

DESIGNING DISTRIBUTED DESIGN STUDIO

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ABSTRACT

This paper outlines the process of designing a globally distributed design studio, which aims to provide future Industrial Design graduates with experience in using skills that will enable them to work successfully with various members in the distributed product development process. The course was jointly developed by academics from two universities and combines face-to-face interaction with web-based teaching and assessment. This paper aims to provide insight into the technical and organisational challenges and issues that had to be resolved to establish such a course.

Keywords: distributed product development, cross-institutional delivery, curriculum development, industrial design

1 INTRODUCTION

In many developed countries, a significant part of the product development process is being outsourced to countries with lower staff and production cost [1-4]. This distribution of the product development process means that designers need to be able to communicate design requirements across physical and cultural distances and to provide briefs and feedback to project partners elsewhere. Curriculum development in the higher education of industrial designers and engineers needs to take into account the changes in contemporary manufacturing organisations and provide students with skills set for operating effectively in these settings [5].

Current design education does little to prepare designers for these aspects of the job market. The majority of teaching is conducted face-to-face and within the dominant culture of the country with few exceptions of collaborative projects between universities across countries and continents [6-8] during which students worked together on one assignment in different locations. The participants of these projects developed their IT and communications skills and gained some experience in cross-cultural and long-distance communication. However, these projects have been restricted to small groups of students as both, costs and supervisory effort are prohibitive. Also, this type of collaboration is just one type in the spectrum of virtual collaboration: in multinational companies teams may be working on the same task in different locations, but for the network of companies a clear differentiation of roles could be more representative [9, 10]. The course described here aims to capture the lessons learned from previous experience but in a setting more amenable to larger groups and budget constraints.

The course titled 'Globally Distributed Design Studio', which was jointly developed by academics from two universities, is aiming to address the development of specific skills by linking student teams across the globe in designer and client roles. In addition to the

skills of analysing, generating and evaluating [11] this course focus is on developing process skills such as cross-cultural communication, efficient use of IT in distributed work settings, critical reflection and workload and project management, as these skills are becoming increasingly important in new product development processes [12, 13].

The course was developed in 2006 and will be delivered in 2006/7 for the first time. This paper provides insight into the challenges and issues that had to be resolved by the involved academics of two universities while jointly designing the new curriculum. The paper reflects the implications of design education as well as the skills required by design educators for such a program.

2 GLOBALLY DISTRIBUTED DESIGN STUDIO PROCESS STRUCTURE

The concept for the design studio was developed over the course of three months during which one of the authors was on sabbatical at the other authors' institution. The authors were therefore fortunate to be able to discuss the requirements and implications in detail and in a co-located manner. The starting point was to re-define the collaborative setting so that the distance would replicate designer – client interactions. Then, skills and learning outcomes were identified from the literature and discussed with colleagues and educational advisors. In order to develop a teaching schedule the time overlap between both institutions had to be determined, which resulted in a timeline of merely 10 weeks. A draft syllabus was conceived and the authors started to lobby for institutional support, as the course had to be ratified by educational committees. At the same time preparations were made for the required IT infrastructure and the course evaluation. After the go-ahead the detailed content was developed from existing and new material of all contributors.

The Globally Distributed Design Studio has been designed so that students develop and gain experience in using skills that will enable them to work successfully with various key players in the distributed product development process. These skills include:

- Develop and gain experience in using distance communication and quantitative information/knowledge transfer
- Develop teamwork skills in a virtual setting
- Reflect on the local culture
- Explore cultural issues and concepts
- Improve skills in writing and evaluating design briefs
- Develop means to communicate the design strategy to a client
- Use technical drawings as a means of distance communication
- Make a design prototype based on supplied drawings
- Provide critical feedback
- Understand the impact of distributed design process on strategies and design outcomes.

The Globally Distributed Design Studio was developed as a course during which students could practice distributed working in settings where distance is used to provide students with an experiential learning environment. The basic idea was to link student teams across the globe in designer and client roles. These roles should provide a clear project demarcation providing students with relative independence from their group members at various stages of the project. In addition, these roles should stimulate discussion and critical reflection amongst the group members.

The following course process structure was developed to support development of the above named skills in the Globally Distributed Design Studio. Students from two education institutions, located in two different countries, are allocated into distributed product development teams. Each of the teams has members from both institutions. Each of the team members performs two roles, designer and client. Each of the teams will go through the following eleven steps during the design exercise (see Figure 1).

