated and explained the content of the different sticky note clusters written in Chinese and recounted some of the participants' characteristics and statements, as they saw them, to summarize the relevant findings. These included, among other things, how the participants conceived of leisure time, family relations, and their general ideas about the key concepts. Their translations were an important aspect of the design process; their translations of the sticky notes and observations during the co-creation sessions served to support the complex social and cultural relationship between the design team and their lead users. Those translations became the foundation for "stories" about the Chinese premium user, underpinned by norms and categories of value,[24] which the designers would later use in debriefing sessions with their colleague stakeholders to create relevant and plausible arguments for their design process and outcomes.

The design team took five full days before the second co-creation workshop to share observations and thoughts and work with the findings and observations from the first co-creation session. In what the design team called "insight workshops" and "analysis workshops," they spent focused time with the external consultants and (at times) company stakeholders to focus on the lead users' statements in relation to different themes such as health, safety, family, and social status. During that period, the design team also began to iterate on the design of the second co-creation workshop. Their specific focus was on optimizing a "company profile" exercise in which the participants would see themselves as investors choosing what to invest in. The exercise was intended as a way to establish an understanding of the values in a company, product, or service the lead users preferred, so they could incorporate those preferences in the design of the concept package.

The second co-creation workshop with the lead users followed the same setup as the first, but this time Tiffany and Hans were present and took notes behind a one-way mirror. This made them more able to partake in discussions afterwards. Participants and facilitators revisited the themes and concepts they had explored during the first workshop, and new themes such as "freedom" and "enjoying life" were introduced to create dialogue and new insights. After the final session, the design team, consultants, and company stakeholders spent time on a mix of workshops and briefing meetings. They discussed products, concepts, and stories based on observation notes, input, and interpretations of the fictive company products and services that had been created by the lead users during the co-creation sessions. Based on this user input, the design team generated ideas on sticky notes, discussed different product features and concepts – wearables, monitoring, personalized items, environmental issues, and non-profit initiatives – and used the translated insights to cluster specific ideas for marketing, storytelling, and accessory products – an air purifier was one idea that emerged – and attempted to determine how best to communicate these ideas to the organization through Tiffany and Hans. During the final days of analysis and iteration workshop sessions, the design team and the external consultants continued to cluster insights and ideas into "story," "product," and "sales" categories. They collaborated on an innovation-matrix, a popular method for product innovation and development. The innovation matrix helped the design team categorize their ideas and determine whether an idea would imply incremental or substantial changes, and if it would generate revenue

24 Lloyd and Oak, "Cracking Open Co-creation," 449–64.

or create costs. They also worked with a template for envisioning "opportunity areas," another popular method to expose strategically attractive areas for new products, accessories, and services.

In between development workshops, the design team met with their stakeholder colleagues to present, discuss, and pitch concepts in the making. The design team had developed persona-like characters from the individual lead users to create idealized versions of their target user demographic, and they used these personas to communicate their user-centric approach in the design process. Using personas was one of the most prominent ways the design team was able to convert their knowledge about the users into actionable insights. The persona design process "enabled the team to (a) methodically sort through the numerous individual user insights, (b) expand the focus beyond individual users to the broader target demographic, and (c) present a coherent story for company stakeholders outside the team," as Hess and Fila observe in their analysis on empathy in design.[25]

In addition to understanding the needs of a specific user demographic and designing with the organizational context in mind, the design team faced cross-cultural challenges, given that they were Scandinavian and designing for a Chinese market. In the next section, we outline some of the difficulties the design team faced in their quest to understand their premium users and design the appropriate concept package for the users and their organization.

Designing across Cultures

During the project planning phase, the design team anticipated that language would be a barrier to understanding the lead users, and thus they made an effort to use the external consultants as interpreters – not only as literal word-to-word translators, but also as cultural translators. Using the consultants as "cultural brokers,"[26] and using translations "for the purpose of validating statements about cultural understanding"[27] also had complications.

