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DEVELOPING A HUMAN-CENTERED ATTITUDE THROUGH EXPERIENTIAL LEARNING

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ABSTRACT

This paper describes factors that nurture a human-centered attitude of a design curriculum. A brief literature study defines a human-centered attitude and explains how to develop this attitude by using experiential learning theories. Furthermore, an illustrative case study reflects on the human-centered elements of a multimedia design course. This study recommends the teaching of human-centered methods as an integral part of a design curriculum, a teaching style that questions the human-centered aspects of the student's work and composing authentic and challenging project briefs with real people. To develop a human-centered attitude students need to involve real people into their design process and empathize with them. The experience with real people affects their beliefs, which can result in changing their attitudes towards people.

Keywords: design education, human-centered attitude, experiential learning

INTRODUCTION

The growing complexity and the ubiquity of technology demands a more human-centered approach in designing products and services (Harper, Rodden, Rogers & Sellen, 2008). Ideally these products and services should perfectly fit into the daily life and work of the people who use them. However, many people still complain about the quirks of their mobile phone or share their experiences about the 'Fawlty Towerish' treatment they have received from their insurance company. Somehow the human aspects seem to be 'forgotten' while developing these products and services.

Many design educators, practitioners and researchers therefore advocate a human-centered approach. Such an approach should lead to products and services that are meaningful to users and other stakeholders (Krippendorff, 2007). In order to create meaningful products and services it is important to understand what people value (Diller, Shedroff & Rhea, 2008). Moreover, the question should be what people's values are. Harper et al. (2008) plea for a better understanding of values as well, and human values in particular and emphasize that understanding human values should explicitly be addressed in the HCI process. They therefore suggest extending the HCI design cycle – which consists of four stages: study, design, build and evaluate – with a new initial stage, called 'understand'.

A thorough understanding of human beings is also advocated by Kouprie and Sleeswijk Visser (2009), although they suggest a more sensitive and empathic approach: "designers should be more sensitive to users, be able to understand them, their situation, and feelings: to be more empathic". Furthermore, Kouprie and Sleeswijk Visser explain that empathizing means that the designers are willing to explore people's situations and experiences, immerse themselves in people's life with an open mind, are able to connect with people to understand feelings and meanings and finally detach themselves by 'switching mode' from being investigative to being helpful. Being empathic requires a willingness to get people involved into the design process. Actively involving users and other stakeholders, as Boyarski (1998) and Krippendorff (2007) explain, is a key characteristic of human-centered design. In addition, Boyarski (1998) stresses the importance of having a strong focus on the human beings that are affected by the products they use. A designer needs to be concerned of the human use of products and

systems, which also includes the entire experience of use. The designer has to take several aspects of human being into account: how people think, feel and behave, which also includes cultural and social aspects.

Designers need a thorough understanding of human values, needs, beliefs, motivations and limitations and how artefacts are being used and experienced by people. This requires a motivation to actively get people involved in the design process in order to gain insights and evaluate design decisions. For a designer it is important to be able, or willing to empathize with people and to be intrinsically motivated to design meaningful products, systems or services for people. This motivation, or this willingness to design for and to design with people can be best described as a human-centered attitude.

However, being human-centered is not an innate quality of a designer; it is an attitude that needs to be nurtured. Our observations in design education show differences in human-centeredness between first-year and fourth-year students. At the beginning of their design education, when the students hardly have any experience with human-centered design, they show little concern for the people while making design decisions. Whereas fourth-year students make design decisions that are based on insights they have gained from preliminary research and evaluations with people. To get people involved into their design process, the fourth-year students also initiate design research activities more often. This striking difference between novice and experienced educated design students indicates that a human-centered attitude can be developed.

The question remains how to nurture such a human-centered attitude. Learning to become a designer requires more than just the acquisition of knowledge and skills. Being a designer also requires an attitude: a way of thinking and a style of acting. Together, these attitudes, knowledge and skills form a design competency (Bakerman, 2005). However, not so many authors on design education have attempted to describe the development of a designer's attitude. A literature review shows that the development of a designer's attitude and the development of a human-centered attitude in particular hardly gained attention in design education. Horváth (2006) discusses the development of a designerly attitude,

but does not mention human-centeredness as being part of a design competency. Van Doorn, Moes and Fain (2008), who have elaborated on the work of Horváth, describe several elements of attitude development in design education. They mention many aspects of a human-centeredness which they describe as an 'open mindset' and do not refer to it as a human-centered mindset as such. Only Boyarski (1998) mentions explicitly the development of a human-centered attitude in design education, but does not explain how such an attitude can be developed.

