

# Cultural impact on co-design teamwork in distributed bi-national teams

Jeff Man<sup>1</sup>, Yuan Lu<sup>1</sup>, Aarnout Brombacher<sup>1</sup>, Fangtian Ying<sup>2</sup>

<sup>1</sup>Eindhoven University of Technology

<sup>2</sup>Zhejiang University

## Abstract

This paper is designed to study the impact of cultural difference on co-design teamwork. The aim of this study is to explore the impact of supporting and hindering cultural factors on co-design teamwork in distributed bi-national teams from Netherland and China. In order to achieve the research objective, a bi-national co-design course was conducted by Dutch and Chinese design students, as a case study to investigate the impact of cultural difference on co-design teamwork. Due to impact of cultural difference in bi-national teams, design ideation and team communication were difficult but important for co-design teamwork. Based on the analysis and results of case study, it is necessary for designers to be aware of and make use of cultural difference for design ideation and team communication in distributed bi-national teams.

**Keywords:** *cultural difference, design teamwork, co-design*

## 1 Introduction

This paper is designed to study the impact of cultural difference on co-design teamwork. The aim of this study is to explore the impact of supporting and hindering cultural factors on co-design teamwork in distributed bi-national teams from Netherland and China. The correlation between cultural difference and design teamwork is regarded as main research object, cultural difference consisting of support factor and hinder factor, design teamwork including design ideation and team communication. Therefore the case is studied that how cultural difference has impact on co-design teamwork in distributed bi-national teams of Dutch and Chinese.

### 1.1 Research objective

This research is designed to study the impact of cultural difference on design teamwork in distributed bi-national teams. The aim of this research is to study the impact of supporting and hindering cultural factors on design ideation and team communication. A joint design course was conducted as a case study to investigate the role of cultural and national diversity on design ideation and team communication in bi-national design teams. The case was studied by following research question: how is the impact of supporting and hindering cultural factors on design ideation and team communication in distributed bi-national design teams from Netherland and China?

### 1.2 Design teamwork

The context of product development has become increasingly globalized in order to keep pace with resource availability and the demands of global markets [1]. Consequently related business processes become unavoidably complex. Much research has been done in the context of incorporating globalization dynamics in research and development, production, distribution and finance [2]. However, limited research has been found related to collaborative design in international teams. Collaborative design is often considered as an important application of information technologies and related existing research focuses very much on the development of collaborative computer systems to support collaborative design [3].

Globalization in the context of product design implies exploiting the knowledge and expertise of all parties involved in the design team, no matter how these parties are distributed geographically and organizationally. Therefore, the communication intensity needs to be high in these phases. According to [4] design ideation represents the creative process of generating, developing, and communicating new ideas in a design process, where an idea is understood as a basic element of thought that can be visual, concrete, or abstract. Especially, given the cultural diversity today's design teams, targets could diverge due to all kinds of misunderstandings, thanks to deference in attitudes, values, and norms [5]. Yet, although knowledge from various cultures from all over the world is needed to come up with new innovative concepts, research about the effects of cultural behavior and values on cultural diverse teams is lacking [6]. Current study focuses on this problem, and therefore, investigates the role of cultural diversity on design ideation in international design teams.

### 1.3 Cultural difference

In this study, culture refers to a community shared system of values, norms, ideas, attitudes, behaviors and communication [7]. Culture has impact on all kinds of aspects of design. It is important to address this, because culture is closely related to design. Different views in cultures may affect the collaboration in design teams. Team diversity can support design teams by for example increasing the number of different views, ideas perceptions, etc. and can also hinder collaboration. Figure 1 illustrates the difference between the Dutch and the Chinese culture in terms of the dimensions proposed by Hofstede.