A key challenge for the design team was understanding the differences between Chinese and European culture, and they spent a lot of time discussing how to navigate their own culturally influenced understandings of the problem. As noted by Shanna Daly and her colleagues, "cultural perceptions and norms also played a crucial role in shaping the problem. There were cultural differences between the design team … and the lead-users…. The problem space ultimately included both the team's Western view of environment and their understanding of the Asian environment definition."[28]

The team made an effort to understand the lead users' culture based on the statements and expressed habits and behaviors of the participants during the co-creation workshops. Their ambition was to get beneath the surface of their assumptions about Chinese culture, and incorporate cultural elements into the core of their understanding of the design problem.

Authors Torkil Clemmensen, Apara Ranjan, and Mads Bødker write that design thinking is a "culturally situated practice."[29] They argue that the design team seemed to approach the design problem in a backwards manner; they knew the value they wanted to create in advance and were thus using the cultural knowledge they had amassed "to figure out the unknown WHAT (products/services) and HOW (working principles of why something would work or not work) in the abduction equation."[30] The three authors conclude that the cultural knowledge and perceptions of the design team (and the stakeholders) seemed to shape the design thinking approach within and across the various design situations, which indicates that the way the design team and the external consultants were thinking was, to varying degrees, biased by their own cultural beliefs and thoughts. Moreover, in the transfer of user insights into design decisions, what the user says is typically

25 Justin L. Hess and Nicholas D. Fila, "Empathy in Design: A Discourse Analysis of Industrial Co-creation Practices," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 489–90.

26 Newton D'souza and Mohammed Dastmalchi, "'Comfy' Cars for the 'Awesomely Humble': Exploring Slangs and Jargons in a Cross-Cultural Design Process," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 311–30.

27 Robin S. Adams, Richard Aleong, Molly Goldstein, and Freddy Soils, "Problem Structuring as Co-Inquiry," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 405–32.

28 Shanna Daly, Seda McKilligan, Laura Murphy, and Anatasia Ostrowski, "Tracing Problem Evolution: Factors That Impact Design Problem Definition," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. B.T. Christensen, Linden J. Ball, and K. Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 561, 563.

29 Torkil Clemmensen, Apara Ranjan, and Mads Bødker, "How Cultural Knowledge Shapes Design Thinking—a Situation Specific Analysis of Availability, Accessibility and Applicability of Cultural Knowledge in Inductive, Deductive and Abductive Reasoning in Two Design Debriefing Sessions," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 153–72.

30 Ibid., 153, 165–66.

31 Nigel Cross, *Designerly Ways of Knowing* (London: Springer, 2006).

not directly incorporated into a design, and designers inevitably incorporate at least some of their own perspectives and expertise in the process.[31]

The design team wanted to treat each workshop participant as an individual, but as the process unfolded, the team (at times) began referring to the participants using plural pronouns,[32] and thus indirectly creating a discourse of cultural generalization about their Chinese lead users that persisted into the final project phases. Newton D'souza and Mohammad Dastmalchi observe how the design team's use of slang and jargon "reveals the traditional dichotomy of Eastern and Western characteristics of culture that include individual versus collective and expressive versus restrained worldviews."[33] There may be several possible reasons for the linguistic shift, including faster design advancement than that afforded by the complexity of the cross-cultural issues at stake; a need to start generalizing in order to move from "understanding of" to "designing for;" or the team ultimately failing to set aside cultural stereotypes in their design activity despite intentions to the contrary.

Creative endeavors face fresh challenges and opportunities when multicultural teams become more widespread in an organization. In this case, the design team and the external consultants represent a heterogeneous team, and their cultural combination could create conflict that could be damaging to the creative process – even to the point of stalling it entirely. By analyzing the dynamic process of micro-conflict (minute disagreements expressed in conversation) in multicultural teams, Paletz, Sumer, and Miron-Spektor find that highly diverse teams are more creative.[34] According to them, one reason might be that the Asian expert consultants who helped to translate Asian culture for the design team and into the design process also added creativity and reflection to the process. Creativity was present in the heterogeneous team, but it did not affect conflict, which suggests "diversity in teams can promote creativity without requiring conflict."[35] Arguably, multicultural teams may experience conflict, but in this particular case, we find a team whose cultural diversity contributes to the creative process beyond micro-conflicts.

Design Thinking inside the Organization

The present case illustrates how the designers engaged with extra-departmental company stakeholders and tried to bring designerly tools and methods into new corners of the company.

