The Use of Design Thinking to Enable Human-Centred Innovation within the Organisation

Lorenz Herfurth

Imagination Lancaster, Lancaster University
Lancaster, United Kingdom, lorenz.herfurth@freenet.de

Abstract: Scholars and researchers are currently looking into the ways in which design thinking and design methods serve the organisation in reorienting and changing itself around the needs of the people they serve [1,2,3,4]. However, there are still few examples that allow us to gain insights of how this works in practice.

This paper explores how design thinking can enable and contribute to the process of change implementation throughout the organisation building on insights and lessons learned from a recent project, in which design in the organisation was a core focus.

Key words: Design Management, Design in the Organisation, Product Development, Design Thinking, Human-Centred Design, Innovation.

1. Introduction

Scholars and researchers are currently looking into the ways in which design thinking and design methods serve the organisation in reorienting and changing itself around the needs of the people they serve [1,2,3,4]. However, there are still few examples that allow us to gain insights of how this works in practice.

This paper explores how design thinking can enable and contribute to the process of change implementation throughout the organisation building on insights and lessons learned from a recent project, in which design in the organisation was a core focus.

While cost control and other regulatives are used by many managerial models like the Taylorist scientific management paradigm [5] to reduce uncertainty and to produce the same product more efficiently, innovation is needed today to meet the fast changing demands of markets and users [6]. On the other hand, because innovation is characterised by unpredictable outcomes it is closely related to creativity and hard to control in a classical sense.

The author reviews the historical developments in management and design management to explore the way in which the tasks that managerial roles in the organisation face today share characteristics with the tasks, designers deal with on a daily basis. This part concludes the identification of comparable attributes of design management and models of management.

The second part focuses on the role of human-centred design in this context. This section argues that a human-centred design approach can contribute to the effective implementation of innovation inside and outside the organisation. A human-centred design approach that investigates the individual user's pathway to find opportunities, and issues related to an organisation's products and structures is able to increase the possibility that an organisation can meet users' needs more effectively by identifying potential for improvement [3].

2. Design Management and the Organisation

In the 1960 a management model called "structural analysis" was developed that focused on the structure of an organisation and its relation to the environment [5]. This time is interesting for the transformation of managerial models from a closed structure, a system that was unable to adapt to its environment (I.e. scientific management, human relations) to an open, adaptable structure [5]. Michael Farr [7] wrote the first definition of design management at that time. He delineated design management as a function within an organisation that was restricted to the planning, control, and execution of design tasks like other tasks that were managed within an organisation [7]. By this definition design is regarded as a tool that helps the organisation to develop product and processes and design management is the function that is regulating and controlling this activity to achieve aims effectively and to stay in the organisation's boundaries of assumptions, values, and beliefs. Design is a closed system in itself, appending value to the process of product development and organisational processes. Design can be and is still used this way. It can be very effective in generating solutions that are feasible and suitable. On an imaginary innovation-scale though, the outcomes will possibly remain at an incremental and evolutionary level.

Oakley [8] appended the dimension of different roles and places within an organisational structure to the function of design management. Still, Oakley defines design management as the part of a company that is integrated in the operational tasks and uses design thinking to improve processes, production methods, and the use of material to gain efficiency in what the organisation is already doing. With this structure, attainable change can vary between incremental and radical. Design is still not regarded as a tool to be used on a strategic level to create a vision and enable innovation to change the organisation and its structures fundamentally and to enable it to innovate continuously.

Why should this be achieved one could ask for good reason. Why should design become a part of managerial thinking and organisational behaviour? Is there a need for that or is it just the wish of designers to gain reputation and credit within the organisation? Except for the fact that usually, at least as I can judge from experiences in product design, the innovative multilayered power, and ability of design are used only to a limited amount, changing circumstances in which organisations operate today call for new answers to new, fast changing challenges [6]. Different factors stress the importance of innovation in the organisation, like competition, and the uniqueness of organisational structure as the last part of a company that cannot be copied by competitors as fast as technology or products can [9].

These factors and the fact, that management in the classical sense is not delivering the right answers, made managerial scientists compare the way that designers think to managers [1, 4].

