TEACHING AND SUPERVISING DISTANT INTERDISCIPLINARY DESIGN TEAMS

Sus Lundgren Chalmers University of Technology sus.lundgren@chalmers.se

Jaap Ham Eindhoven University of Technology j.r.c.ham@tue.nl

Olof Torgersson University of Gothenburg olof.torgersson@ait.gu.se

ABSTRACT

Due to the multidisciplinary character of interaction design and Human-Technology Interaction (HTI), the type of the department that runs interaction design or HTI education typically has a major influence on the education, the courses and the students. We have explored these differences by co-organizing a course together, combining teachers and students from an interaction design-oriented education with those from a HTI-oriented education. In this, we wanted to expose ourselves and our students to the differences that occur when teaching these subjects from different angles, using them as a strength rather than a weakness; learning from them rather than loathing them. We also wanted to explore whether and how it is possible to run and supervise design projects online. The outcome shows that this approach can have great merits – for both students and teachers.

Keywords: Design teaching, multidisciplinary design work, distant collaboration

1 INTRODUCTION

Currently, there is no consensus on how to teach interaction design, or which courses should be considered "standard". Instead, there are several different approaches. One can for example deliberately focus on multidisciplinarity, group work and design as at for instance The Human Computer Interaction Institute at Carnegie Mellon University (John 2005) or the d.sign school at Stanford (Winograd & Klemmer, 2005). Another approach is to target on programming, running projects intertwining software design and usability, as is done at for instance the University of Hamburg (Obendorf et al 2005), or to let the education focus on user-centred design as at the University of Michigan (Olson 2005). Or one can take the same stance as at the Royal College of Arts in London; here the students get a theme and based on that come up with, and run, one large individual project per year, covering parts like field work, analysis, prototyping, strategy development and/or detailed design in the process (Baumann 2004).

Given the above, an interesting question presented itself; what would happen if we united students from different educations in one course? What could we learn from the teachers and teaching at another HCI/interaction design education? Would there be culture clashes? What could we and the students learn from that? How could the different perspectives be utilized in a cooperative design project? Would it be possible to supervise a design project run by remote design teams, and if so, how? These questions were the basis for the course that came to be called Chalmers Interaction Design Challenge, or CHIC for short.

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2 BACKGROUND: SETTING UP AM INTERNATIONAL COURSE

A while back, Sus Lundgren and Olof Torgersson, teachers at Chalmers University of Technology's master program in interaction design, got funding for such a project from IMPACT, a Chalmers-initiative, aiming to improve the university's master programs, handing out ca 3 million Euros over the years.

We decided to co-run our project with the HTI-group at Eindhoven University of Technology (TU/e), more specifically Jaap Ham and colleagues. To fit both educations and our own research interests, we set up a project course with a project concerning Persuasive Technology and aesthetics. We also met in Eindhoven to plan our course, and here, we ran into our first (educational) culture clash, much to our delight! When trying to come up with a suiting project theme, the teachers from Chalmers started a – for them – standard brainstorming procedure based on combining random words, much to the astonishment of the TU/e teachers who were not into design methods at all!

We however saw this difference as a strength, not an obstacle, and felt happy to have established cooperation with an education so unlike our own, combining the design focus of Chalmers with the test- and psychology oriented approach of TU/e.

2.1 TEACHING INTERACTION DESIGN AT CHALMERS: DESIGN

The interaction design program at Chalmers University of Technology, in Gothenburg, Sweden, is a two-year international master's program where all courses are taught in English. The program admits students from a variety of backgrounds, albeit the majority of the students have a background in computer science or information technology. Some 15-20% of the students are international. Compared to most other interaction design educations, Chalmers admits a rather large number of students, typically 40-50. The heterogeneity and the comparably large number of students is seen as a possibility rather and a problem, and has resulted in various strategies, e.g. utilizing students' different backgrounds (cf Lundgren 2009). Much of the work is carried out in groups.

The education's focus lies on design and prototyping. The core courses, which all students have to take, are courses in graphical interface design, ubiquitous computing, design methods, UCD, and analysis methods. More or less all courses contain substantial design projects where students develop and prototype their own designs.