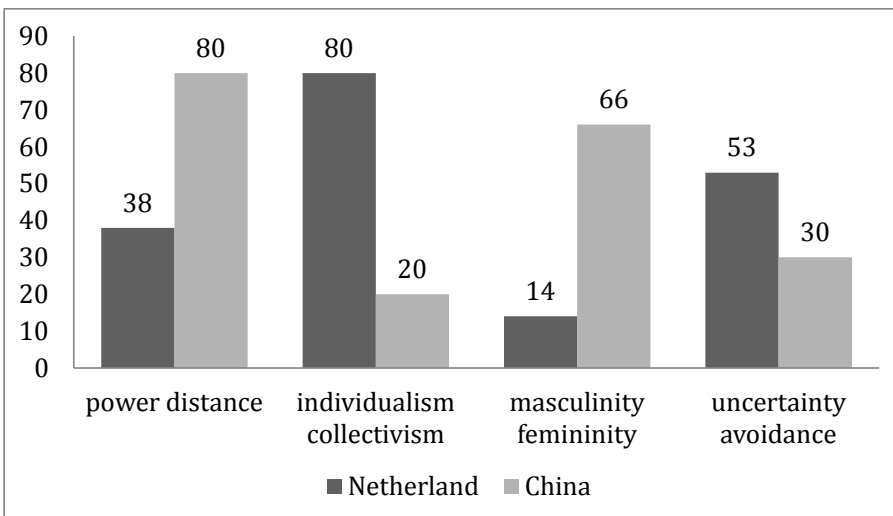


Figure 1. Cultural difference (Netherlands and China)

According to the cultural differences between these two countries [8], it can be stated that these differences can act as barrier in collaborative design ideation. However, it can be argued that these factors could evolve from hindering to supporting, when more understanding in cultural differences is reached within the design team along the design process.

## 2 Methods

In order to achieve the research objective, a bi-national co-design course was conducted by Dutch and Chinese design students, as a case study to investigate the impact of cultural difference on co-design teamwork. The case study observed design process and interviewed design team to explore the impact of supporting and hindering cultural factors and reflect the design teamwork of design ideation and team communication. In the case study, design students considered cultural awareness for elderly communication and experienced design teamwork in distributed teams. Meanwhile, reflection diary and design report were used to record their design teamwork and reflect their cultural difference. During design process, video conference was used for formal sessions with presentation, while email and instant message were used as team communication media.

### 2.1 Research model

As the research model in Figure 2, this research was designed to study the impact of cultural difference on the design ideation and team communication in distributed bi-national teams. The study was to identify the supporting and hindering cultural factors in distributed bi-national design teams from Netherland and China. The correlation between cultural difference and design teamwork is regarded as main research object, cultural difference consisting of support factor and hinder factor, design teamwork including design ideation and team communication. A joint design course was conducted by Dutch and Chinese students to study the impact of cultural difference on design teamwork. It observed and reflected design team to explore supporting and hindering factors of cultural difference in design process.

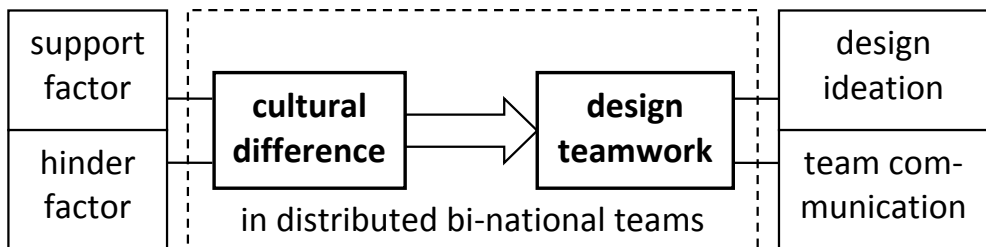


Figure 2. Research model (impact of cultural difference on design teamwork)

### 2.2 Research design

In the context of distributed design teamwork, the joint design courses with cultural and geographical difference in distant communication are increasing and becoming popular. This research discusses a master design course to investigate the role of cultural and national diversity on design ideation in bi-national design teams. The joint design course is conducted as a case to study in depth the design teamwork in the context of cultural differences. It is an effective way to observe design process and interview design team to explore supporting and hindering factors of cultural differences in design teamwork. The analysis focuses on the relation between cultural difference and design teamwork. The experiences of the joint design course have clarified the significance and usefulness of design teamwork. The joint design course involving Dutch and Chinese students explores significant cultural differences in the way of concepts ideation. The presentation and report reflect their cultural differences on

design process and link to their own cultural values. The observation and participation indicate that Dutch and Chinese students solved the design problems in culturally divergent ways.

