DESIGNING PRODUCTS IN MULTI-CULTURAL TEAMS IN THE CONTEXT OF EDUCATION

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ABSTRACT
The key to effective team processes and results is the quality of the cooperation between the team members. However, in design teams the quality of cooperation is challenged by an increasing heterogeneity due to the often multi-disciplinary and multi-cultural background of the team members.
During two student projects the relationship between the 'cultural profile' of individual students and their design processes and design results was explored. The study reveals that *cultural dimensions are influencing design behaviour in teams*: The 'cultural profiles' of the design students per nation differ from the profiles of their own nations. However the differences in between the design students related to the nation were still found. Results around three main groups of findings will be presented in the paper:
1. *Diversity creates creativity:* Explanation and discussion about cultural diversity seemed to improve cooperation and understanding of own identity. The diversity of methods, techniques and opinions about products and users was a rich input of knowledge that stimulated creativity. *2. Cooperation* between students with different 'cultural profile' *leads to global solutions*: Studying the product designs, it was not possible to distinguish solutions that are originated in cultural differences.
3. Communication creates difficulties: Differences between the groups can be related to communication. Since most of the students have difficulties speaking a common language such as English fluently design methods and tools described with a lot of text were difficult to use.

Keywords: Multi-cultural design teams; cultural differences; design education; methods and techniques; design communication; diversity

1 INTRODUCTION

At the Faculty of Industrial Design Engineering, TU Delft, design projects are playing a major role in supporting students to get hands on design and to learn coping with a variety of difficulties which occur during the complex process of designing. During the last five years the number of students from different nations and with different cultural background is growing [1]. Due to globalization we assume that in the near future the current design student generation will practice their profession in multi-cultural teams. Thus, for education as well as for industry it is important to understand how multi-cultural design teams work, what their benefits and limitations are in order to be able to steer and/or improve the process and the outcome. During a Hong Kong Summer course and a Dutch-Hong Kong student project in the Netherlands a study tried to find answers.

2 RESEARCH APPROACH

2.1 Assignments and subjects

Two student projects were object of the study, the summer course 'I DO' in June 2005 in Hong Kong (4 weeks) and a 'Hong Kong - Netherlands' project in August 2006 in the Netherlands (1 week). The 'I DO' summer course, organized by the school of Design of the Hong Kong Polytechnic University offered two design assignments; a public transport system for the West Kowloon District and an electric mode for personal transportation. The objective was to generate design proposals and present them in a final report, a poster and a short commercial. A total of 20 students, 4 students from 5 different nations, attended the course, (see table 1). There were students from the School of Design of the Hong Kong Polytechnic University (HK), the Faculty of Industrial Design of the Konstfack University, University College of Fine Arts in Sweden (S), the Faculty of Industrial Design Engineering of the Delft University of Technology in The Netherlands (NL), the Department of Industrial Design of the Korea Advanced Institute for Science and Technology in Korea (K) and the School of Design of the University of Cincinnati in the United States of America (USA). The number of female and male students was equal.

Table 1 National background and number of the subjects of the summer course

Nations	HK	S	K	NL	USA
Tutors	3	1	2	2	0
Number of students	4	4	4	4	4

The students worked in 4 teams of 5 students each and from each country one student. The tutors visited the course for several days and supported them by giving lectures and coaching. Two tutors, one from The Netherlands and one from Hong Kong, were continuously involved during the whole course. At the start of each week the students were told which deliverables were expected at the end of the week (such as sketch models of the design concepts, a commercial, an A0 poster, a research report, a final report). Design method, techniques, timetables etc. were not offered, so students were free to create their own design approach. The 'Hong Kong - Netherlands' project was attended by 9 Hong Kong students and 9 Dutch students divided in 3 groups with 3 Hong Kong and 3 Dutch students each, working on the design of a public playground in Rotterdam. Design method and techniques were prescribed, timetables were planned.

2.2 Research questions

The general questions were:

1. Do cultural values of product designers differ from the average cultural values of their nation, defined by the five dimensions of Hofstede [2]? If yes, how do they differ?
2. Do designers from different nations share common values defined by the five dimensions of Hofstede?
3. Does the cultural background influence the design process and the product in multicultural teams?

We defined the term 'culture' according to Hofstede as 'the collective programming of the human mind which distinguishes the members of the society or group from those of another' [2].