Lately, also designers and design researchers discovered this new product called the organisation that is in desperate need for design [10]. Most likely for effective and revolutionary redesign. And they had to realise, that managers can write very well about design, and help design to understand itself. Still, they are not familiar with the way designers tick. A good example for that is the way how managers try to take design thinking and turn it into a new management paradigm - one best solution by developing behavioural standards and structural models which are influenced by design thinking like the „design shop" firm [6] or the „circular organisation" [4]. In contrast, designers take every problem for new and unique. The quest for designers is to be aware that every problem calls for a unique solution in order to be addressed effectively. This makes change a natural part of every designer's practice.

The problem is regarded as an opportunity to change the world, to create a desired, better reality. Freedom therefore is cherished over control [6, 11].

3. A Human-Centred Design Approach

Regarding different definitions of innovation, discrepancies and similarities become obvious. For example the notion of the new in form of an idea is mentioned as the basis of invention and innovation [12]. While invention is adverted to by some experts as the creation of a new caprice without relevance to business or society, innovation is characterised as the process of making an invention relevant to business or society in form of a new product or process of different kinds [12, 13].

Lastly, innovation requires a new idea in the first place that is created in a creative process. The exploitation and realisation of innovation depend on a structure in which interactions happen - a social context like an organisation ([14], Henry, 1991, cited in [14], p.119). Further, the implementation of a new idea evokes change (an interpretation of the definition to be found in [15]).

A core contribution that design can make to the process of innovation and change in the organisation is the collaboration with the stakeholders of an organisation. Characteristics of design include participation [11], collaboration [6] and pragmatism [4]. By using creative methods to create manifestations of ideas and thoughts, design mediates between strategic and operational thinking. Its solution focused approach [4] can make processes effective and suitable. The close collaboration with the people who are exposed to changes as a result of a development process is a way to make solutions effective by being appropriate to the stakeholders' needs. Participation is a tool to create solutions which are more likely to be accepted because stakeholders can have a say by being involved in the development process.

The belief that design is grounded in human dignity [16] is critical for raising the awareness of responsibilities that are inherent to every process of creating artificial realities i.e. in form of products, organisations or documents. A human-centred approach can make human longings, demands and rights a central part in the organisational process of developing effective and profitable offers. It inherits almost unlimited opportunities for invention, and a large amount of user focused solution propositions as demonstrated by Eric von Hippels "Lead User Studies" [17].

The people are what makes an organisation. They decide whether an offer will succeed or fail or if a structure will help to accomplish its aim. In a way one can probably say, people and their complex and individual differing personalities are the critical mass in an organisations culture and behaviour.

To begin with the stakeholders of an organisation therefore represents an approach that perceives humans as the most valuable and powerful source in the process of change. Effectiveness can be achieved by many sorts of improvements, by studying processes related to the supply chain for example. Still, changes that were developed using a participatory approach, like the circular organisational design [4] which values participation of different stakeholders from within the organisation in the decision making process as a core asset are more likely to be human-centred and effective.

Design management has engaged itself with applying such design thinking dominated approaches like the human-centred to the development of new products for organisation, but it has failed to see the organisation as a product itself in the past. The described project shows that a holistic approach to developing new products can lead to innovation within the organisation itself. It is shown, that design can close the gap between the offer of an organisation, its structures, its purposes, and its core values, and beliefs.

5. A Case Study

5.1. Introduction

In the following paragraphs, the described Library Project conducted at Lancaster University serves as an example of a human-centred design approach with the intention to inform and provoke change at the organisation's core - its values and beliefs.

The overall project process follows a movement that begins with the stakeholders outside and inside the organisation, takes design to the core of the organisation by developing a mission based on research findings, then moves to the borders of the organisation to envision and prototype a service vision based on the mission, and finally leads back into the organisation by envisioning and prototyping processes and structures of an organisational design that enables the service vision.

Referring to the definitions of a product stated by Victor Margolin that a product is "the human-made material and immaterial objects, activities, and services, and complex systems, or environments that constitute the domain of the artificial" (Margolin, 1989, cited in [3]) the project team was aware that a human-centred approach has to include all stakeholders of the product called Lancaster University Library.

