Mapping Insights in Creative Processes – Prototyping Integrative Research Designs for Design Research

Stefan Wiltschnig
Copenhagen Business School
Solbjergplads 3
2000 Frederiksberg, Denmark
+43 650 9911 0 88
sw.marktg@cbs.dk

Henrik Korsgaard
Aarhus University
Helsingforsgade 14
8200 Aarhus N, Denmark
+45 22377114
korsgaard@cavi.dk

Peter Dalsgaard
Aarhus University
Helsingforsgade 14
8200 Aarhus N, Denmark
+45 20652942
dalsgaard@cavi.dk

ABSTRACT

Conceptual and methodological challenges of studying insight moments in creative processes lead to calls for developing integrative approaches in creativity research. This paper reports preliminary results from a study geared at creating a prototypical research design for tracing insight moments in mappings of creative design processes. The presented data was collected during an interaction design course organized as experimental design practicum resembling the complexity of real world design projects.

Keywords

Insight, creative processes, design, reflective mapping, integrative research approaches

INTRODUCTION

Narrations of "insights" or "Aha!-moments" are at the core of reports about creative processes to come up with new solutions to complex issues. The experience encompasses coming up with a novel solution in a surprising instance and after hard work as well as eventually getting stuck along the way. Creativity research has come up with various approaches and conceptualizations to elucidating this phenomenon "in the wild" and "in the lab" along the development of the field in the 20th century [6]. Even though a majority of designers report insight experiences as vital in their creative processes [9], the concept and its status as exceptional event and indicator of ingenuity gets challenged recently [8].

There has also been criticism directed towards issues concerning ill or too broadly defined concepts in creativity research in general [12]. For the study of insight moments this includes structural differences between laboratory tasks and the complexity of "real world environments" in which creative processes are happening. Wiltschnig and Onarheim (2010) have summarized those issues in a recent review of the development of studies of insights in creativity research and discussed potential avenues for addressing them through "integrative research approaches" [13]. Following

those arguments the question arises how to trace insight moments in real world design environments and deploy "in-vivo-in-vitro" frameworks [2].

This contribution reports work in progress from a study geared at tracing insights in conceptual design processes of advanced student design teams in a design practicum. The studio setting and design brief aimed at resembling most of the characteristics of professional design projects while keeping timeframe and general requirements stable across teams in order to allow for comparisons. It is geared at creating and exploring a prototype of an integrative research setting for studying creative processes and practices [5,12]. Our goal was to generate rich datasets along the creative processes of the design teams and map crucial moments as well as candidate reports of insight experiences within them.

In the following we give a brief overview of the literature on maps for visualizing creative design processes. Emphasis is given to combining methodologies and explicating 1st, 2nd, and 3rd person observational perspectives simultaneously in the mappings. This provides the framework for a description of the research design and mapping exercises deployed in our project. We report preliminary data from the analysis of one of the groups studied and provide a first discussion of our experiences with this prototypical integrative research setting.