The goal of this paper is to understand how a human-centered attitude can be developed in design education. We elaborate upon experiential learning (Kolb, 1984) and attitude development (Fishbein & Ajzen, 1975) and apply these to design education. For this, the curriculum of a multimedia design course is used, in which a human-centered attitude is the corner stone of the course's design competencies. The curriculum is used to reflect upon the factors and strategies, which nurture and catalyze the development of a human-centered attitude.

CONCEPTUAL FRAMEWORK OF HUMAN-CENTERED DESIGN EDUCATION

From an experiential learning perspective we discuss how attitudes can be developed and describe the role of experiential learning in design education. The three domains: experiential learning, attitude development and design education together form the conceptual framework of human-centered design education (see figure 1).
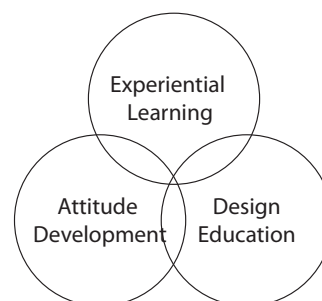
Figure 1. The three elements which form the conceptual framework of human-centered design education.

'Learning by doing' is the credo of most design courses. Actively experimenting (with materials,

methods, tools, principles and theories), experiencing (the results of the experimentation) and reflecting (on the experience) as well as understanding the effect of the design intervention are key elements of design activity and education. These four activities are identical to the activities as described in Kolb's experiential learning theory. This link between design education and Kolb's experiential learning theory is also explained by Demirkan and Demirbas (2008), who describe the learning process as a cycle that encompasses: experiencing, reflecting, thinking and acting. With experiential learning, Kolb (1984, p. 3) refers to developing competencies, which means that experiential learning not only covers the acquisition of skills and knowledge, but also includes the development of attitudes.

Fishbein and Ajzen (1975) consider an attitude as a part of a set that consists of: beliefs, attitudes, intentions and behaviours (see figure 2).
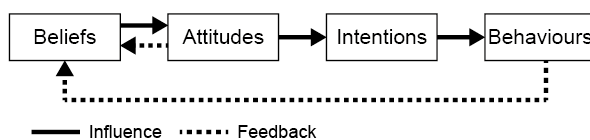

Figure 2. Showing the relation between beliefs, attitudes, intentions and behaviours (after Fishbein and Ajzen).

A small number of salient beliefs serve as factors that affect a person's attitude; a change in beliefs will therefore cause a change in a person's attitude. Furthermore, Fishbein and Ajzen describe active participation as an important strategy to change beliefs, which can lead to a change of attitude: "The active participant is exposed to a variety of informational items, and direct experience of this kind tends to produce changes in corresponding proximal beliefs" (p. 449). From a design education perspective this active participation has been discussed by Kimbell and Stables (2007), who consider it as an important driver of design learning. Fishbein and Ajzen as well as Kimbell and Stables point to the following: active participation is task-centered, performing these tasks invoke a 'direct experience' which eventually can lead to a change in beliefs.

In brief, this means that a concrete experience might alter someone's beliefs, which can change someone's attitude. To change someone's beliefs, the concrete experience should be followed by a reflection in order to conceptualize and learn from the experience (Demirkan & Demirbas, 2008). Learning cannot take place without any action, because activity is needed to experience something. For design education experiential learning is considered as a crucial theory to develop a designer's competence.

GUIDELINES FOR A HUMAN-CENTERED DESIGN CURRICULUM

From the conceptual framework we see that several factors are important to develop or nurture a human-centered attitude.

- Design projects should be authentic and issue-rich (Kimbell & Stables, 2007). This means that the projects should be as realistic as possible. A real life case should be the starting point of the project brief to maximize the concrete experience.

- The students should conduct the research themselves and get the real users and other stakeholders involved in their design process. The students should immerse themselves into the experience of the user to achieve empathy (Kouprie & Sleeswijk Visser, 2009). A project brief should therefore always revolve around people and how they interact with products or services, organisations (the client or other stakeholders) and other people (friends, family and peers).

Furthermore, based on our own experience in design education we see some other factors that contribute to the development of a human-centered attitude. Over the past ten years we have regularly reviewed our curriculum to see how we can improve our programme and make the students more aware of how people interact with technology, other people and society. There are some conclusions that can be drawn from these reviews.

