

DEMYSTIFYING INNOVATION AND DESIGN – THE IMPORTANCE OF VISUALISATION IN IDEATION AND CONCEPTUAL DESIGN

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1. Background

Economic growth and future jobs depend on how industry is able to generate new ideas and develop and turn them into competitive and sustainable products and services. Growing competitive pressure has mounted as a result of globalisation. It does more than offer opportunities for new products: it also forces companies to continuously improve to maintain their competitive edge. It is therefore well-accepted that the mass production paradigm, based on high volumes and standardised products, needs to be replaced by a more flexible and responsive approach, based upon the ability to change and develop products and operations to suit new demands.

The ability to quickly turn ideas into successful products and competitive production systems requires skills for both radical innovations and continuous improvements. Repeatedly innovative companies outperform their peers in terms of growth and financial performance [Tidd and Bessant 1997/2009]. Thus, the industrial challenge is no longer primarily to take innovative ideas to the market in a successful manner; rather, it is to incorporate and manage innovation in the development of products and processes in a conscious, controlled, and cost effective way.

Sawhney et. al. argue that many companies often see innovation as synonymous with new product development or traditional research and development and nothing more [Sawhney et al. 2006]. Industry thus tends to pursue the same customers with similar offerings, using undifferentiated capabilities and processes. Also, experience from industry indicates sharp internal differences in innovation maturity between individuals, positions and different work areas in industry (illustrated in Figure 1).

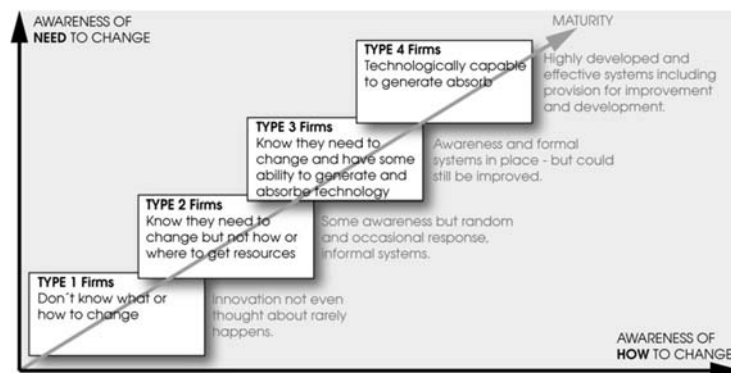


Figure 1. Firms and innovation capability [modified from Tidd and Bessant 2009]

There is a need to support and strengthen innovative development work in industry carried out in a number of different ways, including innovation in business models, products, services, processes, and channels for maintaining or capturing markets, and the reduction of costs or prices through greater efficiencies. In order to strengthen innovative development, it is important to integrate different disciplines as e.g. engineering, creativity/ideation, and communication into the development processes. This is well-known.

Using design to inspire and drive innovation is becoming a growing area of interest [Utterback et al. 2006]. Design can be described in two distinct ways – by reference to the process of design or to the product that has been designed. The former method can be called designing, and is often described as an iterative process in which need, or problem, is understood as the solution that is generated and evaluated [Clarkson and Eckert 2005]. Design is a goal- and action-oriented activity, with professional tools to visualise our thoughts and our creativity into something useful, sometimes elegant and to perhaps tell us a message as well. For products realised today, good function, form and aesthetic appearance do not suffice. The product must also emphasise simplicity and economy of means and low impact and tell us a message we can identify with. The product could be a car, a piece of furniture, spectacles or a wheelchair.

Design is based on an understanding of the users' needs, which includes the product's message (what story the product tells) and the deeper wishes, values and emotions of the customers. The design of the product, as well as design thinking, is very much dependent on the ability to visualise possible future scenarios. This includes multi-dimensional thinking in complex situations in order to create solutions by combining information from diverse areas.

Design thinking derives from a “designerly way of knowing” [Cross 1982]. Design thinking is a human-centred approach to innovation. It includes understanding people's desires and looking and listening to them in order to fully understand their needs. This empathic interest in people also contributes to the inspiration of finding ideas about the area studied. Thinking like a designer can transform the way organisations develop products, services, processes, and strategy. Design thinking actually allows people not trained as designers to use creative tools to solve a vast range of challenges. In addition, this generative approach toward understanding people's needs while interpreting the research made leads the disruption of current conventions and the revealing of new ways of framing opportunities. Understanding the activity and behaviour designers employ when designing, as well as design thinking, has been studied for more than 50 years. One theory that explains design professionals and how their work is done can be found in the work of Schön. He discusses the reflective practice, which focuses on how design professionals think in action [Schön 1983]. This work provides insight into how the role of the designers, the design task, and the design process are integrated. This will be further described in Section 2.

