

The Impact of Cultural Differences in Design Thinking Education

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Abstract

Design thinking is a specific method to develop innovative solutions to wicked problems in multidisciplinary teams. The fact that people with different disciplinary and often also cultural backgrounds work together, makes it quite a challenge to compensate for deficits in common understanding of terminologies or mind-sets. Furthermore, team members from specific cultures and nationalities might have difficulties to cope with specific mind-sets of design thinking. This paper analyses the impact of culture on the design thinking process in an educational context. How do people from different cultural backgrounds cope with the requirements of the design thinking mind-set? We suggest a list of criteria that are crucial for creative work in a design thinking context, based on a literature review and observations in an educational institution for design thinking. These criteria are then compared with Hofstede's Cultural Dimensions. The results are summarized in a framework that outlines the criteria and the respective cultural dimensions. This framework might help educators and also practitioners, who want to implement design thinking in their universities or companies, to understand cultural differences and to identify and anticipate possible complications in design thinking projects.

Keywords

Design Thinking; Education; Culture

Introduction

Design thinking, as a method to develop innovative solutions to wicked problems (Buchanan, 1992), is spreading around the world. Design thinking schools have been established in the US, in several European countries, in Australia, and more recently also in China, Malaysia, Russia, and Latin America. Design thinking relies on a set of criteria, such as the team constellation, the workspace, the design thinking process, and a specific mind-set (Kelley & Littman, 2001, Plattner, Meinel & Weinberg, 2009, Mueller & Thoring, 2012; Thoring & Müller, 2011a, 2011b, 2011c). But how are these aspects perceived and valued in different cultures? This paper focuses on different requirements regarding the educational settings for design thinking in different cultures. We compare cultural dimensions by Hofstede (1994; 1980) for selected countries with a list of criteria for design thinking.

This paper is structured as follows: The first section provides a brief introduction to design thinking and describes a list of design thinking criteria. In the second section we specify cultural differences based on Hofstede's (1994; 1980) cultural dimensions for selected

countries, which is then compared with these design thinking criteria. The next section presents a mapping of cultural differences in design thinking and summarizes the outcome in a framework. Finally, we discuss the results, as well as the limitations of this work, and we present an outlook on future work.

Design Thinking

Design thinking is a specific method to solve complex (wicked) problems (Buchanan, 1992; Rittel, 1972) and to generate innovative solutions, based on a user-centred approach with multi-disciplinary teams. Design thinking—although introduced and shaped by the design consultancy IDEO (Kelley & Littman, 2001)—is becoming more and more popular among business schools, and it is applied in R&D departments of companies to foster innovation. Educational institutions for design thinking (sometimes called D-Schools) are established around the world. Plattner, Meinel, & Weinberg (2009) define three main categories that are crucial for design thinking: 1) a specific design thinking process, 2) a specific constellation of multidisciplinary teams, and 3) a flexible workspace. Additionally to these three aspects a fourth one seems to be of major importance: 4) a specific design thinking culture, including rituals and a specific mind-set. In the following these four categories are described in more detail, and several criteria for each are defined. We base these criteria mainly on the cited literature, and on observations in the HPI Schools of Design Thinking in Stanford/USA and Potsdam/Germany. We are aware that design thinking might be applied differently in other organizations and other contexts, and that there is not “one design thinking process”. Therefore, we limit our study to design thinking as it is applied in design education, specifically in the two before mentioned institutions, which were among the first educational institutions for design thinking, worldwide. In the following we describe these four categories of design thinking, briefly. The defined criteria are summarized in Table 2.