### 2.3 Case study

The master design course was used as the case to study the impact of supporting and hindering cultural factors on design ideation and team communication. Bi-national teams were studied that contain both Dutch and Chinese industrial designer students.

The master design course was conducted in one week, and jointly executed by industrial design master students. The challenge here was to work with an international design team for the international market of Dutch and Chinese. During this week, they were asked to develop products for consumers in both countries. It was very important to take observations on how their different backgrounds influence design decision and communication within the team and how the requirements of consumers with different culture background differ. They were therefore asked to reflect continuously at the team level as well as at the individual level of their design process and to collect actively related user insights in these two countries based on literatures.

This master design course consisted of an iterative design project following two design iterations. The first iteration addressed only one market while the second iteration took into account the other market. It was very important that on the one hand, they understood the different working and communication culture and behavior in their team due to a different national cultural background; on the other hand, they understood the different user requirements due to a different national cultural background. The teams were encouraged to conduct small consumer research by making use of the time differences at the two locations.

### 2.4 Design course

There were 25 design students involved in the joint design course, 12 Chinese students and 13 Dutch students, who were divided into six teams with both Chinese and Dutch in each team. In total six bi-national design teams participated in the master design course. The design teams worked together through one entire week on two joint design projects consecutively. To control for extraneous factors that may influence the design ideation, only industrial design students from both universities participated in this course, and all teams were asked to use Skype as the only communication instrument through the whole week. Consequently, various types of data were collected, including direct observations by lecturers and documentation and reflection of the design ideation of individual team.

Table 1 Course program (one week with two design iterations)

| working day                     | design program       | team activity         |
|---------------------------------|----------------------|-----------------------|
| day 1 / iteration 1 / session 1 | kick-off meeting     | team composition      |
| day 2 / iteration 1             | concept ideation     | choose target group   |
| day 3 / iteration 2 / session 2 | middle presentation  | get feedback          |
| day 4 / iteration 2             | concept finalization | further detail design |
| day 5 / iteration 2 / session 3 | final presentation   | design report         |

As shown in the course program in Table 1, the formal meetings were organized as follows. Kick off meeting was held on Monday morning to introduce and compose the team. First iteration presentation and reflection were held on Wednesday morning. Second iteration presentation, reflection and evaluation were held on Friday morning. Tuesday afternoon and Thursday afternoon were planned for question hours via Skype. The presentation was an elevator pitch, including design problem with consumer insight, design approach and design

proposal with ideas and concepts, and reflection. The report structure included introduction with background and design problem, intercultural design process and approach, results of the first iteration and second iteration, conclusion and reflection both on team level and individual level.

### **3 Results**

Due to impact of cultural difference in bi-national teams, design ideation and team communication were difficult but important for co-design teamwork. Dutch and Chinese team members solved design problems in culturally divergent ways. Each team focused on different aspects of same problem and worked out different solutions. That was a challenge for design team to combine different solutions into one concept. In order to diminish the uncertainty of distributed teamwork, the design teams made a plan at the outset and had frequent meetings during the process. Besides, paper based communication, such as writing document and drawing sketch, could be used to assist information sharing and facilitate team communication.

#### **3.1 Design process**

In this course, the general course structure and process was given, but each individual team still developed their own processes. Due to the different cultures, within each team Dutch members and Chinese members differed in their design process, yet some of steps were similar.