Based on the above introduction, the objective of this paper is to discuss and analyse how design and design thinking contributes to the incorporation and management of innovation in development work. Specifically, the question is how design and design thinking can contribute to an innovative development process in a conscious, controlled, and cost effective way. The subject will be reviewed from a theoretical and a practical point of view. In order to analyse and build an understanding of the design thinking phenomenon in practice, the paper will analyse a case study based on interviews at IDEO, a company successful in its work with innovative development using design thinking.

2. A theoretical review of innovative development and design

The development process of products and processes is not straight forward. The paradox is how to decide on the whole process (without knowing the parts), while the parts in turn depend on decisions regarding the whole. This challenge is often described as being met by a constant iteration between the whole process and the parts. Yet how is this solved in a large organisation, designing complex technical systems? The use of work structures, explicit processes, and efficient tools is often emphasised.

Several researchers have concluded and specified success factors for efficient and effective product realisation. Balanchandra and Friar have made an extensive survey and mapped success factors in

product development literature [Balachandra and Friar 1997]. Categories such as market, technology, environment, and organisation are often found to impact the success of product development. Jackson, Ekman et al. have also listed success factors for an innovative development process, concluded from theory and practice [Jackson et al. 2009]. Their list includes the following:

1. The use of tools for interpretation and visualisation - Successful external cognitive tools compensate for limitations in human memory and information processing at the same time as they take advantage of them. Creativity is enhanced by allowing designers to interpret sketches. Designers view this as interacting with the sketches, like a conversation. They see more in their sketches than they were aware of including when they drew them, and these insights drive further designing.
2. Having an end user perspective and focus - The end user should be incorporated in the development work. This means that ethnographical studies of customers, for example, are important. It is important to understand the market, the client, the technology, and the perceived constraints on the problem.
3. Having a holistic view of the product - When they are included in a project from the early stages, designers always have a holistic view of the product and its use. This is a characteristic of 'the industrial-, product- and information designer's soul'. It differs from that of the engineering designers', who focus more on the technical components and functions of the product.
4. Focusing on creativity - Creativity is one of the fundamental sources of innovation and entrepreneurship. It is also necessary when implementing an innovation, in order for that innovation to be successful in reality. Creativity and innovation are more connected to divergent thinking, which is characterised by intuition, curiosity and uncertainty.
5. Using opportunity-finding methodologies and mindsets - Having an opportunity mindset and not focusing solely on problem solving are what characterise the innovation discipline and practice. Opportunities open up for creating something new, not simply more of the same.
6. Effective communication and networking - All kinds of communication have to be effective and efficient.
7. Using enabling technologies to support development work - Enabling technologies are one of the bases for product development and innovation. Technological breakthroughs will reach the stage of dominant design, where more and more companies work more and more competitively within the same product range. Enabling technologies include technologies connected to the product design, as well as technologies necessary for development. Tools and methods for analysis and evaluation are also important.
8. Using problem-solving methodologies and mindsets - Product realisation is based on the development and design of new products that often originate from problem solving. Based on existing needs and requirements, the ultimate goal is to arrive at an economically produced product and introduce it quickly. Problem solving is initiated by working through a chain of decisions by first establishing clear objectives of the product, then identifying the target market segment and, finally, trying to systematically determine the customers' wants or needs.
9. Having a structured product development process - The design process is a model for the application of the design in product development. It is part of the company's entire development process, and is used to achieve successful, creative results through the medium of design skills and know-how. The design process can be applied to many different areas and projects that concern processes, messages, goods, services, production, or environments.

The above list are examples of success factors in innovative product realisation work. One question is how these factors are related and connected to design and design thinking. What is the relationship between the factors and the reflective practice within design?