Mapping and reflecting upon insight moments

One way of scaffolding analysis of design processes is through the use of visualizations of the design process. Dalsgaard, Halskov & Nielsen (2008) have developed a set of so-called "maps for design reflection" to support the documentation of the elements of a design process and their interrelations, as well as the subsequent analysis of the process [1]. This approach, which focuses on sources of inspiration for design concepts and the material manifestation of design concepts, is inspired by earlier work by Lanzara & Mathiassen (1984), which presented ways of mapping issues related to the management of design processes [7]. Dalsgaard, Halskov & Nielsen (2008) present three types of maps, each of which is intended to support reflection on different aspects of the design process. Overview maps capture and represent the overarching development of a design process by tracing the
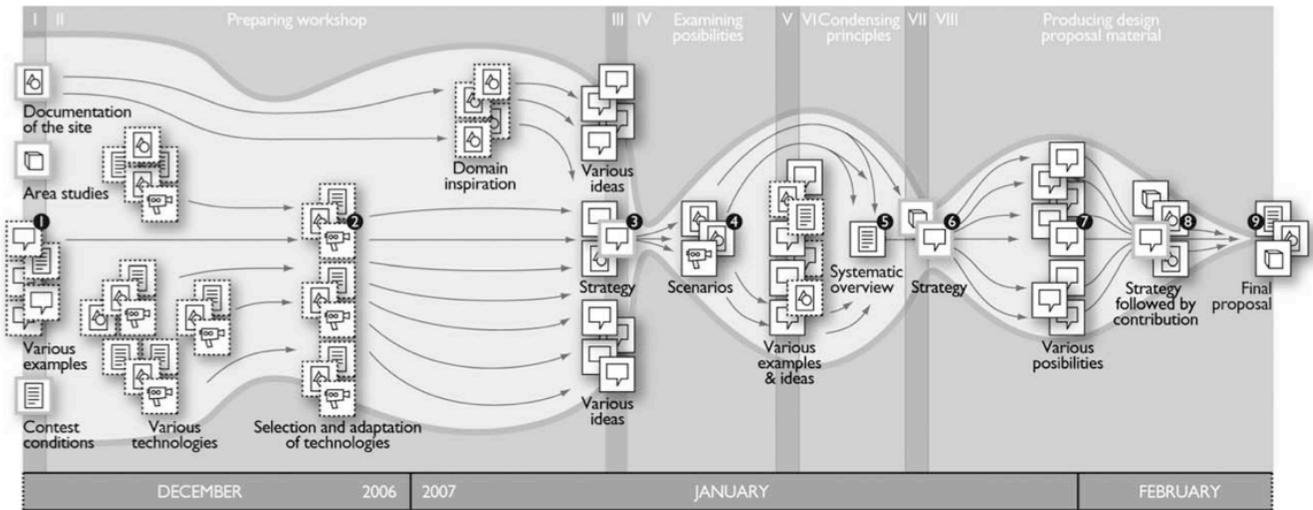
Figure 1: An example of an Overview Map from Dalsgaard, Halskov & Nielsen (2008)

multiplicity of sources of inspiration, design concepts and manifestations of those concepts through a design process; strand maps focus on how specific concepts emerge and evolve over the course of time; and focal maps capture specific design events. On the basis of insights from Schön's pragmatist theory of design [10] and theories of distributed and interactive cognition [3,4], the authors argue, "… the central ideas in a design process are those that are explored through various modes of representation. Subsequently, mapping these representations constitutes a meaningful foundation for design reflection."

In our studies, we have been inspired by how such visualizations can contribute to a better understanding of insight moments in design processes. In addition to offering concise overviews of design projects, the very process of making the maps force the map-makers - design practitioners and/or researchers - to discuss and reflect upon what constituted the most salient aspects of the given project. In the following we describe how these inspirations were used to design and deploy the study in the context of a design course set up as design practicum.

Study context: An experimental design practicum

The students' learning environment in the course that provides the context for our study, is inspired by Schön's notion of *the reflective practicum*, described as "a setting designed for the task of learning a practice"[11]. This is a learning environment in which students are faced with tasks that approximate real world design problems. When establishing a practicum, a number of parameters have to be taken into account in order to balance the nature and scope of the challenge with the students' capabilities in order to achieve the intended learning outcomes:

Closeness to real world

How closely does the challenge resemble a real world problem? How many facets of a real world problem can/must the students address in their work? Do students have to respond to external stakeholders and/or deliver a final product to them? What is the potential risk and impact of the students' work on real life settings?

Access to resources

To which extent do teachers present the students with a proposed and/or obligatory process plan? Do students have to find related works and literature or do teachers provide it? How much coaching and instruction is available to the students? Can students draw upon help and feedback from others who in "real life" might be considered as competitors?

Framing and constraints

What is the time frame of the process? What are the consequences if deadlines are not met? How much can students draw upon external stakeholders and/or clients? What are the requirements for the result/product of the process? By which criteria is the result/product evaluated?

RESEARCH DESIGN

In the study presented here, we used a specific form of the reflective practicum as a frame for studying insight moments. Our research was focused on an interaction design course at the Department of Information- and Media studies at Aarhus University. During one semester the students were introduced to different approaches to interaction design as well as a series of different technologies for producing and sketching concepts, e.g. the open-source prototyping platform Arduino.

The students attended lectures as well as exercise classes, in the same studio environment as they did their design work in. Each group had their own studio space throughout the semester in order to a) provide a space for experiments, mock-up, workshops etc., b) give them a working space, resembling real-world conditions, e.g. within a design bureau, and c) to meet the need for an open space, accessible 24/7 throughout the process.

The framing of the design course was a design challenge within the theme of "smart-cities and values". In the beginning of the semester the students were introduced to different notions of "smart-cities and values" in relation to digital design. Based on that they were asked to formulate their own perspectives in relation to a seminar with potential stakeholders.