Orientation started after the kick off, it was observed that Chinese students took initiative to set up the connection to build relationship, while Dutch students tried to make plan for the process. One team spent time on getting to know each other at the beginning of this project and this was initiated by Chinese team members. Another team started an introduction with each other in order to understand the other culture and then decided the design process together. It was shown that Chinese team members valued the relationships and intended to set up relationships before collaboration. All teams made a plan after kick-off meeting in order to clarify the design process and team collaboration and this was initiated by Dutch team members. It was shown that Dutch team members intended to minimize or reduce the level of uncertainty by plan. Due to time difference, the plan included both collective works (such as discussion) and individual works (such as sketch). There were also many collective works done by the team members from one side (for example, making user research and interview). In that plan, both Dutch team members and Chinese team members reached an agreement on workflow. The general design process contained literature study, user research, brainstorm, concept scenario, detail design and presentation. According to the different social environment and culture, each team operated this design process in its own style.

In design iteration 1, the first iteration of idea generation, both Dutch and Chinese team members discussed and chose the target group in the first internet meeting. Then Dutch team members started work on literature study and shared the key points with each other. While Chinese team members made user interview and shared the materials and results to the other side. According to the data from user interview and literature study, both Dutch and Chinese team members tried to create new ideas and concepts with brainstorm methodology.

In design iteration 2, the second iteration of concept development, all the team members made some progress. Dutch team members and Chinese team members improved the concepts respectively and then completed the most feasible concept as the final concept. Once the final concept was selected, all the team members worked together for presentation. Both Dutch and Chinese team members preferred to divide the work to avoid uncertainty. Dutch team members took charge of scenario, persona and specification. Chinese team members also took

responsibility of sketch, model and presentation. Finally they integrate them into presentation and report.

### **3.2 Team reflection**

During the course work, each design team reflected periodically on their collaboration progress and the design results. In this section, an overview of their reflections is provided.

As Chinese students and Dutch students worked in the international teams, it was a real challenge to deal with culture and language difference for this collaboration. To design communicator for elderly both in China and the Netherlands, they exerted their ability to improve this design project and collaborated with team members in both sides. In general, this international project was a challenge to both sides. It required the intercultural design and also the communication in different languages and cultures.

From the team reflection it was learned that due to the time difference, they made a plan at the beginning of the design process. They could work for nearly twenty hours in advantage, while it was not easy to communicate synchronously. That meant the two sides could not interact promptly, instead of that, they had to record the results and sent email to the other side to get some feedback with less efficiency. They also lost some subtle information in process and put more energy for explanation.

In this international design project, they also felt and learned culture differences between two sides, especially in the view of design problem. As to the same circumstance of target group, two sides were interested and focused on the different dimensions. That was also the reason why they had the variance for the target group at first and even different concepts in the design process. Sometimes it was hard to reach an agreement because of culture differences and language barriers. They had to communicate with written documents and interpretation.

With regard to the design process, they launched this project after the kick-off meeting. The Dutch team did literature study and Chinese team worked on user interview. The two sides found the different direction for the elderly and had to reach an agreement to focus on one target group. During the design process, they did brainstorm to create and develop design concepts and sometimes the discussion took long-time for detail design. They tried their best to improve the concept to fit for the needs of the target group. Considering the lifestyle of the target group, they thought about the design solution to trigger the communication between the elderly to enhance the social cohesion.

### **3.3 Analysis results**

From the data collected, it was noticed that Chinese team members were more collective, took more interaction and even worked together, while Dutch team members worked more individually, created new ideas and promoted to others. As a result, Chinese team members tended to design towards one concept, and Dutch team members tried to make design different from each other. Cater to the different solutions for target group, team members considered several ideas, modified and combined them into concepts.

In the process of collaboration, it was found that the communication of Chinese team members could be characterized as indirect and implicit, and the communication of Dutch team members were specifically direct and explicit. Usually Chinese team members were more polite and implicit to indicate mistake or misunderstanding, while Dutch team members were more direct and explicit to express their ideas and thoughts. It was shown that Chinese team members tended to have more power distance in their communication style than Dutch team members.

As a result of the process, team members had to come up with a concept. With regard to the concept, Chinese team members preferred more function with features, whereas Dutch team members preferred the concept with simplicity. Both sides reached an agreement for the final

concept after discussion and then improved and completed the concept. However, Chinese team members attempted to integrate multiple features, while Dutch team members seek necessary function for simplicity. It was shown that Chinese market required multi-function products to meet the need of consumers, and Dutch market required simple products unless the function worked well.