Schön developed the theory of the "reflective practitioner". In doing so, he used reflections and learning processes to define the professional practice of design [Schön 1983]. This new theory provided insight into how professionals think about doing something while actually doing it. Schön describes this as "reflection-in-action", which is based on the experience of surprise (Figure 2). Within designing, this can be exemplified by the conversation the designer has with the sketch. In this

conversation, time is an important factor. The time factor in the conversation with the situation, the situation being the phenomena studied at that specific moment. This is what Schön refers to as the “action-present” zone of time. Although this zone can be extremely short, it can also stretch over minutes, hours, days or even weeks or months. Action within design can be transferred into the field of innovation making. Schön describes design as a reflective conversation with the situation. In it, the designer “shapes the situation in accordance with his initial appreciation of it, the situation talks back, and he responds to the situation’s back-talk” [Schön 1983, page 79]. Another way of understanding this could be as a type of "reframing" of the problem space justified by the discovery made in the conversation with the situation.

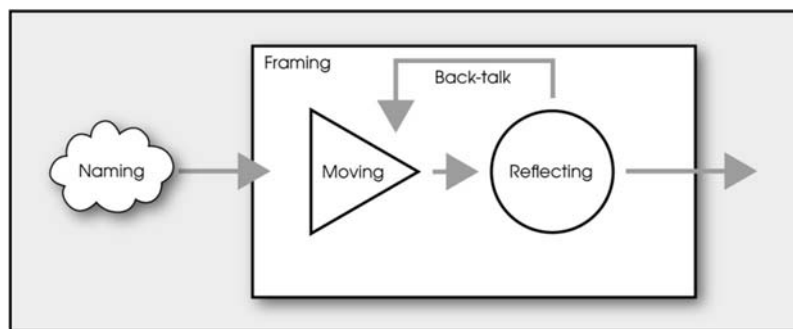


Figure 2. The reflective practice, from [Schön 1983]

When analysing the success factors described at the beginning of this chapter, using the theories of Schön, it is possible to see clear relationships between the factors and the reflective practice in design. They are as follows:

- Factors 1 and 6-9 can be related to the wide frame and process of "reflection-in-action", as Schön describes it in Figure 2. The use of tools for interpretation and visualisation such as sketches, are an important tool for designers. It is also central in Schön's explanation of how professionals interact with the situation at hand. Being visual also opens up for comments from others, if the action-present time frame is longer. Thus, visualisation is actually an enabling technology supporting development work. Also, using problem solving methodologies and mindsets is related to a chain of decisions described which involves reflection-in/on-action, the focus for problem solving is in the "naming" and "framing" phases where the objectives and goal of the project are identified. The design process is a conceptualisation of the designerly ways of knowing and doing. However, although the process is often described in a linear way (in order to be communicative), it is in fact more of an iterative process of "moving" and "reflecting" and testing the ideas towards the "naming" and "framing".
- Factors 2 and 3 are related to "naming" and "framing", with a focus on understanding the phenomena and describing the core of interest and key questions regarding the design challenge. When understanding the interaction between the phenomena and the user in question, the designer needs to understand what the relevant questions are for the people involved. This is one of the activities in "naming". When "framing" the area of interest, the designers need to describe the core of the project and what the relevant questions are with regards to the phenomena. This is very dependent on having an end user perspective and focus, as well as having a holistic view of the product.
- Factors 4-6 can be explained using the "moving" and "reflecting" part of "the reflective practice". Creativity is needed when the designer makes his or her "moves" toward a solution or creates an idea of the solution. These "moves" often trigger an intuitive response to the situation that demands creativity. Using opportunity-finding methodologies and mindsets is central when making "moves" toward a solution. The act of surprise is central, and the difficulty lies in being able to relate to these surprises and create new knowledge from them. An external representation can carry multiple interpretations of understanding, in terms of creating a common mental image in the project. Communicating this mental image, by

”moving” and ”reflecting” between different parts in a development process is difficult. It demands a dialogue that does not flinch at analogies and metaphors and that the receiver interprets from his or her experiences.

In summary, the analysis of success factors for innovative development, and the relationship to reflective practice, shows the relevance of analysing how design and design thinking can contribute to a structured innovative development process. Some reflections on this is how the design thinking phenomenon works in practice. How does one handle the complex situation of being successful in design and innovation, and how does a successful innovation company actually do it. Further, how are new ideas generated, and what part does design thinking play. This paper will further examine how the company IDEO works, comparing this with the above success factors and Schön’s paradigm of the reflective practice.