Design Thinking Process

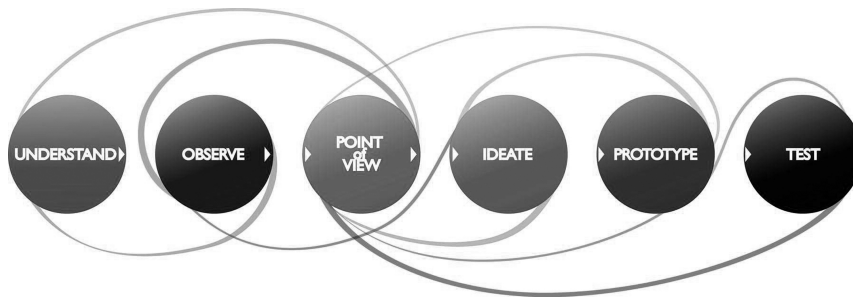


Figure 1: The Design Thinking Process at the HPI D-School (Plattner, et al., 2009).

Figure 1 shows a simplified process model of the design thinking process as it is applied and executed at the HPI D-School in Potsdam/Germany. It consists of 6 steps, which are connected by loops, to demonstrate that these steps are not necessarily executed one after the other, but in iterative loops, instead. These steps are called Understand (desk research), Observe (qualitative user research), Point of View (Synthesis), Ideate, Prototype, and Test & Iterate. While *Understand* means mainly desk research, in the *Observe* step different ethnographic methods are applied, such as Interviews, Observations, Cultural Probes, Try-it-Yourself, etc. During *Synthesis* the gathered data from the research are being structured and evaluated by storytelling, reframing and identifying problems, creating a user’s Point of View, creating a persona or a framework, and results in a How-Might-We Question (HMW) to be used in the subsequent *Ideation*. This step consists of a typical brainstorming, including specific brainstorming rules (be

visual, one conversation at a time, encourage wild ideas, defer judgment, build on the ideas of others, go for quantity), and the selection of the created ideas, usually done by voting. The selected idea is then visualized by a prototype, which could be a low-fidelity prototype (such as drawings, paper-prototypes, mock-ups, role-plays, etc.) or a high-fidelity prototype (video, high-end model, etc.). *Testing* means getting feedback (e.g. through interviews), reflecting upon that feedback, and then incorporating the feedback into iterations. Thoring & Mueller (2011b) provide a detailed description of the design thinking process. Designerly methods and tools are summarized in the Stanford Bootcamp Bootleg (<http://www.dbootleg.org/>), which also provides a list of design thinking mind-sets (Stanford d.school, 2011, 2012).

Design Thinking Teams

Typical for design thinking teams in educational contexts is a mixture of *different disciplines* and also *diversity* in terms of different genders and nationalities, which form a small team of *5 to 6 team members*. Usually, there is *no team leader* and the hierarchies are quite flat. Within the team, *different roles* can be assigned, such as the moderator, the timekeeper, or the documenter (Kelley & Littman, 2005). Crucial for members of a design thinking team is a so-called *T-Shape profile*, which means they should be an expert in one specific field (vertical bar of the “T”), but have an open mind and a broad understanding of adjacent areas, as well as good communication skills at the same time (the horizontal bar of the “T”).

Design Thinking Space

Space in design thinking education is characterized by an *open space* concept consisting of designated *team spaces*, *plenum spaces*, areas for *personal withdrawal*, and areas for *playing* and lingering. All of these areas are usually not divided by walls, but by *moveable* whiteboards or other furniture elements. There are *informal meeting points*, as well as a *craft workshop* with tools and materials. *Whiteboards* and walls are *writable*, and *materials and toys* for inspiration or creating prototypes are on hand. People also can bring and play their own *music*, while working. Thoring, Luippold & Mueller (2012a, 2012b) describe a taxonomy of spatial functions for design education. Doorley and Scott (2012) present an overview of typical space designs for design thinking purposes.