Designing in the context of an organisation is all about people and interactions. Interaction in this context refers to Buchanan's definition that "...interaction design is about how people relate to other people and how products mediate those relationships" [2]. These products can be among others computers, services, or Products, business activities or organisational environments [2]. Still, the designer's work takes place in a far more abstract and intangible realm than the "classical" disciplines of design like graphic or product design which are placed in the fist and second of Buchanan's areas of design [18]. Structures and processes in organisations are the main "design tools" and thereby resemble more the third and fourth area of design. An organisation is shaped by the way people interact, by the way tasks and responsibilities are structured and by the processes that result in offers for the users. These aspects of organisational behaviour are shaped by the culture of an organisation which is based on the values and beliefs at the organisation's core [19].

As interactions between members of the organisation and the organisation and its users seem to play a major role in the design of an organisation; the question was, how can the expertise of design in creating reality be applied to an organization?

As Junginger states, products are part of interactions and can be described as mediators between people [3]. This suggests, that a change in mediating products can lead to a change in the way people interact.

Regarding this causal chain, the first question for the design research into the organisation was: what are the products that shape these interactions? Bearing Margolin in mind, the project team was open to all kind of products that would come up during the research. And again talking about an organisation as a product one has to consider the different product levels. The organisation as a product and its characteristics which are influenced by products. And the outcome of an organisation-which again is a product - in form of a service, offer or physical product.

The project used human-centred approaches to learn about the various kinds of interactions that the organisation was taking part in. This included user research, research into the organisation itself, its people and participative sessions with members of the organisation. From the beginning the focus of the research phase was the identification of design opportunities by identifying user issues and motivations according to IDEO's statement: "Motivations are Design opportunities" [20]. But first, the project team had to make itself familiar with the product. Primary research activities included content analysis of information material, observation of people using the space, analysis of the organisational structure itself and in context of the University and, from the very

beginning, user research. The gathered information formed the background for interviews conducted with users and members of the organisation. With this background the group could create an understanding of the organisation's character, its purpose, and outside perceptions. While in the beginning of the process the aim of the research was to gain an understanding of the organisation as wide as possible, the further progress was characterised by a focus on the users and their demands and issues.

Following users on their way of interaction with the organisation was part of the qualitative and primary research. Interviews and surveys conducted with different groups of users, differentiated according to their use of the library, informed the knowledge about the pathway as well as observations on spot. The user pathway as a research tool is powerful in unearthing the motivation of users and the purpose of their engagement with the organisation. By discovering issues in the pathway of users who engage with the organisation and members of the organisation who act in the structures of the organisation, designers are able to identify possibilities for improvement that are closely linked to the very core purpose of an organisation - to meet users needs and offer a desirable and usable offer [3].

The results of this research phase enabled the team to define user groups that represented different purposes of use, characteristics, behaviours, issues and opportunities. For the further design process these user groups formed the basis.

The issues identified can be interpreted as gaps in the experience of interaction with the organisation [3].

As members of staff participated in team sessions and work group meetings, the team could inform the organisation about current findings and receive immediate feedback from "inside experts." This feedback informed the further process. The involvement of members of the organisation also became an effective means in promoting the project throughout the organisation - after a short period the team was able to talk to the leader himself.

As design strives for a systemic approach to phenomena that derive from individual user research, results from the qualitative user research informed the team's cognition about the general system of interactions between the organisation and the user. Conducting further interviews with members of staff, enabled the team to accumulate additional knowledge of the library's hierarchical structure that incorporated the unofficial interactions and paths of communication between members which are not described by the official relation map. They have to be unearthed with patience, empathy, sensitiveness, and respect. This relates to the way that designers are devoted to the "improvement of the world in its details (Die Verbesserung der Welt in ihren Details)" [21]. Small nuances are relevant and can sometimes make the decisive distinction.

