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THE CHARACTERISTICS OF A SUCCESSFUL FRAMING PROCESS

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ABSTRACT
In design schools and universities we need to teach students how to frame their projects in ways that create a significant and new perspective on the problem situation as well as a clear direction for the solution. We teach students how to engage in user research, prototyping, conceptualization, business and technology analysis, but often the ability to attain information from these different processes and fuse it together to create a concept is left for the student to figure out.
Previous research on the framing process has mainly focused on describing the different steps in the framing process or on describing the type of reasoning that lies behind the framing process. Only a few studies have provided insights into the type of actions that are needed to achieve a successful framing process i.e. searching for the paradox in the data or creating several revisions of the frame.
This study builds upon indications from a previous study presented at E&PDE 2016. This study indicated a significant difference between the high-grade students and the low-grade students both when it came to how they formulated the frame, how they revised the frame, their research strategy, their documentation, as well as their reflections.
This present research project seeks to underline the indications from the previous study. It is based upon 19 students, who documented their framing process during the development of a conceptual design. The present study supports the indications from the previous study and identifies some of the actions that characterize a successful framing process.

Keywords: Design process, framing, design students, successful actions.

1 INTRODUCTION

The concept of framing was introduced to the area of design by Donald Schön in 1984 [1]. In Schön's unfolding of the concept, framing is a natural part of the designer's reflection-in-action and reflection-on-action [2] and a key characteristic of the design process.
Schön and Rein defined frames as *'the underlying structures of belief, perception and appreciation'* [3], that allows us to *'see things as'* [2].
According to Schön, the framing process typically happens in loops of four steps: 1) naming the situation, 2) suggesting a framing of the situation, 3) testing the frame through research or prototyping and 4) then reflecting on the outcome of the test, as well as a reflection on how the outcome influences the project frame [1], [4].
Several studies have characterized the framing process and found that it is an implicit and informal process based on abductive reasoning and tacit knowledge [4]–[7]. Valkenburg and Weick underline that framing is as a process of sense making [8], [9] that enables the designer to create specific object worlds [10].
In 2011 Kees Dorst introduced a model that combined abductive reasoning with the concept of frames[11]. Here Dorst argued that when designers work with wicked problems, it is not possible for them to define upfront 'WHAT' they are designing – nor to identify the solutions principles that will signify 'HOW' the product works.

WHAT? (Thing) + HOW? (Solution Principles) = ?

Figure 1. The challenge of a wicked problem (based on [11]*)*

In order to overcome this challenge, the designer creates a frame which is a novel standpoint that enables him to understand the problem in a new way as well as a new way for acting within it. By doing this, the designer creates a proposal that shows 'HOW' the solution will work in order to achieve an aspired value.

WHAT? (Thing) + HOW? (Solution Principles) = VALUE (Aspired)

FRAME

Figure 2. The designer's way of approaching a wicked problem (based on [11]*)*

Frames are often communicated through storytelling [12], [13] and metaphors [14], because these allow us see things in a certain perspective. Even if frames are often paraphrased as simple metaphors, they are typically quite complex units, that provide the designer with implicit assumptions about: 1) the project's values and goals 2) the relevant issues 3) boundaries to the design situation and 4) criteria for evaluation [7].

1.1 Teaching the Framing Process to Students

Since the ability to frame is vital to working with both design and innovation[15], it is also an important competence for design students to attain. In most design educations there is no particular class or module on framing. Instead students are expected to learn how to frame through various projects and the supervision that comes with this. They may be presented with examples of how successful projects are framed in lectures as well as other types of inspiration for their own framing process. But in many ways the framing process as a competence remains for the student to attain through practice and reflection.

The implicit nature of the framing process also poses some challenges for the supervisor. For instance, as a supervisor, it can be hard to figure out whether a student has fully understood her own project framing as well as the consequences of it. Likewise it can be hard to determine whether the students understand specific comments or critique in relation to the framing and are able to act on it, rather than seeing such comments merely as suggestions.

These challenges might be fewer, if it was possible to unfold and discuss the student's framing process in direct terms and give direct feedback on the specific actions and reflections.

However this is difficult, because there is very little research that qualifies what characterizes the successful framing process compared to the unsuccessful framing process. Most research on framing focuses on defining the 'concept' or describing the framing process in various models and steps [16]–[19], but only very few studies has made the comparison between successful and unsuccessful framing process and hence, very few studies provide recommendations for how to act or navigate during the framing process. The few studies include Valkenburg, who found that the quality of a design team's project is correspondent with the number iterations of the project framing [4] and Christiaan [6], who found that expert designers search for the paradox in the data, as a starting point for their framing.