3. Method

The empirical research presented in this paper has been conducted through qualitative investigative methods in order to analyse how design and design thinking is used and integrated in innovative development work in practice. A case study has been performed at IDEO in accordance with the guidelines identified by Yin [Yin 1994, 2009]. The case study was started with an initial literature study where theory related to innovation and design was reviewed. The later study at IDEO was done in an explorative manner, with the purpose of analysing how companies do innovative development work.

IDEO, one of the leading design and innovation firms in the world, has become successful through the systematic use of tools and methods that stimulate creativity, new ideas, and diversity. This brings innovation to the very heart of the organisation. IDEO has been included in Fast Company’s list of the top 25 most innovative companies, has been ranked as one of the most innovative companies in the world by Boston Consulting Group, and has won more IDEA awards than any other design firm. These merits justify choosing IDEO when seeking to understand how companies work to create new innovations through the use of design thinking, the approach IDEO uses.

The case study at IDEO was conducted in 2010 and 2011 and involved interviews and visits in Palo Alto, California, as well as Boston. The specific goal of the study was to analyse IDEO’s development process and, specifically, how such an innovative culture has been built which has generated many different innovative products using design and creativity.

Looking at the best practice of a design and innovation firm (IDEO), the goal of the case study has been to understand the integrated activities and approaches as regards how design and design thinking leads to innovative development. The following questions were posed:

- Why is IDEO successful in generating new concepts and products?
The first question is an open question with subjective answers. Still, it is interesting to explore how those responding view the company and whether any specific success factors are mentioned.
- How does IDEO’s design process look like, and what are the formal steps and decision points?
This question was initially posed based on the notion that there is a need for an explicit and normative process for managing development and innovation.
- Are any specific tools used to help the creation of new ideas?
In this question, we search for specific tools supporting and helping the process. The idea is to learn and explore work practice through the actual work of generating ideas and concepts.

Data collection was based on a theoretical review and interviews performed at IDEO on two different occasions. The total amount of interviews was nine, and the interviewees were designers, project managers, behaviour scientists, marketers and engineers. The theoretical review focused on two areas: the challenges in innovative development work and the success factors of development work.

The analysis of the interviews was done by comparing the factors from the literature with the typical approach IDEO employs (from Section 4.1). This resulted in what we refer to as “key domains” (presented in Section 4.2), domains of importance in order to be successful. The continued analysis was to make sense of the “key domains” in relation to the way the IDEO design teams work. In this analysis, we used Schön [Schön 1983], as was discussed in Section 2. The analysis included mapping

the different competencies with the different medias they use in order to perform the “reflection-in-action” process central to how professionals work. This analysis resulted in a model for understanding the process from different perspectives (Figure 4) and, in so doing, making sense of successfully creating innovation and design.

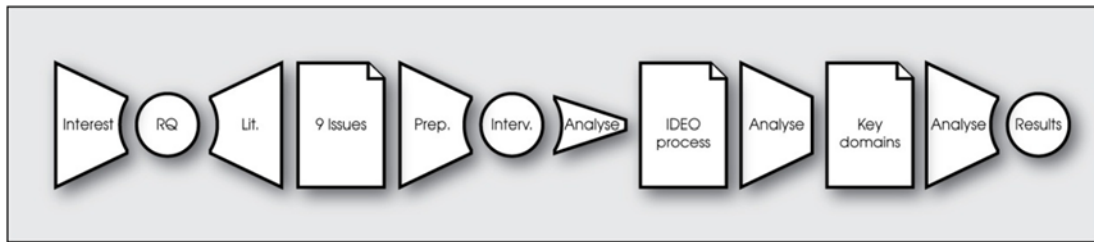


Figure 3. The research study

Yin identifies four criteria for judging the quality of case study research: Construct Validity, Internal Validity, External Validity and Reliability [Yin 1994]. The research for this paper is exploratory and a first phase towards a method that will be further validated. The external validity here (in other words, the possibility to generalise outside the specifics of the studied cases) is not obvious. The reliability is also obviously not verified at this point. However, these four aspects of validity and reliability are important aspects when considering the total research setup, whereas this research is in its first phase. For example, the case selection is central to spanning the solution space and, in the end, establishing external validity.

4. Results from the IDEO case

The visits to IDEO in Palo Alto and Boston started with a walk around the facilities, an introduction to the people working there, and a short presentation of different projects. After that, a corner of the office was prepared for us to have as our office for working and the interviews. We started with the interviews according to the research questions presented at the end of Section 2. Below is a summary of the answers given to us in the interviews.