"We have what we call a collaboration bridge, which is extremely important," Ewan said as he points at an illustration on the project brief showing a bridge with two groups of people on each side talking with each other in different languages. "Out of this there will be a soft delivery around our ability to collaborate with different units within the organization." Ewan and his design team constantly face the challenge of reaching out of their own department, their "own little world" as Ewan put it. Their ambition is to spread design thinking into other areas of the organization. "We would like to really make sure that we have a way of breaking down the silos and collaborating with the people we need to collaborate with, because this project reaches into storytelling, communications, product development, and sales – and not even in our own region of the world! So this is a collaboration bridge between different parts of the EU organization, but also between EU and China," said Ewan during the first interview.

This case is a multi-stakeholder endeavor involving lead users, key actors, and the design team in the design process and the co-creation process. The project plan created by the design team is shown in Figure 1, and the course of action in the project followed the plan's seven steps closely. We observed the design team during steps two through six.

During the earliest stages, when the design team was still assembling the outline for the project, they tried to anticipate the best ways to implement their future

32 Colin M. Gray and Elizabeth Boling, "Designers' Articulation and Activation of Instrumental Design Judgements in Cross-Cultural User Research," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 191–211.

33 Newton and Dastmalchi, "'Comfy' Cars for the 'Awesomely Humble,'" 327.

34 Susannah B. F. Paletz, Arlowe Sumer, and Ella Miron-Spektor, "Psychological Factors Surrounding Disagreement in Multicultural Design Team Meetings," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 41–58.

35 Ibid., 53.

findings at the organization. The team took it upon themselves to ensure internal stakeholder involvement – indirectly and directly involving the organization in the project to ensure frictionless delivery and implementation at the end of the project. Their plans for the coming months included the participation of two stakeholders from the Accessories Department – Tiffany and Hans – but the design team also made an effort to consider the organization's larger branding and marketing departments.

> "We're doing this in the realm of the Accessories Department. Accessories are not the core product – the cars are. Accessories are anything beyond the car. It is important to understand that the car projects are very heavy dance partners – they are massive. Even though they are amazing to be a part of, they are not as agile as they could be. That's why it makes sense for us to work with the Accessories Department – they are a little bit disconnected, so we can pilot different things, and work much faster," Ewan explained in his first interview.

The design team met with Tiffany and Hans during several exploratory meetings. They briefed the two on their plans and talked user involvement and co-creation to attune Tiffany's and Hans' expectations and understandings with their own. Involving the pair in their design activities became as relevant to the final outcomes as involving the Chinese lead users did, according to researchers Frido Smulders and David Dunne.[36] Drawing on Bryan Lawson and Kees Dorst,[37] Smulders and Dunne point out that design involves balancing and integrating stakeholder needs; designers must also focus on the handover of user insights, concepts, and branding strategies to those they call "sequentially dependent intermediate users" – stakeholders – that are also part of the innovation process.[38] As part of the design team, "Tiffany and Hans need to become ambassadors that enhance and facilitate the beliefs of other stakeholders in the company," Smulders and Dunne observe.[39]

The design team was aware that they were designing for Chinese lead users from a user-centered set of values, but they were also aware that they had a design task to perform within their organization: take extra-departmental needs and organizational values into consideration to deliver a successful result. This distance between a designerly way of thinking – represented by the design team, especially Ewan, the team leader – and the organization's other stakeholders' more product focused approach was an underlying theme throughout the design process. The disparity between these perspectives provides a small window into the tension that might exist between a massive organization and a small, local, user-centered unit, who creates stories and helps to shape narratives through co-operative, socially engaged methodologies. Regardless, the design team had to try and ensure company profitability by developing products that would engage consumers and maintain brand success.

As he reflected on the project deliverables in the follow-up interview, Ewan explained that their aim was also to help the organization to think in terms of users and design in the quest for innovation and competitiveness in the market. To Ewan, this meant "getting big companies to work in a specific way. Of course we were making a concept package of products and services, but the main deliverable became 'teach our company, and ourselves, how to be user-centered, and use design thinking in our everyday lives.'"

By having the two representatives from the Accessories Department present during most of the ideation and generative sessions in China, the design team aimed to expand its "shared field of experiences with the intermediate user team."[40] The question remained, however, as to whether this was sufficient to create a shared understanding between the two. Looking back at the project, Ewan expressed a sense of failure when it came to engaging his extra-departmental

36 Frido Smulders and David Dunne, "Disciplina: A Missing Link for Cross Disciplinary Integration," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 137–52.