Design Thinking Culture and Mind-Set

There exist several rituals and mind-sets that are very common in design thinking, and which are believed to have a positive impact on teamwork and creative outcome of a project (Stanford d.school, 2011, 2012). Among these rituals are *Warm-ups*—games and exercises to start a day or project phase, or the *I-like-I-wish* sessions at the end of each day, in which criticism is expressed in a positive and constructive manner. Another mind-set of design thinking is called *fail early and often*, which indicates that a quick try can reveal problems in a concept in an early stage of the process, which is usually positive and saves time and resources. *Show, don't tell* encourages visualizing ideas or building prototypes, instead of just talking about the concepts. *Focus on human values* suggests that the user should always be in the centre of the research. The attempt to clarify any ambiguity and to avoid vague problem statements is suggested by the *Craft clarity* mind-set. *Experimentation* should be embraced, and doing and making should be preferred over discussing and thinking (*Bias toward action*). *Radical collaboration* requires a diverse team constellation, along with the willingness to cooperate and to accept others' perspectives. *Be mindful of the process* suggest that following the design thinking process will result in successful outcomes. At the same time, people should be *open minded*, *playful*, and *empathetic*. And finally, *celebrating* successes is also an important mind-set of design thinking, which is why social events play an important role.

Cultural Dimensions

The goal of this paper is a comparison of the aforementioned design thinking criteria with cultural aspects and to identify related interconnections. For this purpose we refer to cultural dimensions defined by Hofstede (1980).

The tendencies of humans to react to a specific environment – such as an educational context – can be divided into universal, cultural and individual factors (Hofstede, 1994) (see Figure 2). Culture is a broad term that covers professional culture, organizational culture and national culture (Hofstede, 1994).

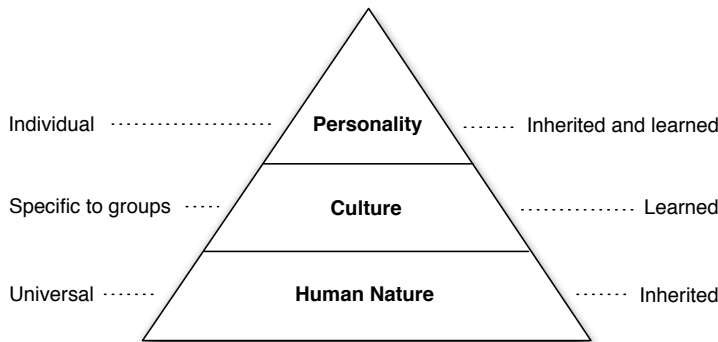


Figure 2: Three Levels that determine Human Action (Hofstede, 1994, p. 6)

Hofstede (1980) conducted a broad international analysis about work-related attitudes between 1967 and 1973 at IBM, in which he analysed about 117,000 survey questionnaires from 88,000 employees. Four dimensions of national culture were found by clustering answers about value orientation, and index scores for forty countries were developed. Index scores for the dimensions were normalized to the interval (0 , 100). The four dimensions are individualism/collectivism, power distance, uncertainty avoidance and masculinity/femininity (G. Hofstede, 1980). Later, a fifth dimension was added: Long Term orientation.

Table 1: Cultural Dimensions in different Countries (Hofstede, 1994)

Country	Power Distance (PDI)	Individualism (IDV)	Masculinity (MAS)	Uncertainty Avoidance (UAI)	Long Term Orientation (LTO)
Germany	35	67	66	65	31
UK	35	89	66	35	25
France	68	71	43	86	39
Hungary	46	80	88	82	50
Poland	68	60	64	93	32
Russia	93	39	36	95	–
Turkey	66	37	45	85	–
China	80	20	66	30	118
Malaysia	104	26	50	36	–
India	77	48	56	40	61
Australia	36	90	61	51	31
USA	40	91	62	46	29
Brazil	69	38	49	76	65
Argentina	49	46	56	86	–

Table 1 shows an overview of the cultural dimensions indices for selected countries. Those countries were selected based on the following criteria: a) at least one country from each continent, b) countries that have established design thinking schools or Universities, and partly c) countries where we have access to those design thinking institutions, in order to conduct case studies in the future. Note, that there exist countries with scores that are higher than 100. This is because Hofstede analysed these countries after he published the first scores and he didn't re-normalize the scores. For some countries no Long Term orientation was calculated. In the following, the five cultural dimensions of Hofstede are described briefly.