The topic that we wanted to bring to our joint course was aesthetics of interaction. Lately, there has been a lively discussion on aesthetics in the interaction design community, and a number of different ideals or approaches have emerged, e.g. designing for function, pleasure, playfulness, or provocation, or to engage all senses or the entire body in interaction. We wanted to present these different views to the students and then encourage them to take on one of them in their design project. Taking different aesthetics into consideration and then coherently pursuing one can – should – be a natural part of interaction design.

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2.2 TEACHING HTI AT TU/E: HTI AND PHSYCOLOGY

In contrast, the master program of Human-Technology Interaction (HTI) admits ca 20 students each year, from diverse backgrounds. The program is based on three fundamentals: human behaviour, specifically applied to technological settings; user-oriented development of technological products and environments; and scientific methodology, most specifically empirical research methods. Thus it provides fundamental knowledge from the psychological sciences covering basic themes such as perception, cognition, language and communication, attitudes and social cognition. This basic knowledge is then applied to a technological domain (e.g. ICT or sustainable energy) of the student's choice.

One of the core topics in the HTI master is persuasive technology, i.e. technology designed to influence behaviours or attitudes of a user, as defined by B. J. Fogg (2003). Recent research also suggests that *ambient persuasive technology* (Davis 2008: Ham et al 2009) is able to influence attitudes or behaviour without any conscious attention to that persuasive technology by the person being influenced (Ham et al 2009).

In the current course, we wanted to explore this new and exciting type of technology—not only because it necessitates a combination of knowledge about very new insights into (unconscious) psychological mechanisms and very new forms and designs of persuasive technology, but also because a lot of human day-to-day behaviour is driven by unconscious motives (Barg & Chartrand 1999) and thereby the importance of ambient persuasive technologies that influence these motives might be major.

3 METHOD: ACTION RESEARCH

The research presented in this paper is a case study, and the major research approach is action research; a form of self-reflective, often cyclic, research where the active practitioner studies, analyses, reflects on and improves his or her practice, which in this case is teaching (Costello 2003, pp. 4-5). According to Carr and Kemmis, (1986) the action part is the very part of the cycle where we probe into the future, proposing change, leaving reflection behind and turning it into action. Since the researcher/teacher looks at her or his specific teaching situation an argument against action research is that it does not generate general knowledge, something that can be countered by either carefully explaining the contexts to one's study so that others can take this into account when applying one's findings (Costello 2003, p.46), or if the research results in products or instruments that can be used in other contexts (Herr and Andersson 2005, p. 6). In this case, our findings may well be transferred to any course or project that incorporates remote teams. To ensure reliable data we are using three different data sources; our own observations, the student's opinions as expressed in the course questionnaire, and the products the students handed in.

4 THE COURSE: CHALMERS INTERACTION DESIGN CHALLENGE (CHIC)

In short, the course was a project course, where students worked in mixed groups. Their task was to design a more or less advanced prototype presenting an ambient persuasive technology. The students needed to take a clear

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aesthetical stance in their design, and they also had to address the testing of the persuasive concept; either by making empirical testing of the major concept before the design, to steer development, or in the form of an extensive research proposal in the report, focusing on how to test the final suggested design. In this way the core disciplines from both educations were combined and covered. To spice it up even further, the group presenting the best design should be awarded with 1000 Euros per person.

Figure 1 –The various phases of the course; getting to know each other in Eindhoven, coming up with concept ideas, creating prototypes (here a concept movie) and presenting concepts.

All of the groups contained four members, two from each university, combined in such a way that their combined skill set was as large as possible (based on students' self-assessment of their skills). All groups but one contained two males and two females, and all groups but one had students of 3 different nationalities. In total, the students came from nine different countries, adding not only multidisciplinary but also several cultural backgrounds to the course.

For a full schedule, project description etc., see the course's home page: http://www.cse.chalmers.se/research/group/idc/ituniv/courses/chic/

4.1 THE 1ST WEEK: LITERATURE STUDIES AND ASSIGNMENTS

The course was run as the first course after summer, which meant that we could not take the Chalmers students to Eindhoven the first week. Instead, the first week was dedicated to starting up group work and necessary background reading on the course's two topics: persuasive technology and aesthetics, collaborating online to carry out some group assignments. The aim of these assignments was both to ensure that the students read the literature and, more

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importantly, to introduce them to each other, and confront them with the
difficulties of online collaboration.

