Paper for the Beyond Oil conference 25.–27. oct. 2017:
Innovative methods and processes for research, learning and governance

Design Thinking, from theory to practice

Associate Professor Linda Lien, Associate Professor Bente Irminger, Cluster Manager DesignArena Torhild Eide Torgersen

Abstract

In Bergen, Norway, a multidisciplinary education in Design Thinking was established in 2015 by the Department of Design at the Faculty of Fine Art, Music and Design (University of Bergen), NHH Norwegian School of Economics and Western Norway University of Applied Sciences. In the program, which is the first of its kind in Norway, designers, economists and engineers collaborate on solving real, complex problems for the industry and the public. Design Thinking is "a practical, human-centered, prototype-driven methodology for innovation that tackles organizational challenges in creative ways."[1] The design-thinking process begins with gaining empathy for the user and ends with the real-world implementation of products, services, processes, experiences and/or systems. In this paper we will describe Design Thinking as a strategy to deal with complexity and social and environmental challenges.

Keywords: Multidiciplinarity, design thinking, empathy, ideation.

The Design Thinking-pilot

Design Thinking: Strategic Design for Innovation (DTBergen) is a 7 month[2], part-time multidisciplinary executive education program in Bergen, owned by Department of Design at the Faculty of Art, Music and Design (University of Bergen)[3], NHH Norwegian School of Economics and Western Norway University of Applied Sciences. The programme is coordinated by the design cluster DesignArena, run by the NGO Design Region Bergen (DRB).[4]

We believe that the ideal way to learn innovation is by *doing* innovation. This is why this program has a strong hands-on, applied, and team-based foundation. It includes workshops and seminars, as well as real-life company design challenges. Thirty students divided into five groups work together for seven months on different cases. Project owners donate a fee, although they are not given guarantees about solutions. Each month the students attend one module, which consists of two to three day-long workshops and seminars given by leading design-thinking scholars and practitioners in Scandinavia. In parallel to these workshops, each multidisciplinary team tackle a company design challenge spanning the entire seven months of the program. The students can directly apply the lessons learned to a real design-thinking project. Each team is assigned a design-thinking coach, who is an alumnus of the program. The team and coach meet each month to drive the company design challenge forward.

---

[1] Definition from http://www.dtbergen.no

[2] The first pilot was 9 months.

[3] Department of Design was part of Bergen Academy of Art and Design (KHiB) until 01/01/2017, when KHiB became part of the University of Bergen.

[4] More about the programme at http://dtbergen.drb.no. Information about DesignArena at http://designarena.no and Design Region Bergen at www.drb.no.

Design Thinking – history and definitions

Design thinking and designerly thinking has been on the agenda for many years. In the article *Design Thinking – past, present and possible futures* (2013) Johansson-Sköldberg, Woodilla and Cetinkaya take a critical look at the design thinking discourse, and gives a brief overview of the history and development of design thinking. They link the roots back to the influential American scientist Herbert Simon, which already in 1969 wrote about design and designerly thinking in his book *Creation of Artefacts*.

Design thinking is a concept used both in theory and practice, and can be divided into two main discourses: The designerly and the management discourse of design thinking.

There exists several definitions of design thinking. Tim Brown describes in *Change by design* (2009) design thinking as the collaborative process by which the designer's sensibilities and methods are employed to match people's needs with what is technically feasible and a viable business strategy: It's a human-centered approach to problem-solving that helps people and organizations become more innovative and creative.

In Design Thinking Bergen we define design thinking as "a practical, human-centered, prototype-driven methodology for innovation that tackles organizational challenges in creative ways."[5] The design-thinking process begins with gaining empathy for the user and ends with the real-world implementation of products, services, processes, experiences and/or systems. The process in our education is divided into five phases; empathy, define, ideate, prototype and test.[6] Despite first impressions, this process is iterative and non-linear. Design thinkers learn to swiftly move forwards and backwards in the process by embracing high-levels of ambiguity and uncertainty.