Because of cultural difference in design process, there were some difficulties for team collaboration. Dutch team members and Chinese team members had to interpret and understand the design process and reached an agreement on it. They also had better pay attention to the subtle different understanding of the same issue. Sometimes bad communication led to the failure of interpretation and understanding. Each team focused on the different aspects of the same design problem and worked out the different solutions. There was a challenge for international collaboration to combine different ideas and solutions into one concept. Paper based written communication, such as document and sketch image, could facilitate to combine various concepts.

Next to the cultural difference, there were also other challenges, such as time difference and language barrier. Time and place difference led to communication problems. Because of time difference, both Dutch and Chinese team had to manage the time efficiently. On the opposite, time difference also led to the continuity of the project. That meant the project could be developed for long time in one day and did not halt at night of one side. As to language barrier, sometimes minor verbal problem (such as pronunciation) caused misunderstanding and confusion in communication, but body language could lower the language barrier. Although internet connection was not enough for distant communication, shared document was used to facilitate communication. As a measure of design process, one team created a clearly written and updated document to record activities on paper, in order to clarify and understand design decisions and underlying reasons. Sketch was also used to assist communication. Moreover images contained more information than words in the international collaboration and communication. One team experienced that using images in distant communication worked better than using words. Furthermore frequent meetings were helpful to avoid uncertainty in design process. Thus both Dutch and Chinese team had several meetings for discussion to reduce the risk of misunderstanding and mistake.

#### **4 Conclusions**

Through observation and reflection on the case study, with regard to team communication, Dutch team members were specifically direct and explicit, while Chinese team members could be characterized as indirect and implicit. Dutch and Chinese team members had to explain ideas generated and understand decision made, and then reached an agreement with each other. They also had better pay attention to subtle different interpretation and comprehension of same information for team communication. Based on the analysis and results of case study, it is necessary for designers to be aware of and make use of cultural difference for design ideation and team communication in distributed bi-national teams.

According to the retrospective analysis, it could draw the following conclusions. Indeed, all cultural dimensions were found as hindering factors in the first design project phase. All findings were in line with the conclusion. For example, power distance and uncertainty avoidance were found as hindering factor due to their impact on communication style. In addition, it was found in most cases that Dutch designers were very direct and explicit in communication, while Chinese designers were very indirect and implicit in communication. Dutch designers insisted to make a plan at the beginning of the process and tended to stick to it throughout the whole week, while the Chinese designers worked as the process went on and when changes occurred in the planning they tried to be clear and informative. In return, frustration and confliction were created in the teams and some teams had two different design

ideation results in each design project instead of one jointly design ideation results. Especially in the case of individualism and collectivism, during the first design ideation, the Dutch design students took individually ideation, while the Chinese design students really tried to work collectively. As a result, many similar ideas were created by Chinese team members even across different teams. This result implied that collectivism was a barrier of the creative process that design ideation required. During the second design ideation, the teams had gained good insight on the differences between individualism and collectivism and their impact on ideation. They first worked collectively to define the design goal and agree on design process. Secondly they went for individual ideation as it stimulated the creative process. After that they went back again to the collective process in order to reach consensus on the concept selection. In this way, the collaboration profited from the improved cultural insight on the bi-national design teams.

Based on these and many other results from the data analysis, it could conclude that the early culture study already provided a good conceptual foundation to describe and support collaboration in bi-national design teams. However, this study more precisely investigated the supporting and hindering factors in design ideation. The initial results indicated that collaborative design ideation was a dynamic process. If the participants were willing to learn from each other and open for the cultural differences, they could find out the optimal process eventually. Collaborative design ideation was about collaboration with jointly actions, not about cooperation with independent tasks. Globalization has led to many cases of outsourcing, which calls more for cooperation than collaboration. In the case of collaborative design ideation, the team really needs to work collaboratively but also be creative. How to support the international collaboration in design activities based on the understanding of cultural differences and the characteristics of design activities are of importance for future design research in international context.

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