At the 18th International Conference on Engineering and Product Design Education (E&PDE16), the author of this paper presented a small study, which explored the qualitative differences between high-grade and low-grade students' framing processes. The study was based on 14 students, who partially documented their framing process during the development of a product concept.

The study indicated some quite interesting differences in the framing processes of the students, who received a high grade and the students who received a low grade. These differences were documented in the figure below.

	Students with low-grade	Students with high-grade
Formulation of the frame	Overall	Specific, more nuanced over time
Revision of the frame	A few times	Frequently
Research strategy	Aiming at covering most 'territory' (zooming out)	Aiming at finding a focus (Zooming in)
Documentation (of move)	Document, what they know	Document, both what they know and what they do not know?
Reflections	Summary	Critical questions

Figure 3. The qualitative difference between the students with high and low grades [16, p. 563]

As shown in figure 3, the first difference between high-grade and low-grade students framing process, is the way they formulate the frame: *Even if almost all students start with a fairly overall formulation of the frame, the students with high grades relatively fast find a certain direction for the project framing and from this point on they nuance the frame again and again. On the other hand, the students with low grades remain in the overall formulations* [16, p. 563].

The second difference between the two groups of students is the number of times the frame is revised: *The students with low grades have a tendency not to revise the frame. There are several examples where they write 'same as yesterday' or even copy the sentences several days in a row. The students with high grades frequently revise their frames by adding nuances to it or by exploring different formations* [16, p. 563].

The third difference between the high-grade and the low-grade students framing process can be found in their research strategy: *The research strategy for the students with low grades is characterized by an attempt to cover most 'territory' (...) Parallel to this, the students with high grades seemed to research one or two topics at the time and then reflect on the outcome of this research in order to find new or more nuanced focus.*

A fourth difference between the students with high grades and low grades was found in their documentation style: *The students with low grades had a tendency to list all of their findings one after another. The students with high grades often shortly documented their insights, and followed it up with a number of questions in respect to what they did not know, i.e. one student wrote in his reflection: 'What do people do when their desk gets cluttered? Where do they put their 'stuff' when they need to get organized?'* [16, p. 563].

The fifth and final difference, between students with high grades and students with low grades, was the way they reflected on the framing process. *(...) the students with high grades seem to reflect much more on the process and ask more critical questions. (...) the students with low grades seem to use the reflection space as a place to summarize, what they had been doing. The students with high grades, on the other hand, used it for critical questioning, i.e. one student with high grades wrote: 'Is there even a need for storage in the modern office?' And another student wrote: 'Am I right about the framed problem?'* [16, p. 563].

These qualitative differences between students with high and low grades points to a number of ways to support students in their framing process and enable them to improve their framing ability. Unfortunately, the study from 2015 was rather limited and therefore it was not conclusive but only indicative.

The aim of this research project is to repeat the study from 2016 with a new set of students in order to provide an even larger empirical basis for drawing potential conclusions on the differences between the framing processes of students with high and low grade and to move one step closer to understanding what characterises a successful framing process.

2 METHOD

As in the first study, the empirical data for this study derives from the Industrial Design program at Aalborg University and more specifically a five ECTs course module: *Advanced integrated design: Pre-phase.* The data for the initial study was collected during the course in the autumn of 2015, and the data for this study is from the 2016 course.

The overall aim of the course is to familiarize students with theories, tools and methods required for the early phases of the design and innovation process. The focus of the course is "what to design" and "why". After the course the students were asked to specify both a conceptual product as well as the

reasoning behind the product, including it context-of-use, market, competition etc. The course includes an initial introduction to The Delft Innovation Method [21], Business Model Generation [22], product market positioning, value proposition, and the relation to the client company's brand and market position.

The course includes collaboration with an industry partner. The industry partner gives the students an assignment (typically an open-ended assignment with focus on future products, new markets or application of new technology etc.), and the student act as an external designer.

The course **consists** of 11 lectures, group supervision as well as individual supervision. After the four-week course, the students have to hand-in a conceptual design and the argumentation behind it.