As early as in the 70's, the Nordic countries were using processes which can be compared to Design Thinking. The director at the Danish Design Center, Christian Bason, writes in a blog post in Mandag Morgen that the Nordic countries were the first to work systematically with participatory design; design processes where the customers, users, employees and partners are involved in the project development. Bason states that the Danish and Nordic ability to design together with users and to reflect their needs in innovative products, services and systems was quickly discovered by the Americans (Bason, 2016).[7] The global design company IDEO has implemented clear elements of participatory design or as they call it, human centered design, and concepts of co-design, design thinking and service design are triumphing around the world.[8]

Design Thinking can also be related to Urban Living Labs (ULL). ULL is a forum for the research and innovation of new solutions, where there are close links between the public sector, private sector, citizens/voluntary sector and research/academia[9].

ULL is being used increasingly by cities, helping to draw new actors and new perspectives into the development process, and as a form of open innovation, characteristics by utilizing new and creative forms of cooperation that integrate different actors throughout the process as users and co-workers. Explores, searches, experiments, tests and evaluates new ideas, scenarios, processes, systems, concepts and creative solutions in complex and realistic contexts (Hvitsand and Richards, 2017).

In Design Thinking ideation and vizualisation play an important role, and the process is divided into clear phases, like empathy, define, ideate, prototype and test.

The DTBergen program started out with a prototype April 2015 to February 2016. The second prototype is running from November 2016 to June 2017. The students are asked to evaluate after each module, giving us a good foundation for our own evaluation and further development. The evaluation takes form as questionnaire

---

[5] Definition from http://www.dtbergen.no

[6] The process is based on d.schools process. D´school is a hub for innovators at Institute of Design, Stanford University, USA: http://dschool.stanford.edu

[7] http://danskdesigncenter.dk/da/nyheder/vi-skal-genfinde-nordens-design-dna Published 12/01/2016.

[8] In 2009 IDEOs´ launched the Human-Centered Design Toolkit, which was the first-of-its-kind book that laid out how and why human-centered design can impact the social sector. Over 150.000 copies of the book / kit has since then been bought or downloaded. See https://www.ideo.com/post/design-kit Last update 2017.

[9] https://doga.no/globalassets/dokumenter/rapport-urban-living-labs-.pdf

which also allows for comments. In the following, we present our main takeaways from the first prototype, and the alterations we have made for the second.

Team dynamics

Design Thinking is a creative process, demanding enthusiasm and energy. Working in multidisciplinary teams is challenging, and the potential for conflict is high. During the first prototype some of the groups struggled a lot with conflict and tension, affecting the result of their work. Dealing with frustration and group tension is part of the DT process, and it is important that the students experience it. However, for the second prototype, the students have been given more time and tools to handle their own process, and also have alumnis from the first prototype coaching them along the way. This seems to be helping, although team dynamics and figuring out how to deal with the cultural and personal differences within the groups is still one of the trickiest things we deal with. To quote some feedback from the current students, on this topic: "I knew it would be challenging, but I never imagined it would be *this* challenging!"

The presence of design as a profession

During the first prototype, the *design process* was important and emphasized, but the skills and contributions of the *design profession* in itself, and the role of the designer, was lacking. For the second prototype, the Department of Design has contributed with substantial teaching both in the design profession, as well as the design process, which significantly strengthens the program. Design Thinking has been criticized for devaluing design by letting non-professionals use design methods. Design Thinking is an interdisciplinary process, where respect for each other's unique skills is fundamental, as well as openness to working closely together. The experience in Bergen is that the designer's ability to visualize and their training in thinking `out of the box` is unique, and that participants gain greater respect for each other's disciplines after completing the course. This also means that a Design Thinking process without a designer might not be very effective.

Iterations

In the first prototype, the students went through the design thinking process once, spending each module focusing on one step of the process, doing practical work in between the modules. In the end, they presented a prototype as the result of their work. An important part of the DT-process is testing solutions over and over again in a constant loop of design-build-test-design-build-test etc. In the second prototype, we are trying to achieve several iterations, by getting the students quickly and more superficially through the entire DT-process during the first two modules, spending time in the remaining modules on digging deeper and doing more iterations. So far this seems promising.

Participation and work load

One of the biggest challenges in the execution of the first prototype was getting all the students to dedicate enough time and effort to the practical work. Lacking contribution from group members was a constant source of conflict within the groups. For the second prototype the communication clearly stated the expected amount of work and dedication, both in the information provided during the recruitment stage, and also when the students were offered their spots. However free riders and lacking efforts still seems to be a source of conflict among the groups. Free riding is well known as one of three main reasons for why group work is not always a success (Schei and Sverdrup, 2011).[10] In pilot 2 we are experimenting with peer evaluation, to see if this can increase the participation and involvement.