5.2. Future Challenges - Trends in User Behaviour and Technology

The interviews and surveys that were conducted with the users of the library led to findings and main user issues that informed the further process of the project. The primary research undertook with the user group itself was one part of the investigation into the needs and demands the organisation faces. Other primary and secondary investigations were conducted to learn more about the challenges and opportunities of future developments relevant to the library. An important finding resulted from an interview with an expert from another university's library. He pointed to technological developments which form the future challenges, and opportunities related to information gathering and the creation of knowledge - internet and e-resources will play a major role in future education [22].

What are the implications for an institution that provides access to information? How does the role change, when the information is not tangible any more? What impact does the arrival of the digital native, people „who have

grown up immersed in the use of and dependence upon information technology" [23], have? People who take the internet and Google search for granted and who are used to non scientific information like Wikipedia? How can a development be initiated that incorporates new technologies and enables students to navigate through the vast amount of information available?

And related to the main offer of the organisation - its services:

How does the service structure of the library of the future has to look like to meet the changes in user behaviour and technology?

These questions call for a strategic approach that allows the organisation to act beyond its operational boundaries. While other institutions like the U.S. Air Force are aware of the challenges they face in relation to recruiting and training the millennial generation alongside an exponential growth of information" [24], Lancaster University as an organisation has not developed an information strategy that is about this problem, as we found out during the research. The library is neither mentioned in the University's „Strategic Plan 2006-2011" (Lancaster University, 2006), nor has it developed its own strategy. This situation made me realise the lack of awareness, and the minor role the library plays within the university - although it is a core part of it as it provides the main resources for the students' learning experience and success.

These observations were pieces of a puzzle that made up a comprehensive picture of the library as an organisation and of its interaction with other organisations within the university. An organisation that is characterised by an unofficial but effective internal communication which fails to successfully interact with other departments and the user. Further more, operational consequences for the users were caused by the lack of strategic collaboration between the departments as described in the following.

The IT department's responsibility for the equipment in the library entailed that librarians had no access to the printers. Further, IT staff did not work on weekends which resulted in problems with a printer that had run out of paper on weekends. No one could maintain it, and the students had to wait until Monday. This became a main user issue.

All these observations and findings characterise the culture of the library as an organisation. As its head puts it in an interview, its main objective is to react to demands and to best maintain the standard with the financial resources at hand. An operational point of view rather than a strategic plan of action.

As stated before, the gathered information called for a shift from operational to strategic thinking and passive reaction to active action.

How can design help an organisation to enable that shift and create appropriate offers?

5.3. Translating User Issues

The Lancaster University Library's mission statement can be interpreted as a self-reflection on its purpose:

„The mission of the Library is to provide, maintain, and develop library and information services to support teaching, learning, and research of the University." (Lancaster University Library, 2004). This statement implies, that the Library is aware of its role in the context of teaching and learning. As an institution that provides resources, in an appropriate quantity and quality, but also to enable effective information use.

Future challenges are missing, and interactions with other organisations of the university are neglected. By thinking "out of the box" and fostering connections between different areas of the organisation [9], design can enable the organisation to approach strategic challenges holistically. Further, a user-centred design approach that looks at the user pathway (the sequence of steps a user takes before, when and after using the library) could result in the notion that effective learning and studying relies on three main aspects:

The knowledge about the right and required information, the easy and fast accessibility of appropriate information and the precise use of this information to be able to process it into useful knowledge.

A user-centred approach to the study environment therefore should consider the universities structure as it is characterised by a division into resources (library), information technology (ISS) and learning techniques (CELT-Centre for Learning and Teaching).

The services of these different departments heavily depend on each other to create a consistent learning experience; i.e. the ISS maintains the equipment that makes the information accessible, the library submits the knowledge about the appropriate information and acquires resources while the CELT is involved in the development of effective ways to make use of the information (like e-learning).

5.4. The Service Vision and the Organisation's Mission

To change the organisation's behaviour to a more strategic form, a transformation process that addresses the core of an organisation - its mission - is more likely be effective. Therefore the design process started off with redefining the library's purpose, and formulating a future mission - the service vision. It incorporated basic outlines of actions that were considered necessary to address the different issues, and made use of the opportunities, found during the research.

Changing the mission of an organisation is an effort that takes place right at the core - its values and beliefs. In this way, the user findings can have an impact directly on the organisational culture.