- Projects should be challenging, but not too challenging. The challenge should be balanced with the skills of the students, in order to avoid that students with a limited set of skills are confronted with a 'mission impossible' and become anxious. On the other hand, if the project brief does not challenge the students enough, it might

demotivate them and might lead to boredom and relaxation as well (see also Csíkszentmihályi, 1991). We therefore recommend that the complexity of project briefs and the distance to the users are increased step-by-step. For each stage of the course, the level of a design challenge is set a bit higher than the actual skills of the students. For defining the level of each stage it is useful to take the expertise model of Dreyfus and Dreyfus (2005) into account. This model describes five layers of expertise: novice, advanced beginner, competence, proficiency and expertise. Each layer covers different modes of thinking and acting and strategies to solve problems or to complete tasks. Lawson and Dorst (2009) have elaborated on this model and describe how it applies to the acquisition of design expertise. According to Lawson and Dorst an educational system must facilitate the transition from one layer of expertise to the next, this transition starts at rule-based thinking and progresses to situation-based thinking, to end with strategy-based thinking when students graduate. However, facilitating this transition as an educator may not be easy, because the acquisition of design expertise is not one continuous and seamless process.

- Let the students work in teams. Working in teams encourages the students to share experiences and support each other. According to Kouprie and Sleeswijk Visser (2009) working in teams also supports discussion and the development of an open attitude towards people, which will lead to increased understanding. Developing empathy remains an individual process, however.

- Support students (and tutors) with a process and a collection of human-centered methods. Students should actively experiment with different methods. After reflecting on the experience, the tutor can suggest methods to support the abstract conceptualisation as referred to in Kolb's learning theory.

- The role of a tutor is more like that of a coach than of an instructor or a knowledge provider. According to Schön (1987) the tutor can use three different styles of coaching: follow me!, joint experimentation, and hall of mirrors. Especially

the hall of mirrors is an interesting style, which means that the tutor will ask many questions that will help the student to reflect on his work and actions. By asking questions the tutor also becomes a role model (follow me!) showing the students, which questions can or need to be asked. Design is characterized as question intensive (Eris, 2003). Students therefore need to develop a mindset of questioning. For human-centered design this means that students have to phrase questions that concern the people who will use the design and the people who are affected by it.

ILLUSTRATIVE EXAMPLES

To illustrate which factors and strategies contribute to the development of a human-centered attitude, we will discuss the curriculum of a bachelor course: Communication and Multimedia Design (CMD) of Rotterdam University of Applied Sciences. The bachelor course of CMD is a four-year course, which educates students to become designers of interactive media. CMD students conceive, design and develop: websites, mobile applications, interactive environments and many other interactive artefacts. The curriculum consists of projects and modules. Each project is supported with two modules, which provide the skills and knowledge that are needed in the project (see figure 3).
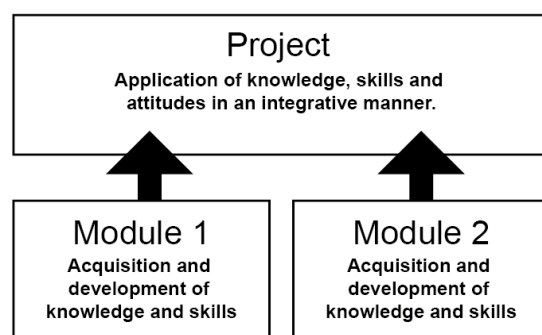