4.1 The IDEO way, a presentation of empirical material

Regarding the success of IDEO, the following results can be presented:

- An emphatic way of understanding the human involved with the object to be designed.
- A flat structure of the organisation and the use of multidisciplinary team in the projects.
- The efficient use of methods supporting idea generation in different ways.
- The ability to always use visualisations to communicate within the team and others.

When the answers connected to the second question were synthesised, some difficulty appeared, due to the fact that four processes were visualised in order to explain the different steps and decision points during project execution. The different processes had four to nine steps. The following presentation is a synthesis and an explanation of the steps from the four different processes. The process could therefore be seen more as a framework than a process with three key areas, inspiration, ideation and implementation.

The study shows that inspiration and information gathering is important in design thinking in order to fully understand the context of the observed area, and to gain insight into the problem. You collect information in order to share it within the project team. Storytelling is used, and is important in order to create a common mental image of the area observed. Since the work is focused within human centred design, the aim is to understand humans on multiple levels: social, cultural, cognitive, emotional and physical. This becomes the foundation of the synthesis of the gathered information and the stories told. The stories help provide a framework for creating ideas, as well as making clear what the design problem actually is. Stories also help to scale and frame the design problem, thereby making it easy to formulate a design brief. The stories help navigate ideas through an organisation because of their richness of available intersections for interpretation and openness to feedback. Stories are useful because they are based on specific events, not just general statements. They provide the

design team with concrete details that help them (and us) imagine solutions to particular problems. In this way, IDEO creates a story about a product before it exists.

When ideating, the focus is on creating opportunities based on the need, creating many possibilities through divergent thinking. This ideation aggregates, edits and condenses what we have learned. It enables us to establish a new perspective and identify opportunities for innovation. In this phase, most designer teams work together in a workshop format to translate what they hear from people into frameworks, opportunities, solutions, and prototypes. During ideation, people move from concrete to more abstract thinking in identifying themes and opportunities and then back to concrete thinking, with solutions and prototypes. Build to think is the mantra of ideation. One can see this as a source of learning by making in order to further evolve ideas. The use of prototypes at IDEO speeds up the process and shows strengths and weaknesses explicitly.

Implementing the solution is based on engineering, with a focus on developing, expressing and executing the vision of the project. However, this phase also includes experimenting and navigating ideas and concepts through the organisation. The use of storytelling seems to fulfill the emotional connection needed in order to achieve buy-in and buy-in to the idea. Stories seem to function like glue between people and things. A story also indicates that a journey has started and that this journey does not stop until the new product reaches the market and becomes successful. In this phase, the strong engineering, design and social science capabilities within IDEO works together to create the solution. They also provide help with the path to the market and with a communication strategy for the solution. This process, very much a generic one, is the way IDEO works today. The process has been developed over the past 10 years, and has become more of a mindset than an actual process. The mindset supports the process and gives guidance and structure to the work. However, one needs to always be open for change and to adapt to the situation, as one of the interviewees said. There is a great deal of frustration and ambiguity involved in the process. This springs from the fact that you have no idea what the solution is and sometimes you do not even know the problem.

In coming to the last question about the tools to help creativity and the creation of ideas, one thing strikes us as central in all interviews: the use of visualisation throughout the project. The approach to visualisation becomes extremely clear during the interviews, when seven of nine respondents actually used sketches in order to answer and explain their answers to the questions. As shown above, in the three areas described as the foundation of IDEO's work, visualisation is used in all parts of their approach. As we have discussed earlier, visualisations are central to the reflective practice theory.

IDEO use visualisations to be able to understand the problem and try out the solution, with a focus on and for people. The nature of using visualisations could be explained by some citations from the interviewees: “- it can look bad”, “- I can show you what I mean”, “- I’m telling a story with my sketches” and “- anything that will show you the idea”. They use a shift in the usual mindset: you should not think about what to sketch, but sketch to think.

4.2 Summary of IDEO case – key domains

One of the world's most famous design firms, IDEO has developed an approach to innovation that is based on design thinking and focuses on user experience and the situation of the phenomena to be improved. The approach is based on observations, visualisation, and the modelling of ideas. This approach was something that we did not expect to see. We went there to understand the process. However, according to the interview answers, an explicit and normative process for managing development and innovation does not exist at IDEO (regarding the practical work in projects). However, when communicating the approach, they talk about a process of several steps. But, referring to a quotation from the interviews, “the idea of process does not exist” becomes central regarding the objective of determining how design and design thinking can consciously be used and integrated to improve “innovative” development.