2.3 Assessment of data

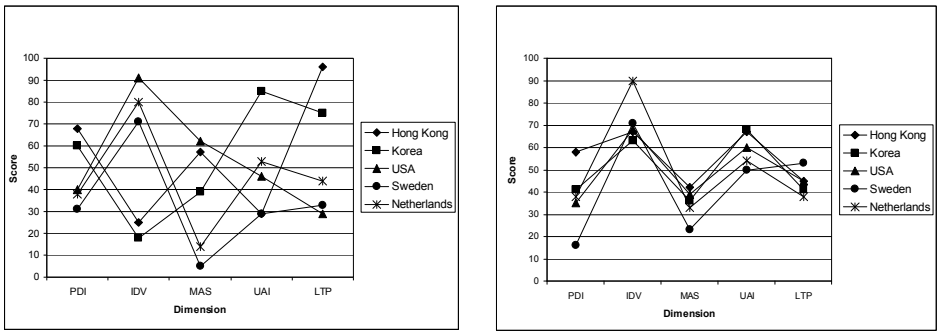
Focusing on the first and second research question the students had to fill in a questionnaire, developed by a consultancy [3], in order to define the cultural profiles of the students by nation and to compare the results with the average profiles of their own nation and with the profiles of their fellow students from the other nations. For answering the third research question each group of students from the same country were interviewed at the end of the courses. The interviews took about one hour and had the character of an informal group discussion. The design topics were:

- Management: related to the general process in the team during the design task:
  - General behavior in the team
  - Communication between team members
  - Roles and responsibilities of the team members
- Methods and techniques
- Products: related to product characteristics, features, functions, style and identity
- Users: related to the user characteristics, behavior, taste etc.

3 RESULTS

3.1 Questionnaire

The questionnaires were evaluated and profiles were built for each group of students from the same nation according to Hofstede. The five dimensions of Hofstede that differentiate cultures define the profile of Power Distance (PDI), Individualism (IDV), Masculinity (MAS), Uncertainty Avoidance (UAI) and Long Term Pragmatism (LTP).



Cultural profiles of the five nations *Cultural profiles of the students by nation*

Figure 1 'I Do' project: Cultural profiles of the five nations of the students (left) and the cultural profiles of the students by nation (right)

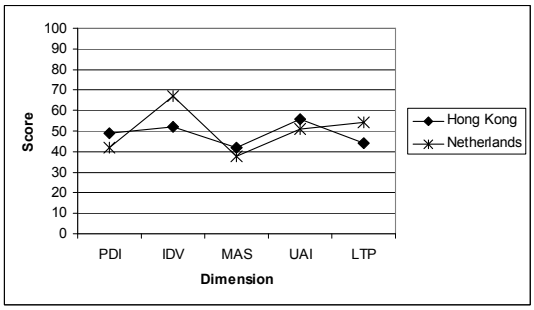


Figure 2 'HK-NL' project: Cultural profiles of the students by nation

The left diagram in figure 1 shows large differences between the scores on the five dimensions, especially between Western and Asian nations. Some explanations on how and why Asians think differently can be found in [4]. When looking at the right diagram in figure 1 and the diagram in figure 2 the differences between the students by nation are less although some differences between Western and Asian students are still visible.

3.2 Interviews

In the following the results of the interviews will be explained;

General behavior: The Dutch and Swedish students mentioned that some American students showed more confidence than others, expressed by phrases like 'yes I know, I am very good at..', gaining the credits for the design results and speaking about 'I' and not 'we'. The Swedish students prefer to talk about 'we'. This was said also to be expressed in their grading system; they do not get grades at all. The Americans could not imagine having no grades at all. The Dutch students perceived the Swedish students as 'very democratic', 'they want to discuss everything'. A Korean student mentioned that Americans were focused on planning, getting and selling the result. They felt they had to slow down the Americans. According to the Hong Kong students, Dutch students seem to be proud of their education; 'in discussion they have very strong opinions'. Also Korean students mentioned that Dutch students show a lot of confidence. Similarly the Americans express, according to the Hong Kong students, more often own opinions than others, and are more dominant because they are native speakers.

Communication: Korean students mentioned that in the beginning it was difficult to talk in the group. They stated that Western students feel freer to express their opinions and ideas. One Korean student said: 'I learned to tell before someone asking, not waiting for permission'. They learned in their own culture that the way of communication is depending on one's place in the social hierarchy. Students do not ask questions, because the professor might think that his/her explanation was bad. Western, especially American students learn that it is good to question and argue the theories of a professor. Dutch students however mentioned that communication and cooperation with Korean students went well because of a similar design approach. The Swedish students wanted more discussions with the Asian students, a 'yes' after a question was not enough, 'you had to ask consistently; 'what do you think?'. This statement confirmed the perception of Dutch students that Swedish students wanted to act in a democratic manner. An American student mentioned that he is lacking the sensitivity and experience to speak with people from different nations speaking different languages just because he can always speak his native language.