The next step towards the development of future service offers, describes how values and beliefs defined by the service vision can be transformed into offers using design thinking.

The developed idea generation model consists of three "step stones":

1. Investigation: The first step-stone investigates a main area of interest. This area is closely related to one main aspect mentioned in the service vision.

2. Implication: The second step-stone lists possible implications for the organisation.

3. Realisation: The third step-stone asks how to realise?, and can incorporate suggestions for the realisation of services.

The content of the first "step stone" was generated by brainstorming and trend research on future user behaviours and technology. In this way, the outcome is a mixture of free associations to open the mind for free and unfamiliar ideas and more realistic and feasible suggestions related to the research findings. This again serves the aim to think "out of the box."

Asking for the implications on the organisation in the second "step-stone" brings those ideas and findings closer to the structure of the organisation and can give ideas about possible ways of reaction. This stage defines the strategical level of development. The question for implication is a self-reflective one. How are we strategically set to meet future challenges, what do we have to change? It calls for analysis of the present position and evokes a plan of action - a strategy.

Possible results of these actions are defined and described in the third step-stone. The third step-stone represents the operational level of the idea generation model. It can include descriptions of features and characteristics of the final product or service.

The "step stone" -process is supposed to be a filtering process for ideas and concepts. This tool can help an organisation to generate and shape ideas and concepts of products. By splitting up the idea generation process into three parts, ideas can be generated effectively and focused. By concentrating on one aspect only (i.e. the future user) without linking it to the overall question (the service structure of the organisation) first, the potential

for brainstorming is wide and the search for ideas open. The results are more likely to be unexpected because they will not be influenced by existing constraints and opportunities or available resources. This process incorporates a major characteristic of design thinking - a solution focused approach that generates an answer to a question from the perspective of a desirable solution [Fig. 1].
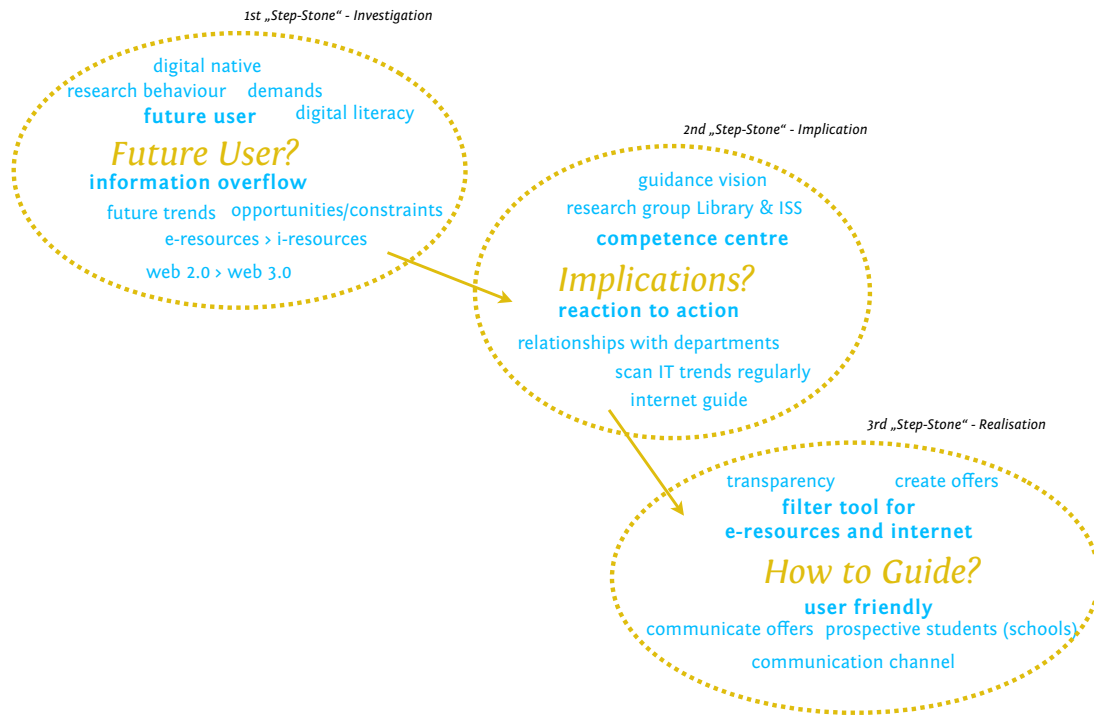