Dedication from the case owners

All the students in the first pilot had the opportunity to offer a practical case free of charge, of which five were chosen. We didn't follow up on the dedication within the case provider's organizations specifically. For several of the groups this resulted in a lacking interest and priority from the case providers, which again caused frustration. For the second prototype, getting a practical case on the program demands a 100.000 NOK (app. 11,100 Euros) donation, and a confirmation of top management priority, in addition to having a dedicated student from the organization following the program and the company's challenge.

Institutional ownership

The dedication and involvement from the different partner institutions in executing and planning the first prototype was varying, leading to the hire of external teachers in situations where one might well have used internal resources. A higher degree of internal expertise used in the second prototype, secures a stronger and wider involvement within the institutions, and makes it easier to think holistically and to link modules together.

---

[10] https://www.magma.no/nar-kreative-team-mangler-kreativitet Published 6/2011.

When it comes to securing the future and further development of the program, it is also of great importance that it is thoroughly anchored within each partner institution.

The neutral process facilitator

Koria, Salimäki and Karjalainen (2011, p. 23) suggested that "multidisciplinary teams more often fail than succeed in achieving excellence. (...) just bringing different professionals together is not enough; one has to know how to train and manage the teams."[11] In the process of developing DTBergen, the different academic institutions were themselves a multidisciplinary team with very different professional backgrounds.

Having DRB present as the neutral process facilitator, was and still is crucial to the success of the program. Through the facilitator, we have secured that no profession has been preferred to the others in the development. To succeed as a neutral facilitator, our experience suggests that the most important factors are: i) respect and honor each profession without any bias, and make sure that this is also what the different partners perceive ii) establish trust, openness and respect within the group iii) establish a common vision iv) constantly calibrate and clarify expectations between the partners, and steer them towards the common goal.

When working in a multidisciplinary environment, disagreements, uncertainty, fear and protectionism must be expected. A facilitator that acts in a neutral fashion with no hidden agenda, and is also perceived to be doing that, is in a much better position to ask questions and look for solutions when the different partners fall out. To achieve all this, we believe that having a professionally trained process facilitator is important. For the DTBergen development process, DRB provided a Kaospilot[12] with substantial training within the field of process facilitation.

Rapid prototyping

The Design Thinking process suggests that one should prototype solutions as quickly as possible to learn from them – *fail early to succeed sooner* (Brown, 2009) Working with a big vision and several very different parties, could mean a lot of planning and bureaucracy, and constant postponing of the launch. The empathy phase happened early, and involved potential students (i.e. the market) through interviews, focus groups and advisory board. This gave us important feedback and helped us in the development.

The decision to go ahead and launch the program as a prototype, has been an important contributor to the program's success. In this phase both skepticism and fear was present within several of the partner institutions, and it was very important that DRB - together with certain key supporters in each of the partner institutions pushed for launching a prototype even though everything was not ready. The prototype gave us important learning that we could only get through practice, and it also helped us speed up the process of getting the academic institutions fully involved; the prototype proved the interest in the market and clearly showed the potential in such a multidisciplinary program. As a result, it became clearer to the different partners what their contributions could and should be for future cohorts.

Multidisciplinarity

Another important success factor is the multidisciplinarity present both in the partners offering the program (three different institutions) *and* the students. A DT-program at any one school, is in danger of becoming biased towards the preferred subject; "business design thinking", "design design thinking" or "technology design thinking". A collaboration between different partners with different backgrounds is important to achieve true multidisciplinarity. We also strive to have truly multidisciplinary teaching, in the sense that we constantly combine different perspectives in the modules; i.e. an engineering professor and a design professor, or a business professor and an engineering professor teaching the same subject. Multidisciplinarity is also true for the students – in order to capture the full potential of the DT-process, the group needs to be multidisciplinary, which we secure during the acceptance phase of the students. At the first prototype of DT Bergen we had ⅓ designers, ⅓ engineers and ⅓ business people, as well as ½ women, ½ men, making the group truly diverse.

From our experience with DTBergen, it is very clear that the role of the designer within the groups is an important one. The design thinking process can be learnt and executed well by people of different professions, however the designer provides a natural skill for creative exploration, searching for several answers and postponing realism, where the analytical fields crave definite answers.