Power Distance Index (PDI)

Power Distance is defined as “the extent to which less powerful members of organizations and institutions expect and accept that power is distributed unequally” (Hofstede, 1994, p. 28). The PDI measures the preferences and perceptions concerning the decision-making style of superiors and the fear of disagreement with supervisors (Hofstede, 1994, p. 25).

Cultures with a high Power Distance Index (PDI) tolerate social inequality. The leadership style is benevolent autocratic and employees fear disagreeing with their managers.

In cultures with a low PDI, high social equality is expected. Employees prefer a more democratic style of leadership with more independence in decision-making.

Individualism versus collectivism (IDV)

The individualism-collectivism dimension measures the “relationship between the individual and the collectivity which prevails in a given society” (G. Hofstede, 1980, p. 148), and the degree to which individuals are integrated into groups.

Cultures with a high Individualism Index (IDV) have loose ties between individuals: “everyone is expected to look after him/herself or his/her immediate family” (Hofstede, 1994, p. 51). Work environments that are challenging and allow individual achievements and working styles are preferred.

Countries with a low IDV “are societies in which people [...] are integrated into strong, cohesive groups, which continue protecting them in exchange for unquestioning loyalty” (Hofstede, 1994, p. 51). Group goals and group harmony are more important than individual goals (Hofstede, 1994, p. 51).

Masculinity versus femininity (MAS)

Masculinity describes the “preference in society for achievement, heroism, assertiveness and material reward for success” (G. Hofstede, 1980).

Societies with a high MAS index are more competitive.

Femininity refers to “a preference for cooperation, modesty, caring for the weak, and quality of life” (G. Hofstede, 1980). Societies with a low MAS index are consensus-oriented.

Uncertainty Avoidance Index (UAI)

Uncertainty Avoidance is the “extent to which the members of a culture feel threatened by uncertain or unknown situations” (Hofstede, 1994, p. 113).

Societies with a high Uncertainty Avoidance Index try to manage uncertainty by following written and unwritten rules strictly and by establishing highly structured environments. Job tenure is expected to be very long. People appear busier and more restless.

People from low UAI societies are more comfortable with ambiguous and unstructured circumstances and dislike formal rules. They appear to be more “easy going” (cf. (Hofstede, 1994, p. 109) and (G. Hofstede, 1980, p. 110)).

Long-term versus short-term orientation (LTO)

In societies with a long-term orientation, “people believe that truth depends very much on situation, context and time” (Hofstede, 1994). There is an ability to “adapt traditions to changed conditions, a strong propensity to save and invest, thriftiness, and perseverance in achieving results” (Hofstede, 1994).

In societies with a short-term orientation, there is generally a “strong concern with establishing the absolute Truth”, a normative thinking, “great respect for traditions, a relatively small propensity to save for the future, and a focus on achieving quick results” (Hofstede, 1994).

Cultural Dimensions and Design Thinking

The fact, that more and more educational institutions for design thinking are established worldwide, raises the question whether particular cultures might influence the appropriateness and effectiveness of design thinking criteria and mind-sets. In the following we compare the design thinking criteria with Hofstede’s cultural dimensions in order to identify problematic or supportive cultural dimensions.

Table 2 shows a framework, mapping the identified design thinking criteria (DT Criteria) to the 5 cultural dimensions defined by Hofstede. The respective label (+/–) indicates, that a high value within the cultural dimension influences the respective design thinking criterion in a positive (+) or negative (–) way. No label means that there is no relevant influence.