Figure 1: "Step-Stones"

5.5. Creating the Service Offer

With this work done, many ideas are generated that now have to be prioritised to make them usable for the further process. Two key aspects of each stepping stone are prioritised and used together with an associated verb to form one part of the "implementation chain". The "implementation chain" [Fig. 2] consists of three parts describing three categories of actions the organisation should undertake: analyse, conceptualise, and synthesise.

Figure 2: Implementation Chain

The result can best be described as a chain of action which serves as a guideline for the product development process. In conclusion, the chain consists of three verbs, representing six main aspects of the product development process. Please see the following graphic for illustration. The „implementation chain" is closely

related to the imagination of future interactions between the organisation and its users. Combining key aspects and related actions is an associative process which is intended to result in the formulation of future scenarios, as short, summary like stories that describe desirable actions. Based on the "implementation chain"-process, a user pathway scenario for the library was prototyped, including possible structures, products, and services that shape the interaction between the user and the library. This prototype served as a manifestation of the changes that the project was intended to initiate at the core of the organisation.

The project had arrived back at the place where it started - at the interaction between organisation and user [Fig. 3].
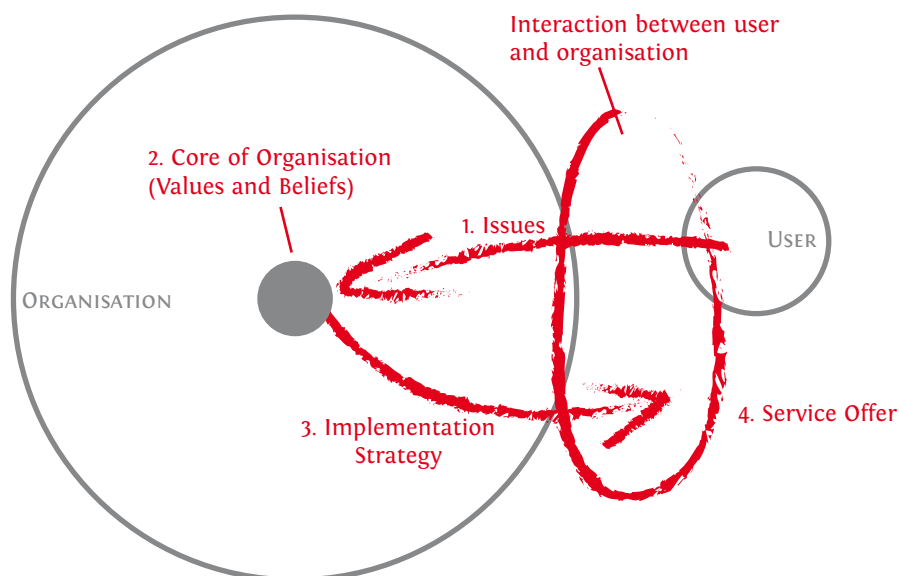

Figure 3: The Design Process

6. Conclusion

The experiences made during the Library project show, that a human-centred approach can incite innovation and change on different levels of an organisation; its interaction with the user, its organisational structure, and its core - the mission. The analysis of the user's pathway as an instrument of human-centred design allows the designer to gain insight into an organisational system which otherwise would hardly be understandable due to its complexity. As Buchanan [25] points out: "By definition, a system is the totality of all that is contained, has been contained, and may yet be contained within it. We can never see or experience this totality. We can only experience our personal pathway through a system." According to Buchanan's four orders of design, a human-centred approach can widen the scope of design management towards the fourth placement of systems and environments [3]. Design Management thereby helps the organisation to create a culture of innovation that enables faster and effective reactions to a changing environment. By evoking change where it really has an impact on the structure of the product called organisation- at the values and beliefs that shape its culture [19].

7. Acknowledgments

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