4.2 THE 2ND WEEK: INTRO WEEK.

The introduction week took place in Eindhoven and started with a group activity
and dinner on the Sunday evening right after arrival of the Chalmers students
and teachers. After introductions and an overview of the course, the first day
started with a presentation by each group of the results of the preparatory
group assignment. Next followed an in-depth overview of the state-of-the-art of
research on (ambient) persuasive technology in the form of a two-hour lecture
by Jaap Ham. In the afternoon, students had to work on a second group
assignment on persuasive technology. The second day consisted of a lecture and
assignments on aesthetics and design by Sus Lundgren, followed by a design
exercise to be carried out in the groups. The third day covered a short lecture on
project management, as well as a lecture on the ethics of ambient persuasive
technology. Thereafter an intense group work session started; groups worked on
their concept ideas for two days before presenting their best five concepts for
each other and the Eindhoven teachers the fifth day.

4.3 THE 3RD – 7TH WEEK: REMOTE WORK.

After the intro week, the Chalmers students and teachers returned home, and
the online collaboration design work started. The groups chose their two most
promising concepts, elaborated them and got written feedback from all teachers
before choosing their final concept. The typical organization within the groups
was that they had Skype-meetings on a regular basis (e.g. once or twice each
week) and that Google docs was used to shared written documents and plans. E-
mail was also used a lot.

Each group had supervision meetings with their local teachers on a weekly basis.
Between supervision meetings students worked by themselves. During these
weeks, groups met one of the two teachers at each site each week. So, each
teacher met each group every two weeks in this five-week period. In addition to
these supervision meetings, students had to hand in several design documents
for feedback.

It soon became clear that most groups divided the work based on the
differences in skills trained at the two universities. Students from Chalmers took
care of design and prototyping, while the students from TU/e focused on
collecting background material and doing psychological studies. Then they
communicated their ideas and findings respectively, affecting each other's work.
Still, they did not cooperate as tightly as we had wished.

4.4 THE 8TH WEEK: FINAL WEEK.

Before the beginning of this final week, Eindhoven students travelled to
Gothenburg. Here, they spent three days finishing their project reports (due one
day before the presentations to give the teachers time to read them), finalized
their prototypes and practiced presentations. The last day, each group gave a
30-minute presentation of their concept and prototype, followed by questions
and the teachers trying out the prototypes. In the afternoon, teachers discussed
their assessments of each group's performances with each other, and struggled
to come to a unanimous judgment about which group won the first prize. Again

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we experienced a slight culture clash: Two groups were very close, one of which
scored best on persuasive tech criteria whereas the other's design scored better
on design criteria and this resulted in a long discussion on what was "best" in
relation to the given task and the grading criteria we had set up. Finally, a
decision was made and the winning group was presented at the public prize
ceremony (Fig 2). After a well-deserved farewell party, the TU/e students and
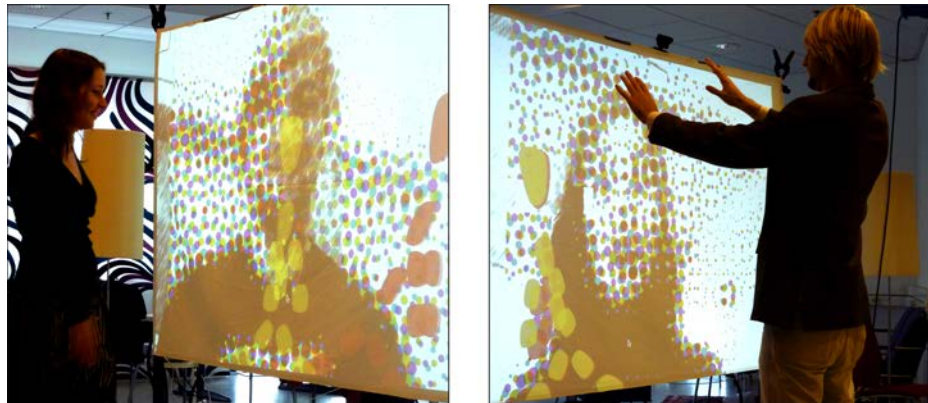their teachers returned home, and the course was over.