37 Bryan Lawson and Kees Dorst, *Design Expertise* (Abingdon: Routledge, 2009).

38 Smulders and Dunne, "Disciplina," 137.

39 Ibid., 147.

40 Ibid., 149.

41 Ibid.

colleagues in the design process. As Smulders and Dunne note, Ewan acknowledged that reasons for this failure included "a lack of time and priority, and a lack of social connection."[41] In their analysis, Smulders and Dunne conclude that the disconnect was likely due to the fact that the design team was not able to fully comprehend the goals, constraints, and mindset of the organization's other stakeholders, or their broader context.[42]

Despite the organizational challenges that Ewan and his team did not manage to overcome, this case illustrates a trend that many in the field of design research have reported: design and designers are being asked to find responses to complex problems that extend into terrain beyond what their technical competencies alone can address. Moreover, the meaning of what design and designing is continues to evolve, and the dimensions of both design practice and understanding are under transformation.[43]

Design Tools and Materials

The case presented here involves a design problem that the team addressed through a plethora of designerly methods, utilizing PowerPoint slides and sticky notes extensively in what became a text-based design process. Sticky notes served as externalizations of design ideas – the designers and the other stakeholders used them to think *with,* and in the ongoing conversation among the designers, sticky notes supported their reflection-in-action.[44] "I am sitting in my chair, then I am giving a sticky note to you, you stick it to the wall, we're part of – kind of – the same being … and I have an idea with it, but maybe you stick it somewhere else and I say, 'Ah okay, wow, that's interesting! That wasn't what I was thinking!'" Such was Ewan's description of what happens when designers collaborate using those ubiquitous, often yellow – but also colored – sticky notes.

The design team used adhesive notes for different activities throughout the design process. They appeared to be the team's preferred design material. The notes appeared in almost every meeting as either simple tools for note taking or planning, or as the go-to medium for brainstorming and idea generation sessions. "One strength of the sticky note has to do with this feeling of working together with someone on a physical level – which is fantastic," Ewan explained in his final interview. "They have this ability to maintain order, to express something at different levels," He uses sticky notes in most of his work as a designer, be it planning or prototyping, and believes that the sticky note affords certain aspects rarely seen in other materials. As he describes: "It has to do with just being able to clear your mind, you know … when the note is on the wall you don't have to keep it in your mind. You can go home, you can sleep well, you can go out, you can have a beer or a coffee with your friends and think about other stuff, because the idea is on the sticky note on the wall."

The sticky notes became like batons passed between the Chinese lead users and the design team. The notes not only directly transmitted user insights; they supported the transmission of those insights into the design team's awareness and informed the team's formulation of the solution space. As mentioned previously by Shanna Daly and her colleagues,[45] that translation of user data was one of the key factors driving the evolution of the problem space in the project. The design team translated user data based on their observations and notes from the two co-creation sessions. They also had sticky notes written in Chinese from the two workshops, which they translated in collaboration with the external consultants. The sticky notes afforded multiple interpretations, allowing the designers to draw their own inferences and use them in their own way, much like mood boards, albeit in linguistic rather than graphic form.[46] The translations may have had some impact on the problem space, as Daly and her colleagues note.[47] One example is how

42 Ibid.

43 Richard Buchanan, "Wicked Problems in Design Thinking," *Design Issues* 8, no. 2 (1992): 5–21, DOI: https://doi.org/10.2307/1511637.

44 Donald A. Schön, "Designing as Reflective Conversation with the Materials of a Design Situation," *Knowledge-Based Systems* 5, no. 1 (1992): 3–14, DOI: https://doi.org/10.1016/0950-7051(92)90020-G.