In 2015 the industry partner was a Danish office furniture developer and manufacturer. In 2016 the industry partner was a small Danish company, who develops and manufactures water coolers for particularly schools and other public facilities. Figure 4 shows there is an example of a student's hand-in from 2016, where he developed a water cooler concept for adventure parks and zoos:

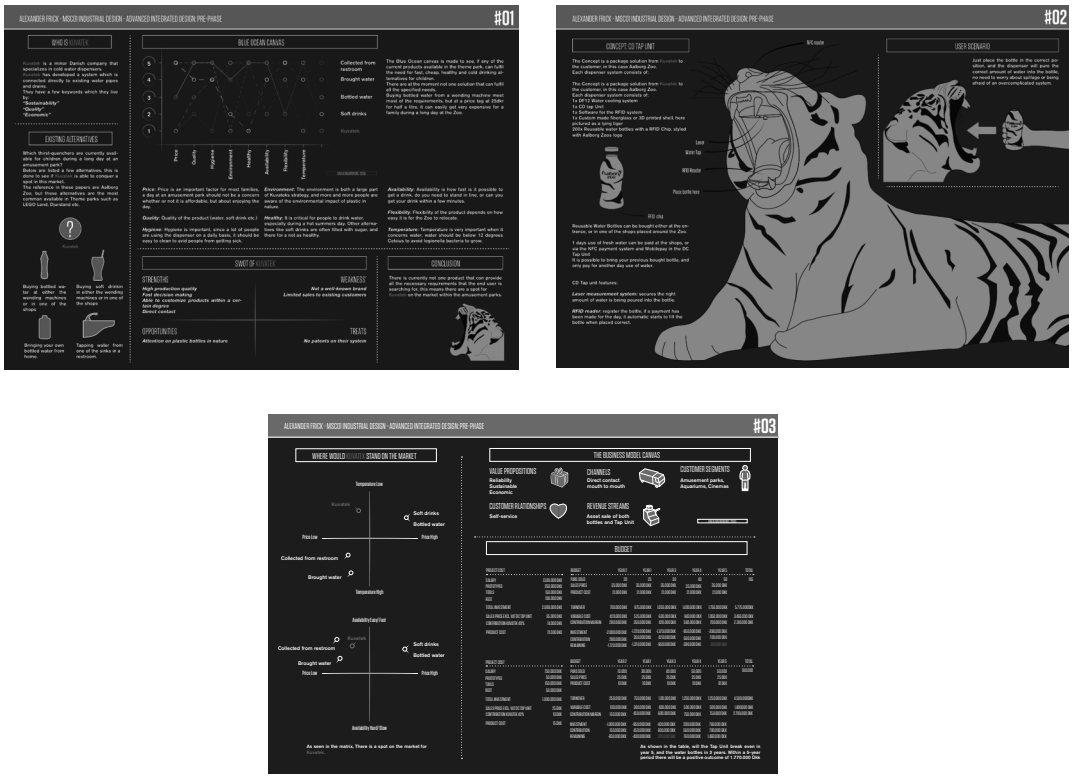

Figure 4. An example of a student hand-in from 2016

In the initial study, 14 of the students, who participated in the course, volunteered to be part of the study. In 2016, 19 students participated. During the courses these students were asked to document their framing process. The students were introduced to the basic framing theory and provided with a 'working-template', which illustrated the framing process. The template included following questions:

1) Name the relevant issues in the design situation *(What are you trying to find out?)*
2) Frame the problem in a certain way *(How do you see/understand the issue/situation? Why?)*
3) Move towards a solution *(What will you do to get to know more about the issue/situation?)*
4) Reflect on those moves and the current frame *(What did you find out? Is the frame still the same?)*

In 2016, the students were furthermore asked to describe the concept's *'aspired values'* and *'working principles'* – (as described in figure 2) three times during the course.

In the initial study, the volunteering students were divided into two different groups. The first group made notations on their framing process every day as a kind of diary (they filled in the template every day), whereas the other group made notation on their framing process every time it seemed meaningful for them to do so. In 2016, the volunteering students were asked to document the framing process every day.

3 FINDINGS AND CONCLUSION

When analyzing the data-set from 2016, it is evident that it supports the findings from 2015. As in the first study, there is a significant difference between how the low-grade students and the high-grade students handle the framing process. The students with high grades frame their projects more meticulously, and they make the frame more and more nuanced over time. They revise the frame frequently and in their research they aim at finding a focus to zoom in on. They document both what they know and what they do not know, and they ask critical questions throughout the process. This is in contrast to the low-grade students, whose project framings remain overall and are not revised often. Moreover, the low-grade students focus on covering as much 'territory' as possible in their design research, and they only document what they find. And, finally, their reflections are often in the form of a summary.

Apart from the findings that support the previous study, the new study also shows that the students with high grades are more explorative, when it comes to defining the *'aspired values'* and *'working principles'* in the project. They make suggestions several times during the process, work with the formulation of these and question whether their present *'aspired values'* and *'working principles'* are the right ones. In comparison, the students with low grades either choose not to describe the *'aspired value'* or *'working principle'* or they choose to describe them with just one or two words.