*Figure 2 –The winning concept, Social X-ray (designed by Mieke Kleppe, Bo Merkus, Laleh Omalaki and
Steffen Streatz) is an interactive, two-sided wall. It shows three things; a vague human shape
representing the user, mimicking his or her movements, another similar shape, mimicking the
movements of the person on the other side of the wall, and a background image showing a distorted
image of the person on the other side. The image gets sharper if the user moves much or goes very
close to the wall. The general idea is to persuade people to interact with the strangers around them, in
a public place*

5 OUTCOME: LESSONS LEARNED

But – what did we learn from this, in terms of running international courses with
remote design teams? The conclusions in this section are based on three
different types of data; our own observations, a questionnaire that the students
answered after the final presentations but before the prize ceremony, and the
material the students handed in. As you will see our findings suggest that three
issues are especially important for the effectiveness of the current course
format: adequate awareness of different (cultural and disciplinary) backgrounds,
coherent supervision and as much face-to-face time as possible.

5.1 QUESTIONNAIRE DATA: THE STUDENTS' ASSESSMENT

After the final educational activity, we assessed students' opinions about the
course through an anonymous questionnaire. Twenty-one of the 24 students
handed in a completed questionnaire. Overall, students were quite satisfied with
the course in general ($M = 3.6$) and the teaching ($M = 3.5$; 1 = low satisfaction,
5 = high satisfaction). Furthermore, results of this questionnaire suggested that
more than half of the students found it frustrating that they had different
approaches and backgrounds. Also, results suggested that the most common
sources of cooperation conflicts were different ideas about the concept idea
(mentioned by 5 students), different working methods (4), different design

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approach (3) and different backgrounds (3). We argue that these sources for conflict might for a large part stem from the difference locations of team members; as many as thirteen students report that they cooperated well with their local team mate whereas conflicts arose with the two distant team members. Seven students reported no conflicts in their team.

All students but two (i.e., 19) stated that the distance affected the working process negatively, and that the main problem (pointed out by 13 students) was that they experienced online communication to be harder than face-to-face communication. Again, some students mentioned cultural differences (3) and different backgrounds (3) as issues that complicated communication. Relatedly, *all* students indicated that the fact that they met during the intro week mattered, 12 even though it made a great difference. When asked how to improve the course, nine students suggested more face-to-face time.

These results suggest that both distance and differences in backgrounds hindered communication and thereby project outcomes. As major reasons for group conflict, four students blamed different working methods, and four mentioned different design approaches. When asked how to improve the course, eight students suggested that it was important to clarify different backgrounds, both in terms of the different educations, and each person.

Results of the questionnaire also suggested (corroborating student remarks with our own observations) that local supervision in online collaboration weeks had the major disadvantage that each pair of teachers in their supervision of their home-town students focused more on their own specialty, sometimes resulting in contradictory wishes from teachers. Therefore, a major improvement would be to supervise the entire group (through online means). A related important improvement, we argue, is that groups should be asked to articulate decision procedures, decisions, and responsibilities.

Notably, all students found the course to be time consuming (11 very much so), despite the fact that the reported average time invested (19.3 hours per week) was less than the demanded time investment (approx. 25 hours). Intriguingly, all (but 1) students indicated to have done their share (3 students) or more than their share (16) of the work. These (psychologically not uncommon) perceptions may have been the cause for frequent reports by students to their local teachers indicating that they were working harder than the remote students. A cause for these perceptions might not only be working at a distance, but also deficiencies in students' knowledge of each other's backgrounds and respective disciplines (e.g., time and effort needed for design processes and for experimental testing, respectively).

On the bright side, the four things students claimed to have learnt the most from were working in groups, the literature, each other and the work of carrying out the design process. This suggests that the sometimes-annoying process of cooperating in multidisciplinary teams at distance was a learning experience after all, just as we had intended. And, 19 students thought that the course was fun rather than not fun, 20 thought it was interesting rather than uninteresting. Finally, students were also very positive towards their final design concept.

5.2 TEACHERS' OBSERVATIONS

We had believed that there would be a fierce competition for the prize, resulting in extraordinary concepts, but the concepts and prototypes were at the same

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level as in Chalmers' ordinary project course, albeit more thoroughly researched. The competition *did* affect the students, but more in the sense that groups were anxious to know how the other groups did, which for instance resulted in a pre-test boom. According to the questionnaire, only seven students really wanted to win the money. Another five did not care about the money, but wanted to win anyhow. Another five did not care about the prize at all. Apparently – and somewhat to our positive surprise – the major reason for applying to the course, as stated by twelve students, was the international exchange.