Figure 3. Basic structure of the course CMD

In these projects the students need to apply their design competencies in a comprehensive manner. The projects are characterized by a human-centered approach: design research and evaluation techniques are required to successfully complete the project. At the end of each project the project outcomes and the process are assessed.
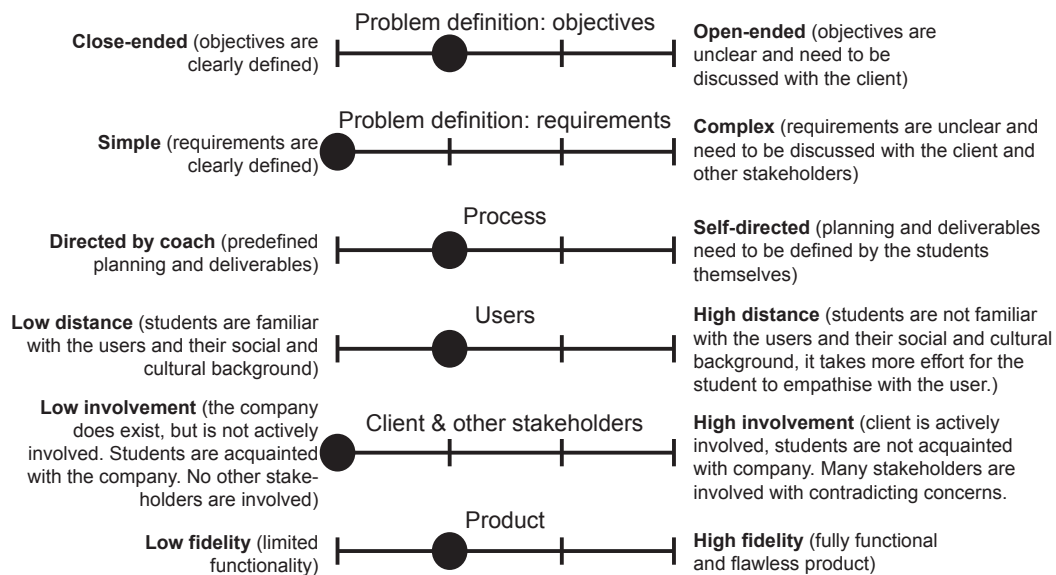
Close-ended (objectives are clearly defined) — **Problem definition: objectives** — Open-ended (objectives are unclear and need to be discussed with the client)

Simple (requirements are clearly defined) — **Problem definition: requirements** — Complex (requirements are unclear and need to be discussed with the client and other stakeholders)

Directed by coach (predefined planning and deliverables) — **Process** — Self-directed (planning and deliverables need to be defined by the students themselves)

Low distance (students are familiar with the users and their social and cultural background) — **Users** — High distance (students are not familiar with the users and their social and cultural background, it takes more effort for the student to empathise with the user.)

Low involvement (the company does exist, but is not actively involved. Students are acquainted with the company. No other stake-holders are involved) — **Client & other stakeholders** — High involvement (client is actively involved, students are not acquainted with company. Many stakeholders are involved with contradicting concerns.

Low fidelity (limited functionality) — **Product** — High fidelity (fully functional and flawless product)

Figure 4. Project Equalizer, the settings of each dimension serve as guidelines for defining the scope of the project brief.

Real projects with real people

Starting from day one we confront the students with real people in their natural environment. At the very beginning of their first project and their course, our students get the assignment to do observations and interviews in bars or clubs. However, students are often hesitant to contact people they do not know, or who are not their social peers. We therefore ask students to do a field study in their favourite bar or club. Students have to do this research in couples, because it makes them feel more confident. Eventually, after the students get more confident, we challenge them in other projects to research the daily life and behaviour of people they are not familiar with. Furthermore we use real companies (except for the projects in the first year, because dealing and conversing with real clients is not the learning objective for these projects) with real challenges to compose a project brief, which makes the project authentic and issue-rich.

Project Equalizer

In order to balance the expertise level of the student with the project challenge, we have developed the Project Equalizer (see figure 4). The Project Equalizer aids us in defining the scope and difficulty of the project brief. We have defined six dimensions: objectives, requirements, process, users, client and other stakeholders, and product. The users and other stakeholders are on top of our minds when we compose the project briefs. For the dimension of the user it is important that students gain confidence in doing research with real people. Therefore, at the beginning of their course, students can use their peers (friends, relatives) to elicit information, or to evaluate their concepts and products with. After a couple of times the students gradually gain more confidence and expertise in getting people involved in the design process; it then becomes easier to get 'strangers' involved in their research activities and evaluations.

Providing a process and a toolkit

Students need guidelines and tools that aid them to achieve their project-goals (also see the rule-based thinking as described by Lawson and Dorst (2009)) and help them to shape a mental picture of a human-centered design process. As a guideline we have therefore developed a process that consists of different stages: research, concept, design, development, and implementation. Having a process and discussing it with students seems very fruitful for especially the first-year students, because it helps them to get an idea of the activities that are involved in a human-centered design process. Beside having a process, we have developed the Human-Centered ICT Toolkit (Leurs & Mulder, 2009), which offers an overview of methods and tools that are available for each different stage in the human-centered design process (see figure 5).

Figure 5. Human-Centered ICT Toolkit as discussed on the Internet (http://project.cmd.hro.nl/cmi/hci/toolkit).