In general, the findings of this second study clearly support of the findings of the first study. This means that we are one step closer to understanding what characterizes a successful framing process – at least in regards to how formulate and revise the frame, how to approach the design research process and how to document and reflect on the present frame.

In an educational perspective, these insights make it possible to provide better guidelines for the students in a supervision situation. For instance when the students are formulating their frames, we as supervisors can encourage them to make them as specific as possible rather that accepting a very overall formulation that we know will be of less benefit to them. We can also ask students formulate the framing on paper and discuss their progress with them on a regular basis in order to encourage revisions and further nuancing. Similarly, we can help students plan their design research in a number of focused iterations with valuable reflections rather than a very broad and overall process. And finally, we can ask the students to reflect on what they know, what they do not know and what they feel unsure about.

In general the two studies also point to several new research projects on defining and characterizing the successful framing process. First of all, it could be interesting to develop the identified characteristics of a successful framing process into a tool or method that could help or guide design students during the framing process and find out whether this could improve the framing process in general. Furthermore, there is the possibility to follow up on the very few studies that focus on characterizing the successful framing process. In particular it would be interesting to explore the other aspects of the framing process i.e. how or why high grade and low grade students deal differently with the conceptual development that is an essential part of the framing process and the progression in this compared to the progression in the framing. Furthermore, it would be interesting to take the present research out of the educational context and see how expert designers perform and act on the different parameters like formulation of the frame, research strategy etc. compared to the students.

And finally, there is the possibility to explore the framing process in a team setup, as this clearly opens into a larger complexity both in respect to management, shared understanding and documentation – not to mention the extra challenges that come with interdisciplinary teams.

REFERENCES

[1] D. A. Schön, "Problems, frames and perspectives on designing," *Des. Stud.*, vol. 5, no. 3, pp. 132–136, 1984.

[2] D. A. Schön, *The reflective practitioner*. Basis Books, 1983.

[3] D. A. Schön and M. Rein, *Frame Refelctions*. New York: Basic Books, 1994.

[4] R. Valkenburg and K. Dorst, "The reflective practice of design teams," *Des. Stud.*, vol. 19, no. 3, pp. 249–271, 1998.

[5] R. C. Valkenburg, "Shared understanding as a condition for team design," *Autom. Constr.*, vol. 7, pp. 111–121, 1998.

[6] H. Christiaan, "Creativity in Design," TU Delft, 1992.

[7] J. H. G. Hey, C. K. Joyce, and S. L. Beckman, "Framing innovation: negotiating shared frames

during early design phases," *J. Des. Res.*, vol. 6, p. 79, 2007.
[8] R. Valkenburg, "The reflective practice in product design teams," TU Delft, 2000.
[9] K. E. Weick, *Making sense of the organization*. Malden: Blackwell Publishing Ltd., 2001.
[10] L. L. Bucciarelli, "An ethnographic perspective on engineering design," *Des. Stud.*, vol. 9, no. 3, pp. 159–168, 1988.
[11] K. Dorst, "The core of 'design thinking' and its application," *Des. Stud.*, vol. 32, no. 6, pp. 521–532, 2011.
[12] A. Simmons, *The Story Factor: Secrets of Influence From the Art of Storytelling*. Basic Books, 2006.
[13] J. S. Bruner, *Acts of meaning*. Cambridge: Harvard University Press, 1990.
[14] G. Lakoff and M. Johnson, *Metaphors we live by*. Chicago: University of Chicago Press, 1980.
[15] L. Darsø, *Innovation in the making*. Copenhagen: Samfundslitteratur, 2001.
[16] D. Schon, *Frame Reflection: Toward The Resolution Of Intractrable Policy Controversies*. 1995.
[17] D. A. Schön, "Designing: Rules, types and words," *Des. Stud.*, vol. 9, no. 3, pp. 181–190, 1988.
[18] J. Kolko, "Sensemaking and Framing: A Theoretical Reflection on Perspective in Design Synthesis," *2010 Des. Res. Soc. Conf.*, pp. 1–9, 2010.
[19] K. Dorst, *Framing Innovation*. Cambridge, Massachusetts: The MIT Press, 2015.
[20] L. Møller and P. K. Hansen, "Making Students' Frames Explicit," in *DS 83: Proceedings of the 18th International Conference on Engineering and Product Design Education (E&PDE16), Design Education: Collaboration and Cross-Disciplinarity, Aalborg, Denmark, 8th-9th September*, 2016.
[21] J. Buijs, *The Delft Innovation Method: A Design Thinker's Guide to Innovation*. Eleven International Publishing, 2012.
[22] A. Osterwalder and Y. Pigneur, *Business Model Generation*. 2010.