We chose this course for our research because it gave us access to a series of relatively comparable design projects, the design challenges and processes approximated real world design challenges, and we could make it mandatory for the student designers to carry out the reflective mapping and visualization exercises, get access to these artifacts, and carry out in depth interviews.

The beginning of the design challenge was marked by the formulation and presentation of each groups design document, including a domain description, potential users and a plan for action. These design documents to some extent resemble parts of a real world design contract/brief, but still lack elements like the client relationship, budget- and requirement negotiation, and the commitment to a real world setting. The students could reframe their project, in light of new perspectives or technological challenges, without dealing with real-world consequences, which led to a more dynamic learning environment for the students.

The initial presentation marked the transition from a broader perspective on interaction design to the actual design work of the course. From that point on, the group work and tutoring classes revolved around each groups project, and the structured lectures aimed at providing theoretical and technical perspectives to the students.

The final prototypes were presented and exhibited at a design expo. During that exhibition, two judges from Østjysk Innovation, a business development and investment firm from the local start-up environment, assessed each concept, based on their normal investment criteria, and gave a price for best concept and most creative concept.

Research Interventions
During the research period, we had five different data collection points: (1) the students were asked to document their process using a distributed note-taking tool (Evernote); (2) a semi-structured group interview with each group; (3) sitting in and observing the external judges voting at the design expo; (4) a questionnaire given to the audience at the design expo, assessing "most creative idea"; (5) The final workshop, with the individual- and group mapping exercise, followed by a reflective interview.

Each of them was geared at capturing different perspectives around our research interests, varying in type and aim of collection. As stated in the introduction, our research objective was the generation of rich datasets along the creative processes of the design teams and the mapping of crucial moments in the process as well as candidate reports of insight experiences.

Course related Interventions
During the course we had a few points of intervention, which both fed into the learning process and gave us a deeper understanding of each group and their design process in a research perspective: (1) an introductory lecture around models of creative processes and the concept of insight moments; (2) deadline for signup for the project, as well as informal group interviews on project status, theme and general information; (3) Expo day participation; (4) Workshop and reflective interviews and finally (5) the

oral defense and grading of academic papers and the projects as such.

DATA FROM MAPPING WORKSHOPS
At the mapping workshop the students were asked to map and illustrate their process in three levels of abstraction, inspired by the "maps for design reflection": Firstly they were asked to draw a "picture of their design process" (Figure 2) leading to a free, artistic representation of their experiences along the projects.
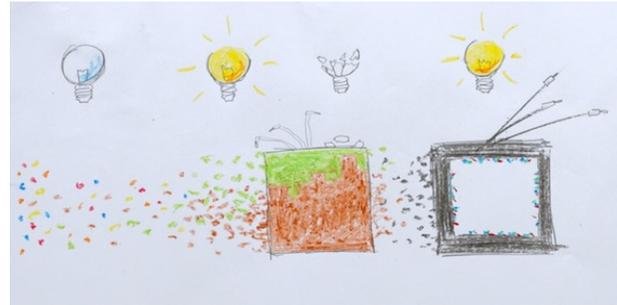
Figure 2 Abstract drawing of the design process

Secondly they were asked to draw a set of fever-curves (Figure 3) on a provided timeline, representing their perceived workload and energy in the process. This should allow them to recall the overall development of their experiences during and identify turning points and key events along the process.
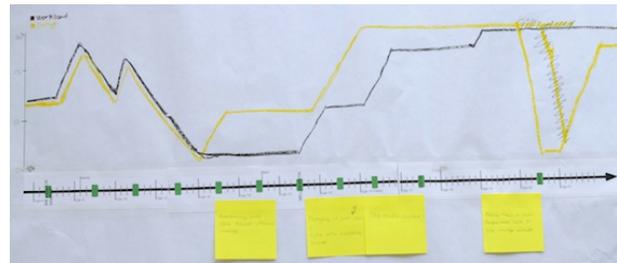
Figure 3 Fever-curves: Workload and energy levels