The methodology for creating the framework was as follows: Three researchers, who have many years of experience in teaching design thinking in different countries, stated for each cell the expected influence. If there was a disagreement between the researchers, they discussed the influence until an agreement was reached. For each non-empty cell also the reason for the influence was described. A more detailed table that also provides explanations about why a design thinking criterion was labelled as positively or negatively influenced by the respective cultural dimension, is not included in this paper, due to the word limit, and is available upon request.

Table 2: Framework of Cultural Dimensions and Design Thinking Criteria

Category	DT Criteria	PDI	IDV	MAS	UAI	LTO
Process	Understand: Desk research	0	0	0	0	-
	Observe: Interviews	-	0	-	-	+
	Observe: Observations	0	0	-	-	+
	Observe: Cultural probes	0	0	-	-	+
	Observe: Try-it-yourself	0	0	-	-	+
	Observe: Storytelling	-	0	-	0	+
	POV: POV	0	-	0	0	-
	POV: Reframing + identifying (problems)	0	-	0	0	0
	POV: Persona	0	-	-	0	-
	POV: HMW	0	-	0	0	0
	POV: Frameworks	0	-	0	0	-
	Ideation: Be visual	0	0	0	0	0
	Ideation: One conversation at a time	+	-	-	0	+
	Ideation: Encourage wild ideas	-	+	0	-	+
	Ideation: Defer judgement	-	-	-	-	+
	Ideation: Build on the ideas of others	0	-	-	0	+
	Ideation: Go for quantity	0	0	+	-	+
	Ideation: Selecting ideas / voting	-	-	-	+	-
	Prototype: Drawings	0	0	0	0	0
	Prototype: Low-fidelity physical prototype	0	0	0	-	+
	Prototype: Roleplay	-	0	0	-	+
	Prototype: Video	0	0	0	0	-
	Prototype: High-fidelity prototype	0	0	0	+	-
Test: Getting feedback (interviewing)	-	0	-	0	-	
Test: Reflecting Feedback	0	0	-	0	-	
Test: Conversion/ incorporating feedback	-	0	0	0	-	
Iterative Loops	-	0	0	-	+	
Team/ People	Interdisciplinary	0	0	-	-	+
	Diversity (gender, nationality)	0	+	-	-	+
	T-Shape profile	0	-	-	-	+
	Small teams (5–6)	0	0	-	0	0
	No team leader, flat hierarchies	-	0	-	0	0
Distribution of roles and tasks	-	-	-	+	0	

Category	DT Criteria	PDI	IDV	MAS	UAI	LTO	
Space	Open space	-	-	-	-	0	
	Moveable furniture	0	0	0	-	0	
	Designated team spaces	0	-	-	+	0	
	Designated plenum/presentation areas	0	+	+	+	0	
	Designated areas for play	-	0	0	0	0	
	Designated areas for personal withdrawal	0	+	0	+	0	
	Informal meeting points	-	-	0	-	0	
	Writeable walls	0	-	-	0	0	
	Materials and toys on hand	-	0	0	-	0	
	Craft workshop	-	0	+	+	0	
	Music	-	0	0	-	0	
	Mindset	Warm-up games	-	0	0	-	0
		I like I wish (no criticism)	-	-	-	+	+
		Fail early and often	-	0	-	-	+
Show, don't tell (be visual)		0	0	0	0	0	
Focus on human values		0	0	-	0	0	
Craft clarity		0	0	0	+	-	
Embrace experimentation		-	0	-	-	+	
Bias toward Action		0	0	+	-	0	
Radical collaboration / teamplay		-	-	-	0	0	
Be mindful of process		0	0	0	+	0	
Open Mindedness		0	0	0	-	+	
Empathy for the user		0	-	-	0	0	
Playfulness		-	0	0	-	0	
Celebrate (every small success)		-	-	+	0	-	
Every opinion counts	-	+	-	-	+		

In the following we explain in more detail, how a high or low value in the respective cultural dimension might affect the ability to cope with specific design thinking requirements, regarding the four main design thinking categories: process, team, space, and mind-set.