The consultants are highly creative and use visualisation as a method for understanding, creating, and communicating between people in all of the phases of the project. The visualisation is a systematic support throughout the project. The fundamental form of IDEO's success according to the interviews is the use of design thinking as a mindset and the systematic use of visualisation in order to establish

information sharing as well as a communication method in the dialogue with the situation, referring to Schön [Schön 1983].

For the people working at IDEO, designing is like driving a car: you need to do it step by step and be prepared to adapt to the circumstances and the fact that the project constantly changes and evolves. The people at IDEO are, of course, crucial for the success. However, we will in our discussion focus on the explicit media used to communicate and be creative, visualisation. This because IDEO sees visualisation as one of the core activities that is dominant and creates value during the projects. Being visual is a central part of innovation and design at IDEO.

5. Discussion

In this section, we will discuss the way IDEO works in relation to the issues drawn from the literature analysis. We will consider how our observations can be explained by the theory used to analyse the data [Schön 1983]. In addition, we will discuss that the very core of these processes is dependent on the way reflection-in-action takes place at different levels of both abstraction and media used (such as sketches, reasoning, dialogue and experimental models) to understand and develop ideas and concepts. By understanding the process of how the professionals think in action in general, and naming, framing, moving and reflecting specifically, we can bring some clarity to the relationship between innovation and design. While elaborating on the process of innovation and design, we can see patterns occur; through them, we can contribute to the knowledge concerning how companies like IDEO are successful.

When preparing to start a project, IDEO designs a team with the right competencies, “right” in the sense that different competencies support the process and respond to the design challenge. The core team almost always has designers, behavioural scientists, marketers and an engineer involved. This set-up ensures that design starts day one. Although there is a focus on understanding human behaviour, there is also a close connection to the market and an insistence that the solution be technically feasible. Due to the multidisciplinary structure of the team and the way people interact during the projects, a high level of information sharing is crucial to creating a common mental image of the challenge in front of them. In the approach that IDEO employs, this sharing is done by using different kinds of media.

The language of designing, as Schön [Schön 1983] describes it, refers to how drawing and talking are parallel ways of designing. So, if the drawing and talking of a designer creates the language of designing. The language of multidisciplinary designing, in the case of IDEO, goes through several “reflection-in-action” depended on the different competences involved. The behavioural scientist applies his or her reasoning to the subject in order to reflect, the engineer develops models and thought experiments, and the marketer uses dialogues. These different media types are all part of the multidisciplinary designing that IDEO does. So, how can this be part of innovation and designing that leads to success? The answer to this question is not a straight forward. However, looking at the designerly way of working, designers make sketches in order to reflect and create new knowledge, and these sketches are visible and communicative. So, if all people with their different competencies involved in the projects use the language of designers, they would do this in their own way. Behavioural scientists would sketch their reasoning, the engineer would sketch his or her thought experiments, and the marketer sketches their dialogues. In this way, one could say that the methods of designers are applicable to other competencies as well. The visual thinking in designing is transferred and used by the different people involved, and they become designers in their mind and profession.

In seeking to understand and convey what makes IDEO successful, we suggest a multidimensional model of reflection-in-action (Figure 4), based on Schön's reflective practice. The model suggests that the team is seen as “the professional” that reflects upon the moving in the “reflection-in-action”. The model also shows how “reflection-in-action” works in multidisciplinary teams within a design challenge using the same type of media, visualisation.

The language at IDEO becomes visualisation. Through this tongue, they have tools to discuss and share information, thoughts, and ideas. Through the always ongoing sharing of information and the use of visualisation, they make and test new models of the situation. What is more, through that the team creates a common metal image of the situation. This leads to the perception that the individuals

in the team use visualisation as an expression of the different types of media used. For example when “moving” they perform as individuals but see themselves as one professional when “reflecting”. One “professional” possessing a designer mindset and multidisciplinary competencies who uses visualisation as an expression of the types of media used in the different conversations they have within the team.