Another issue was that the students' focus on aesthetics got lost somewhere in the process; it was seen as just an extra necessary add-on, rather than the fundament of design, much to our disappointment. Since persuasive technology was a much more tangible project requirement, focus landed there instead. This suggests that one should not try to introduce too much new theory in such an online project course, or make sure that both aspects are equally important; otherwise the least important one will drown in issues about communicating and collaborating.

As for our interpretation on how well the groups cooperated we noted that the students stuck to the specialty that they brought with them from their education, e.g. the Chalmers students designed and the TU/e students tested. After all this is the most effective way to work, but we had still hoped that some students would engage in the others' specialty, e.g. Chalmers students performing tests in Gothenburg. If one wants to achieve this, we think that one must state this initially and possibly also create pairs of remote students and assign them to one half of the project, and then pair the pairs.

When analysing our own teacher-role in the course, we can conclude that we should have strived more for a more coherent approach; partly by supervising entire groups, partly by setting up a system for giving students feedback. In such a multidisciplinary remote course as CHIC it is very important that teachers from both approaches give input to all students. For example, the Chalmers teachers had to leave Eindhoven after the first three days of the intro week, due to teaching in other courses. This meant that they could not give their design- and aesthetics-oriented feedback to the groups when these presented their initial five concepts, possibly resulting in the ignorance towards aesthetics, and some extra confusion when it came to choosing a final concept, despite the written feedback that was given.

As already mentioned we also clashed slightly when it came to the grading criteria; they were not exact enough. On the other hand it's very hard to come up with exact grading criteria when it comes to judging design. A mistake we made here was that we all tried to grade all parts, i.e. parts that were not part of our expertise. Possibly it's better to divide grading into distinct parts, which different teachers take responsibility for.

6 CONCLUSION AND RECOMMENDATIONS

To conclude, we argue that the format of the current course has several very important advantages. By its very nature the current course format is very well suited to reach learning goals related to international and intercultural (online) collaboration and group work. Also the current format with its interdisciplinary approach of teaching is unique in being able to teach through an interdisciplinary perspective on design and HTI.

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There are of course a couple of things that one must pay extra attention to if arranging such a course. Firstly, it is important to communicate frequently, and preferably use webcams or a conferencing system. For the students this *is* important in the design process because it's easier to make, show and discuss quick sketches, which then can serve as a basis for decisions, rather than just orally discussing ideas. This is also a way to increase the face-to-face time, something that nine students wanted when asked how to improve the course. Also, students' face-to-face time could be increased by either just increasing the time in general, or by omitting shared lectures, instead turning them into reading assignments.

Teachers must be very coherent in their teaching, having their own weekly meetings, communicating issues like what was going on in the different groups and in the class as a whole. When teachers are co-located this tends to happen automatically, which is note the case for working remote – thus having organized meetings becomes crucial. Also, we strongly recommend that this be maintained by having online supervision meetings with entire groups, not just one's local students. Preferably teachers from both universities take part in these meetings.

In order to help students utilize each other's strengths and realize the differences between the two educations one must really give a proper introduction to how the educations differ, as well as demand from students that they introduce themselves and their skills more thoroughly to each other. If one wants to avoid issues based on (ethnical) cultural misunderstandings, language barriers and different working cultures, one might want to collaborate with a school from the same country.

One must choose the project task/content carefully, formulating it in such a way that both educations' and their students' strengths are significant. If possible, the project should be multidisciplinary in such a way that it cannot be easily divided in two parts, carried out independently at the respective universities. E.g. in CHIC, we countered this by having psychological theory affecting design which in turn affected testing which affected (re)design. Albeit desirable, one cannot expect that students actively and thoroughly teach each other their specialties; then again this is not the aim of the course. The aim should be to give both students and teachers an insight in how others, coming from a different angle can approach a certain task, get respect for and somewhat insight in the other's specialties, as well as realize how one can adapt to and utilize a multidisciplinary environment. In that respect, the CHIC-course was really a success.

7 ACKNOWLEDGEMENTS

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