---

[11] http://idbm.aalto.fi/pdf/IDBM_papers_vol1.pdf (published 2011).

[12] Se more at http://www.kaospilot.dk/about/story/

The designer's ability to visualize what does not yet exist, and to visualize thoughts, plans and processes helps the teams create a common language, assures them that they are in fact talking about the same things and helps them explore different solutions through sketching. The students of DTBergen have also reported back that the designers' natural talent for empathy and curiosity was very important during the empathy phase. It seemed like the engineers in particular had a hard time asking the 'stupid' questions, whereas the designers were naturally curious, and thus got people talking very easily[13]. Another important skill that the designers bring to the table, is the ability to 'translate' all the insight from the process into visually aesthetic solutions that people truly want. In our work, we constantly stress that design is more than form, colour and decorations, however when it comes to creating products and services that people love, these are very important, and should not be underestimated.

Conclusion

In this paper we have been discussing the experiences of a multidisciplinary education in Design Thinking established in Bergen in 2015 by the Department of Design at the Faculty of Fine Art, Design and Music (University of Bergen), NHH Norwegian School of Economics and Western Norway University of Applied Sciences. The first prototype showed how challenging multidisciplinary teamwork is, and in the second prototype we have spent more time on working systematically with building strong teams with an identity (by workshops and developing tools). Still team dynamics and figuring out how to deal with the cultural and personal differences within the groups is one of the biggest challenges. People tend to jump straight to discussing the case, instead of paying attention to designing a good team.

The experience from the first prototype also lead to a more clarified role of the designer. The design thinking process can be learnt and executed by people of different professions, however the designer provides a natural skill for creative exploration, and can visualize what does not yet exist, as well as visualize thoughts, plans and processes. The students of DTBergen have reported back that the designers' natural talent for empathy and curiosity has been important.

For the second prototype, getting a practical case accepted as a team challenge demanded a fee, as well as confirmation of top management priority, in addition to having a dedicated student from the organization following the program and the company's challenge. This brings important ownership into the process.

The anchoring of the program within the different partner institutions has been varying. If you are able to use internal expertise instead of outsourcing teaching assignments, the anchoring of the program becomes stronger within larger parts of the institutions, which might make holistic thinking and the linking of modules easier.

In the first pilot, the students went through the design thinking process once, and in the end, they presented a prototype as the result of their work. In the second course, we are trying to achieve several iterations, by getting the students quickly and more superficially through the entire DT-process during the first two modules, spending time in the remaining modules testing solutions over and over again in a constant loop of design-build-test-design-build-test etc. This makes it possible to dig deeper and do more iterations. So far this seems promising.

The main success factor, however seems to be the use of the neutral facilitator; a facilitator that bridge the cultural gap between designers, economists and engineers.

References
Bason, Jason (2016). *Vi skal genfinde Nordens design-dna*. Mandag Morgen 04/01/16 and Dansk Design Center 12/01/2016.

Bason, Jason (2014). *Dilemmafylt design*. Mandag Morgen 07/11/14.

Brown, Tim (2009). *Change by design. How design thinking transforms organizations and inspires innovation*. Harper Collins Publishers. New York.

Hvitsand, Christine and Benjamin Richards (2017): *Urban Living Lab: Bruk av metoden i Norge og med eksempler fra Europa*. TF-rapport nr: 393. ISBN: 978-82-336-0033-4 ISSN: 1501-9918

---

[13] It should however be clear that not all designers automatically possess these qualities, and that personalities play an important part.

Karjalainen, Toni-Matti and Mikko Koria, Markku Salimäki (ed.) (2011). IDBM papers vol 1. Pentagon Design Published by IDBM Program,Printed by DMP, Aalto University, Helsinki.

Johansson-Sköldberg, Ulla, Jill Woodilla and Mehves Cetinkaya *(*2013). *Design thinking: Past, Present and Possible Futures.* Creativity and Innovation Management. Volume 22, Issue 2, pages 121–146, June 2013

Schei, Vidar og Therese E. Sverdrup (2011). *Når kreative team mangler kreativitet*. Magma 6/2011: 67-72. https://www.magma.no/nar-kreative-team-mangler-kreativitet

Simon, Herbert (1969). *Creation of the artefacts.* MIT press

Verweij, Lucas (2016). *Why are designers whining about design thinking*? Dezeeen 24/05/2016.