Power Distance (PDI) and Design Thinking

Cultures with a high PDI accept or expect hierarchies and unevenly distributed power. This is contradictory to many of the identified design thinking criteria that require flat hierarchies and democratic team play. Strong hierarchical structures are usually not part of the design thinking culture. For example, in high PDI cultures playfulness might be difficult when your boss is around; the fear to make a fool of oneself in front of your superior might be counterproductive in ideation, where wild ideas are expected, or in role-plays, where it is easy to be embarrassed. Too much acceptance of hierarchies might also influence interviews and storytelling, since the feedback from people with a higher status

might be privileged, regardless of its relevance, while observations, desk research etc. are independent from the PDI.

Cultures with a low PDI might be able to cope better with teamwork. They easily accept that every team member is on the same level and that decisions are made democratically, e.g. by voting.

The PDI is mostly irrelevant when it comes to the use of analytical methods and tools (Synthesis, Frameworks, Persona etc.), and also most prototyping techniques (except role-play) are not influenced by the PDI.

Individualism (IDV) and Design Thinking

Cultures with a high IDV (Individualism Index) tend to focus on personal goals. They appreciate the individual and have loose ties to the groups. These characteristics might be problematic when it comes to the team-based approach of design thinking.

Cultures with a high IDV index are good in brainstorming, when wild ideas are encouraged. But besides that they might have problems with the typical design thinking process. Especially the analytical parts of the process (such as synthesis, frameworks, personas etc.) are more challenging in cultures with a high IDV, since these methods highly rely on mutual consent and agreement among the team members.

On the other hand, cultures with a high IDV can cope better with diverse teams, since they appreciate the individual and accept any eccentricity or quirkiness. For the same reason they accept the idiosyncratic opinions of every team member. On the other hand, a high IDV might contradict the idea of a T-shape profile, since high individualism usually results in fewer connections between individuals.

Also, in terms of the open space concept of design thinking, a high IDV might be problematic, since this requires a lot of respect in order not to disturb others by making lots of noise, for example. This is typically not a characteristic of cultures with a high IDV. On the other hand, these cultures feel comfortable with plenum spaces, and they like space for personal withdrawal.

Cultures with a low IDV might be better able to deal with teamwork in general and they are more likely to feel empathy for the users, during research.

Masculinity (MAS) and Design Thinking

Cultures with a high MAS (Masculinity) index might be characterized by competition among the teams; people are very career-oriented, which might result in a less T-shaped skill profile. Due to a lack of empathy for the user, these cultures might find it more difficult to conduct user research. In terms of the teamwork, cultures with a high MAS index might be problematic, because they care less for others and for group harmony. Based on the definition of the MAS dimension, we infer that they might not share their ideas so easily (e.g. on writeable walls), and are not so thoughtful in terms of making noise in an open space. On the other hand, they can cope positively with plenum and presentation spaces, and feel comfortable in the workshop where they can build something. Additionally, some of the design thinking mind-sets might make them feel comfortable, such as experimenting, bias towards action, etc. (they do not discuss and think much, instead they just act and enjoy it).

Cultures with a low MAS index, however, might be better in user research, because of their empathy.

Uncertainty Avoidance (UAI) and Design Thinking

Cultures with a high UAI tend to have a need for rules and structure. This might result in difficulties with the experimenting mind-set of design thinking and the playfulness. On the other hand, their preference for a structured environment with a strict set of rules might in fact be positive for the quite strict design thinking process in general. Regarding the space this might mean that cultures with a high UAI like the designated areas for specific purposes, but feel uncomfortable with flexible, moveable furniture. In terms of the playfulness, the impact of a high UAI value depends on the type of play: games with strict rules would be better than games that require lots of improvisation.

Cultures with a low UAI cope better with the uncertain nature of design thinking. They accept that the outcome of a project—the solution—is not obvious in the beginning. They embrace experimentation and accept failure as a tool to improve their solutions.