Roles and responsibilities: Dutch students mentioned that Hong Kong students could leave the group without announcements, their motivation and reasons were not clear to them. The Dutch and Americans perceived the Swedish as very democratic and the Swedish stated that that the Dutch were analyzing too much and did not discuss enough. Dutch students mentioned that some students were used to work more individually and that this might be due to the educational background. Korean students experienced that all students behaved individualistic, Western students however probably a little bit more. One of the Korean students mentioned that gender was playing a role; men were more deciding and selecting their own ideas.

Methods and techniques: Korean and Dutch students have learned similar design methods and techniques. In one of the groups only the Dutch student brought in methods and tools. A Dutch student experienced that the Delft method, as described by Roozenburg and Eekels [5], was too structured. The team members could not follow

this approach; they needed some more individual freedom and competition between each other. Dutch students mentioned that they learn to generate a variety of ideas and than select in a group whereas the American and Swedish students were working more individually without using specific methods. Dutch students perceived them less focused. Swedish student stated that if you are uncertain you need methods. They perceived the methods used by the other as 'intellectual' and preferred 'learning by doing'. A Swedish student found problems in understanding each others method: definitions are often not clear. The word 'concept' (business- or product concept)', 'brainstorm', 'mood board' and 'scenario' have different meanings in different schools. The Korean students are experienced in doing research and have good methods to organize the results. In the beginning of the projects there were no boundaries. Some of the Korean students preferred to have more boundaries but another student was happy to have not, because that was new to her. Especially the American students had many ideas without boundaries. One Dutch student experienced that the Dutch and Swedish students were doing brainstorming on a more abstract and freer way than the others and this was even irritating for the other group members, because it was going beyond realistic solutions.

Products: According to a Dutch student the American students were focusing on the outside (form), 'bodywork', only. Dutch students work from both sides (inside-out and outside-in). According to the Dutch student the American student was thinking in large sizes, a lot of chrome and his assumption was that European people like the American style. They did not think about technical details and semantics. 'They try to make it look simple, but technically it becomes more complicated'. The Korean student could distinguish a Swedish product style but it was not recognized in the project. According to the Hong Kong students; 'In graphics you can see the expressions of our culture, in products it is difficult to see, they are more global designs'.

Users: Students mentioned that everybody has his/her own image of the intended users. For instance a Hong Kong student was laughing when a Dutch student showed pictures of typical Hong Kong users. The Swedish students experienced that other students were thinking in stereotypes. A Hong Kong student stated that by explaining the other students the values of Hong Kong citizens she learned more about her own culture.

4 CONCLUSIONS AND DISCUSSION

In this paper we presented results of an exploratory study of the effects of cultural differences in multi-cultural teams in the context of education. As this study was only explorative it was in the end not possible to decide whether the experienced differences were due to differences in personality, educational background, culture or other causes. However this research, based on Hofstede's model, showed that, cultural differences *are* an essential part of individual contributions in the design process and influence the group process and the results.

The study reveals that *cultural dimensions are influencing design behaviour in teams*. Although the cultural profiles of the design students per nation differ from the profiles of their own nations, there were still clear differences in between the design students per nation. These differences were confirmed in interviews by the students.

1. *Diversity creates creativity:* Students stated that they were very happy to gain more insight in both, other cultures as well as their own culture. It seemed to improve their cooperation and their understanding of their own identity. The diversity of methods, techniques and opinions about products and users seemed to be a rich input of

knowledge, skills and insights that stimulate creativity. This corresponds with the statement of Banks [6] that multi-cultural teams are more creative.
2. *Cooperation leads to global solutions:* Studying the results, the product designs, it is not possible to distinguish solutions that are originated in cultural differences. This is basically due to the cooperation which led to 'a common sense approach' and thus resulted in 'global solutions' without an identity that was based on cultural values and habits, but on universal principles only.
3. *Communication creates difficulties:* A major of understanding was related to the different languages of the students, but also of the different understanding of design methods and concepts.
For a global design project we propose the following: In order to stimulate *creativity* (1) multi-cultural teams will be formed; each team member will have a different cultural background. Specific team roles will be divided by the team members themselves and design methods and techniques will not be prescribed. *Cooperation* (2); At the start of the project the cultural profile, personality and educational background of the team members will be defined. Theory on cultural diversity will be explained to the students and, together with the cultural profiles, discussed. *Communication* (3); In order to create a shared understanding on different design methods most important definitions related to methods and tools such as 'concept' will be explained and discussed and it should be agreed that hardly any text will be used but other communication tools such as drawings, images, gestures and three-dimensional modelling.
Further research should compare the outcomes, on both process and design, of such prepared multi-cultural teams with the outcomes of non-prepared multi-cultural teams and with mono-cultural teams.

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