45 Daly et al., "Tracing Problem Evolution," 555–72.

46 Eckert and Stacey, "Designing the Constraints," 433–36.

47 Daly et al., "Tracing Problem Evolution," 555–72.

48 Ibid.

translating what the participants said about the topic of "status" led to contrasting meanings, whereas the translation of the lead users' statements about "trust" led to one collective, shared understanding within the design team.[48]

New ideas emerged based on the translation of the lead users' sticky notes during idea generation sessions. Bo Christensen and Linden Ball took a close look at the uncertainty linked to the translation of the Chinese sticky notes, and found that for the designers, the process of deciphering what the lead users meant was fraught with doubt.[49] Some see uncertainty as a pervasive aspect of design with positive effects on the design process, since it provides opportunities for creative ideation.[50] Christensen and Ball examined the effects of the epistemic uncertainty – a subjective feeling of uncertainty during information selection and design decision making – associated with the notes' translation,[51] and found that it evoked attentive returns to the topic at later points in the design process. Contrary to their expectations, however, they observed how increased epistemic *certainty* – as opposed to uncertainty – triggered more frequent instances of immediate, creative reasoning and information elaboration in the design team.

During collaborative activities, including idea generation and concept development, sticky notes can support a team's collaborative cognition and aid reflection-in-action.[52] Using sticky notes externalizes ideas and thoughts, and these demonstrate qualities associated with long-term semantic memory such as typicality gradients and hierarchical ordering.[53]

Ewan explained that sticky notes are his preferred design tools, saying, "When you do user-centered design, it's important to know the individual user, but it's really important not to focus only on the individual, because then that can color the entire project …. You need to be able to see all these levels." In this design expert's estimation, sticky notes can transmit information on at least three levels: 1) at the level of the unique note, with its detailed information; 2) via clustering of several notes with a visible headline; and 3) via an entire wall of notes, where only the colors and cluster formations are visible to the eye at a distance.

In Conclusion

With the present paper, we hope to have added a small contribution to the rich history of case studies in design research by using the first version of the case format in *She Ji* for introducing a new variant of case studies: the themed case analysis review. The case description, as presented here, offers an overview and entry point for new readers of the DTRS11 research output, focusing on moving from raw video data to a proper collected case narrative using new empirical content stemming especially from observations of interactions and interviews with the team leader Ewan. Many of the individual design research team analyses of the DTRS11 *in situ* design team case touched upon the four central themes of co-creation, cross-cultural design, design thinking within organizations, and design tools and materials. Each of these themes stems from particulars in the present case, but at the same time serves to hint at developments taking place in design practice more broadly. We hope the Design Thinking Research Symposium series, and its pioneering approach to video-based data sharing, may serve as an inspiration for others to share their design practitioner cases for collaborative analysis here in the case format offered by *She Ji*.

Acknowledgments

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49 Bo T. Christensen and Linden J. Ball, "Fluctuating Epistemic Uncertainty in a Design Team as a Metacognitive Driver for Creative Cognitive Processes," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 249–69.

50 Jorge Alcaide-Marzal, José Antonio Diego-Más, Sabina Asensio-Cuesta, and Betina Piqueras-Fiszman, "An Exploratory Study on the Use of Digital Sculpting in Conceptual Product Design," *Design Studies* 34, no. 2 (2013):264–84, DOI: https://doi.org/10.1016/j.destud.2012.09.001; Janet McDonnell, "Gifts to the Future: Design Reasoning, Design Research, and Critical Design Practitioners," *She Ji: The Journal of Design, Economics, and Innovation* 1, no. 2 (2015): 107–17, DOI: https://doi.org/10.1016/j.sheji.2016.01.007; Donald A. Schön, *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books, 1983).

51 Christensen and Ball, "Fluctuating Epistemic Uncertainty," 249–69.

52 Jeanne Bamberger and Donald A. Schön, "Learning as Reflective Conversation with Materials: Notes from Work in Progress," *Art Education* 36, no. 2 (1983): 68–73, DOI: https://doi.org/10.2307/3192667; Schön, "Designing as Reflective Conversation," 3–14; Donald A. Schön and Glenn Wiggins, "Kinds of Seeing and Their Functions in Designing," *Design Studies* 13, no. 2 (1992): 135–56, DOI: https://doi.org/10.1016/0142-694X(92)90268-F.

53 Graham Dove et al., "Grouping Notes Through Nodes: The Functions of Post-It Notes in Design Team Cognition," in *Analysing Design Thinking: Studies of Cross-Cultural Co-creation*, ed. Bo T. Christensen, Linden J. Ball, and Kim Halskov (Leiden: CRC Press/Taylor & Francis, 2017), 229–48.