Long Term Orientation (LTO) and Design Thinking

The Long Term Orientation Index (LTO) seems to be the most relevant dimension for design thinking, in terms of the process, the ethnographic research methods, and the mind-set. Cultures with a high LTO (Long Term Orientation Index) should be able to cope well with most of the design thinking criteria, since they are open to alternative truths. They are open to new insights in any form of user research. Desk research, however, as a means to gather an 'objective' or 'absolute' truth, might be negatively affected. Also, any analytic method (framework, synthesis, etc.) might be challenging for these cultures, because there the goal is to define or to agree upon one truth. Low-fidelity mock-ups are preferred to 'almost-finished' high-end prototypes.

Cultures with a low LTO, on the other hand, might be able to cope better with the analytical aspects of design thinking (e.g. synthesis), and they can better cope with decision making (e.g. voting for ideas, craft clarity, or incorporating feedback). The concept of the space setup is not influenced by this cultural dimension.

Discussion

In this paper we present a framework of cultural dimensions (based on Hofstede (1980)) and a theory of the influence of culture on specific design thinking aspects. We highlight certain challenges some cultures might have with certain design thinking process steps, team constellations, spatial concepts, or mind-sets.

However, we cannot provide precise guidelines about how to deal with the consequences of this framework. One could either adapt the design thinking criteria to make people from a specific culture feel more comfortable (e.g. reduce the playfulness, change the space layout, establish more hierarchies with a determined team leader, etc.). However, the exact opposite might also be a promising strategy. Maybe, creating some kind of 'culture shock' and confronting people with inconvenient rituals is exactly what is needed to reach a creative leap.

Hofstede (1994) distinguished between professional, organizational, and national cultures, and he suggested the same five dimensions for organizations. Design thinking institutions (universities or companies that teach or apply design thinking) can be seen as organizations with a specific culture. An organizational culture can, to some extent, be different than the culture of the nation in which the organization is located. Because

Hofstede used his dimensions also for analysing organizational culture, we think our work might be helpful to understand also the effect of organizational culture on design thinking.

Summarizing the afore-mentioned differences in cultural dimensions, we can say that there is not one 'perfect' culture for the design thinking method. Every cultural dimension has some positive and some negative affects on design thinking, and every culture has some characteristics that can cope well with the methodology. This leads to our conclusion, which suggests to always combine team members from different cultural backgrounds within a design thinking project, in order to gain from specific positive aspects of one culture, and to balance possible negative aspects.

Limitations

We are aware that design thinking is a broad term that might be applied differently in different corporations and educational institutions. We refer to design thinking as it is described in the related literature, and as we have experienced it in an educational context at the HPI Schools of Design Thinking in Stanford/USA and Potsdam/Germany.

Also, we are not questioning any of the mentioned design thinking criteria, such as process steps, tools, space and team setup, and mind-sets, since a critical discussion of the design thinking methods and guidelines is not the scope of this research. We just analyse whether some cultures might be more predestined for the suggested design thinking criteria than others—according to Hofstede.

Another limitation of the study is that Hofstede's data is almost 30 years old; it is more than likely that some countries (especially Asian countries) might have experienced some major development during the past decades, and some dimensions might have changed accordingly. However, since there is no alternative data of such comprehensibility available, we are limited to Hofstede's dataset.

Of course all of these insights have to be handled with a lot of precaution. Obviously people are individuals, and the fact that one person has a specific cultural background does not necessarily mean, that he or she will behave as Hofstede's dimensions would suggest. However, we believe that in fact difficulties might occur, when taking design thinking to other countries without considering the different cultural traditions and mind-sets.

Future Work

In order to compare the results with our theory of cultural differences in design thinking, we are planning to conduct several case studies at other design thinking institutions. Furthermore, we want to analyse specific parts of the design thinking criteria in more detail, e.g. the role of the space.

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