Thirdly they were asked to add post-its (Figure 4) to the timeline for what they perceived as crucial moments during the design process. This was done individually for each student, followed by a reflective interview.
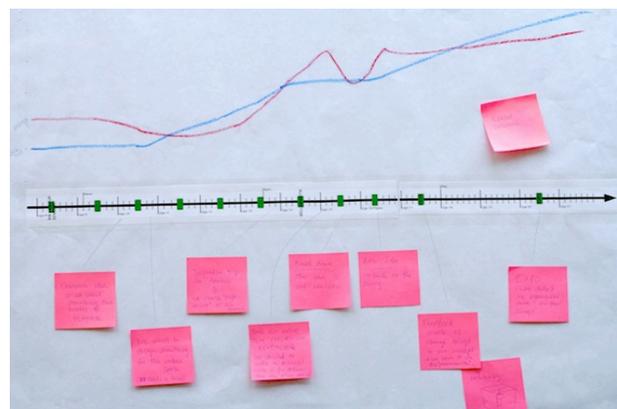
Figure 4: Example of full map, with curves and post-it notes

After that the teams were asked to create a "shared map" for each group and going into a discussion of similarities and differences between their individual maps feeding into the shared representation. Both the reflective interviews and the group mapping conversations were captured on video. The group discussion allowed a comparison and consolidation of individual views on the shared experience. These retrospective views can be verified with the data captured during the unfolding process in evernote.

DISCUSSION AND OUTLOOK

While the research approach of studying the reflective maps and visualizations in a practicum proved fruitful and yielded interesting results, this setup comes with a number of limitations. First, we collaborated with the teaching staff and the students may have been biased towards a more positive attitude towards the value of developing and employing the maps in order to please us. Second, although the practicum was an approximation of a real life design situation, it is first and foremost a learning environment, and the constraints and pressures in a real life design project could likely affect the findings.

That being said, the mapping exercise and following interviews show both an articulated level of reflection from the students, as well as providing concrete accounts on their experiences, especially what they perceive as crucial moments in the design process. The maps provided a fruitful departure point for the reflective interviews, in the sense that each student had time to reflect on the relations between the workload, energy and crucial moments within the timeframe. Furthermore, the variation between the individual students experience of the process and crucial moments seem to align well with the common perspectives. Even though the group mapping did involve a certain amount of alignment, negotiation and individual lead, the three levels of data on each crucial moment - individual map, group map and process documentation - show converging experiences. This is of course biased to some extent by the huge amount the groups already had discussed and worked together in their studio.

While we have only initiated preliminary analysis of the workshop data, it is increasingly becoming evident that the maps provide a rich source of descriptive accounts on insight moments. After viewing and transcribing the relevant sections of all the interviews, and triangulating with the other data, especially the documentation and first round of interviews, we hope to be able to identify some similar patterns between the experiences of crucial moments and insights that could feed into generating a taxonomy of insight moments.

REFERENCES

1. Dalsgaard, P., Halskov, K., and Nielsen, R. Maps for Design Reflection. *Artifact 2*, 3 (2008), 176-189.

2. Dunbar, K. and Blanchette, I. The InVivo/InVitro Approach to Cognition: The Case of Analogy. *Trends in Cognitive Sciences*, (2001), 334-339.

3. Gedenryd, H. How designers work. 1998.

4. Hutchins, E. *Cognition in the Wild*. MIT Press, Cambridge, 1996.

5. Kaufman, J.C. and Sternberg, R.J., eds. *The Cambridge Handbook of Creativity*. Cambridge University Press, Cambridge, MA, 2010.

6. Knoblich, G. and Öllinger, M. Einsicht und Umstrukturierung beim Problemlösen [Insight and restructuring in problem solving]. In J. Funke, ed., *Denken und Problemlösen. Enzyklopädie der Psychologie.* Hogrefe, Göttingen, 2006.

7. Lanzara, G.F. and Mathiassen, L. *Mapping situations within a system development project*. Aarhus Universitet. Matematisk Institut., Aarhus, Denmark, 1984.

8. Lawson, B. and Dorst, K. *Design Expertise*. Architectural Press/Elsevier, Oxford, UK, 2009.

9. Murty, P. and Purcell, T. Levels and Experiences of Insightful Design. *International Design Research Symposium*, (2006).

10. Schön, D.A. *The Reflective Practitioner: How Professionals Think In Action*. Temple Smith, London, 1983.

11. Schön, D.A. *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions*. Jossey-Bass, San Francisco, London, 1987.

12. Weisberg, R.W. *Creativity - Understanding Innovation in Problem Solving, Science, Invention, and the Arts*. John Wiley & Sons Inc., Hoboken, 2006.

13. Wiltschnig, S. and Onarheim, B. Insights into insight - How do in-vitro studies of creative insight match the real-world complexity of in-vivo design processes? *Design Research Society International Conference*, (2010).