This toolkit also offers a theoretical and practical understanding of human-centered design methods for interactive software and media. Each tool has been described on a reference card, which contains: a brief description, when to use it, why to use it, points of interest and references to literature and online resources for more information.

For students – and tutors sometimes as well – the toolkit is very helpful in choosing methods to gain insights in people's needs, motivations, behaviour and limitations or to evaluate design decisions. The tutors encourage students to use tools to find answers to their research questions. The vast array of tools challenges them to try methods that are fun to use for both the students and the respondents, or to find methods that they have not heard of yet.

It is important to mention that these tools are only recommended and not being taught during the project-work, because in projects the application of knowledge and skills is key, not the acquisition of knowledge and skills. Many of these tools are explained and trained in the accompanying modules (e.g. Design Research, Usability Testing) for the projects (see figure 3). In these modules students learn to do interviews, observations, user testing and developing personas, scenarios, etc.

Design as a process of understanding and questioning

Design is not just problem solving, it is a process of gaining insights in context and user behaviour, it is therefore a process of learning and understanding about people's lives. In order to understand and to learn, designers tend to ask many questions. In design education tutors have the habit to constantly question the work of the student, just like they would do as practitioners. With this questioning tutors intent to challenge the student to develop a mindset that questions everything.

However, in weekly project-meetings with our students, we tend to focus our questions on the user and not so much on questioning 'everything'. The goal of our questions is to let students reflect, individually and as a team, upon their process and reflect on how their decisions affect the people they design for. In these questions we often take the user needs and goals as a starting point. Students are motivated to explain why their concept or product is the right solution for the users. Examples of corresponding questions are: 'Why would people use this product?', 'What are the needs of the user?', 'How does your product affect the user?', 'What are the external factors that affect the interaction of the user with the product?', 'How does your design proposal relate to the research you did with the users at the beginning of the project?'

Over the years we have compiled lists of these reflective questions that help tutors to structure conversations with the students and to assess their work. These lists are especially helpful for tutors with little experience as a project coach. Even students sometimes use these lists to reflect upon their work.

DISCUSSION AND CONCLUSIONS

The goal of this paper is to understand how a human-centered attitude can be developed in design education. A literature study and a reflection on a design curriculum show that design cannot (only) be learned from a textbook, because active participation and concrete experience are important elements of design learning. It is therefore important to get real people involved in the design process and in the projects that the students work on. These projects should offer an authentic learning experience that enables students to experience the life and behaviour of real people. As the theoretical perspective of Fishbein and Ajzen (1975) shows, experiencing real people forms a crucial factor to change the student's beliefs and develops an attitude that takes the versatile array of human aspects into account.

Reflection on experiences with real people is in line with Kolb's learning cycle. Reflection is even

considered as one of the most important stages of design learning. In order to support and intensify the reflection on the student's experiences, tutors can use lists of human-centered reflective questions. These lists should be used as a guide, not as a checklist. Furthermore, students can be supported in their project-work with a clear and comprehensible process and a collection of tools and methods that helps them to elicit information from users and guides their decision-making.

A human-centered attitude goes a few steps further than just getting the user involved in the design process by doing an interview and a usability test. Students should actively experiment with different design research methods and strategies to experience how valuable and important real people are for designing successful and meaningful products. These experiences should foster the development of a human-centered attitude. This might also mean that the role of the tutor changes from knowledge provider and trainer of skills to a coach or guide who teaches and challenges the student to ask the right human-centered questions. These questions should address ethical issues as well, because doing research with real people also means intervening with real lives. Students therefore have to consider how their research activities affect their respondents and other stakeholders.

Design research, the teaching of methods and its underlying theories should be an integral part of a design curriculum. Design courses should have a plan or framework that defines how students progressively become more competent in their design research skills. In this design research programme, students learn how they can 'step into the user's shoes' and 'walk the user's walk' (Kouprie & Sleeswijk Visser, 2009) and let them empathize with people and get a thorough understanding of people's lifes, their contexts and most importantly their values.

As said before, a proper body of knowledge of how to nurture a human-centered attitude in design education has been missing. Despite this absence, it seems there is a tacit need among design educators for more knowledge of a human-centered pedagogy. By laying this first brick in how to nurture a human-centered attitude, we aim to contribute to human-centered design practice and education and we hope that this work encourages other design educators and researchers to share their knowledge and experiences to help building this body of knowledge on developing a human-centered design attitude.

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