When using visualisation in a systematic and structured way, like IDEO does, the factors described in Section 2 are handled within the process. To gain a sense of the way IDEO actually uses visualisations in a structured way, one need only look at one of their project rooms. The best rooms available in their offices are project rooms. The walls are covered with post-its, sketches, pictures, renderings and animations concerning the area to discover and develop ideas and stories within. Post-it notes cover a large part of the walls. There are almost only sketches on the post-its, very few words. The reason for this, explained through the interviews, is that when it comes to making a quick and intuitive evaluation of all the ideas on a wall, the ideas that have a story with sketches are easier to hoc-up to and make an emotional connection to then the ones with words. However, the strategy behind visualisation as a language comes from our cognitive behaviour as humans: our visual working memory is dependent on information that is acquired from the visual environment. External cognitive tools, like sketches, maps, charts, or boards with information compensate for limitations in human memory. This has been systematised in the approach IDEO uses.

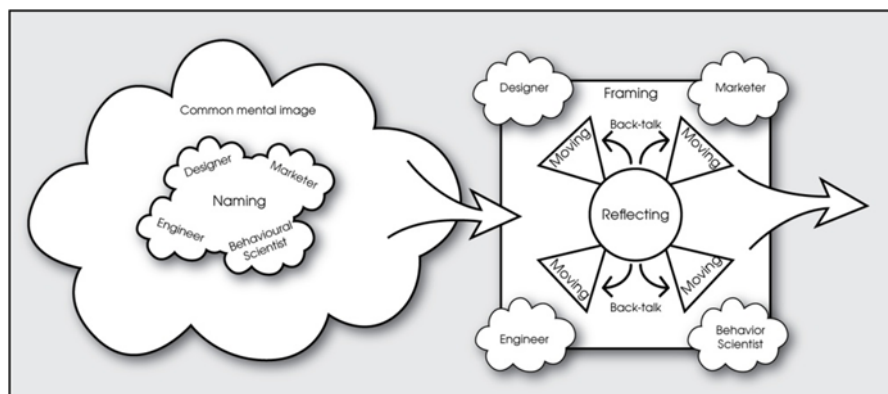


Figure 4. The multidisciplinary team and the reflective practice

6. Conclusion

The objective of this paper was to discuss how design and design thinking can consciously be used and integrated into innovative development work. We also investigated whether there is a need for explicit and normative process for this. In addition, we wondered if there were tools and methods that companies could use that are specifically connected to innovative development.

We have found that a conscious and focused way of working with design and design thinking supports the work of successful innovative development work. However, the people involved in the projects constitute the most important part of this work. They need to be disciplined and eager to learn new things. This requirement leads to an assumption that curiosity is an important characteristic among these people. When coming to the need for an explicit and normative process for managing development and innovation process, the need for explicit and normative processes is vital, in terms of how people hoc up to the approach. It is not vital in terms of a tool for guidance or as a gate-process. One could say that the idea of process does not exist. Despite this, design exists from day one. The tools and methods used are many, and they are commonly used for development work and designing. The important factors here are to be visual in all phases, stay focused on the challenge, and perform with a high degree of accuracy.

It becomes clear that the information sharing takes place in the inspiration and information gathering phase. Every part of the information gathered is transformed to a visual media. For example, observations become storyboards, interviews become mood boards, and research is translated to

“sacrificial concepts” to take out for testing. Everything is done to create a common mental image of the area of interest and to be able to discuss. These insights are seen as fuel for innovation.

The creation of information is fundamental for the ideating phase when recalling information occurs due to the intuitive response to a design situation. Expressing one thought or idea occurs when you extract your ideas from your head and prepare them for communication, in a move toward shared understanding and exploration.

These expressions become experiments when entering the implementation phase. The experiments are tangible and learning objects. Specifications of the solutions become visible and are the motivating force behind the validation of the solution. The communication is supposed to work outside the team, and stories are told in a visual way, either by storyboards, films, or animations. The visualisation of the way of reaching the solution tends to be important when it comes to understanding the choices made and the ownership of the solution.

This speaks for the use of a visual mindset in developing new products, processes, and services. The use of visualisation at IDEO could be described as a defining feature of a company at the very top of its industry.

Finally, in this first paper, some exploratory research has focused on understanding how the use of design and design thinking can contribute to the successful management and practice of innovative development. The overall aim is to develop a methodology for innovative development. However, further research is required in order to validate the results presented here. In such future research, a qualitative study of the work practice of a design team during an entire project, where the researcher could perform either participatory observation or action research, could be one way to create both reliability and validity in the results.

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