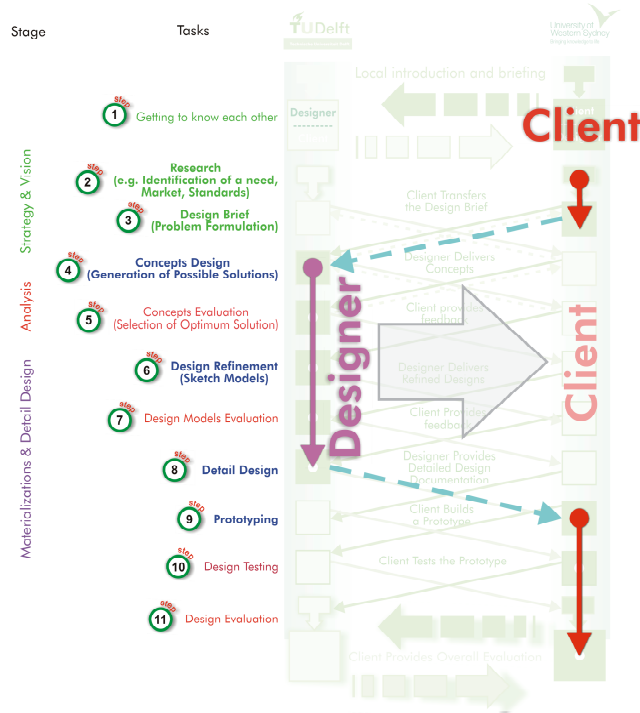


Figure 1. Indication of the activities in managing distributed client relationships course

(i) The first step is to form teams and getting to know each other. (ii) The clarification of the problem requires that each team individually develops a design requirement list, and writes a design brief for a product suitable for their own country. These specifications form the specific client requirements. (iii) Then, the design team members exchange their design briefs. (iv) The development, exchange and (v) evaluation of the concepts, (vi) models and design briefs follow on this. An initial exchange should encourage a discussion about similarities and differences between the two countries/institutions for the particular product. During the design exercise, each of the design teams is working on design concepts aimed for the other country, so that designers from one country develop design concepts (vii) and models based on the briefs/client specification intended for the other country's market, and vice versa. (viii) Development of the detailed design proposal is followed by (ix) the final prototyping of the design concept which is again done by each of the group member counterpart. Finally the client (x) will test the design prototype, which is then (xi) evaluated.

3 CHALLENGES

During the development of the course, a number of issues and challenges arose that had to be addressed. We will discuss those that are likely to be of relevance to other institutions, too. The major issues were to pitch the curriculum appropriately for both institutions in terms of the timing and assumed skill level, and to define learning outcomes that were consistent with both degree programs. The assessment had to be designed to measure the above-mentioned skills for distributed product development and to encourage individual and group reflection. The development required clear ownership at both places as well as institutional support.

Timing

The start of the academic year, semester and subject length varies from country to country. In order to overcome this issue, a teaching period with the best overlap was including any breaks and holidays, was identified. The challenge was then to convince the respective committee of this non-standard solution. The teaching period was then structured for each week in regard to: (i) lecture topics and supporting exercises, (ii) tasks that students should complete by that week, (iii) expected learning outcomes, (iv) staff involved in class support and delivery during that week, (v) suggested reading and (vi) research questions for course evaluation to guide future improvements.

Defining the assignment and prerequisite student skills

The assignment chosen for the pilot was a toy that would reflect cultural expectations as well as different regulatory standards in both countries. Students should already have basic design skills and experience of working within teams, so that they are able to communicate design intentions as drawings. It was also seen as crucial that students should prototype the proposed design developed by their counterpart. In order to minimise the prototyping time, ideally a rapid prototyping machine would be used. This means that students need to have well-developed CAD skills in order to model their designs and a good basic understanding of electronics and mechanics.

Ownership of the programme

Any collaboration across distance requires commitment and ownership at both ends to sustain any difficult periods. Care was therefore taken to ensure that the structure of the program allowed the course to be co-owned by each of the institutions.

Assessment

The assessment had to conform to requirements at both institutions and provide a means of reflection that was consistent with the web-based format. The assessment was also seen as an instrument for studying how the teams interact and cope with the lack of face-to-face contact in order to evaluate the course and address specific difficulties students might encounter. It was therefore decided that the assessment would consist of the design brief, the design evaluation report, a design process diary, a virtual client presentation and a final report with drawings and prototypes/user experience. The design evaluation report and the design process diary are regarded as team based and also evaluated on a team level.

Resources

The course was structured so that where possible, the existing physical resources were utilised. The main investment consisted a set of web-cams for the student team. It was

the academic staff time that represented the bulk of the resources needed while developing this course. This was seen as an advantage of this approach, as it did not require 'cashed-up' academic partners and a substantial amount of industry funding.

Language barrier

It has been identified that language proficiency could act as a barrier to successful communication in virtual settings. At TU Delft undergraduate courses are usually taught in Dutch and only Master courses are delivered in English. It was however felt that the course may provide an opportunity to practice English as a lingua franca as long as the "technical language" is sufficiently similar for exchanging information. In addition, this studio is an opportunity to illustrate to students how import the language for a successful design process can be.

Academic staff skills

The diverse skills at the two participating universities provided an opportunity to develop a broad range of comprehensive classes to complement the studio experience. Cross-disciplinary staff with various skills and backgrounds (e.g. industry experience, cross-cultural design transfer research, educational advisory, design management, and psychology of designing) participated in developing this course. Thus, the diversity of the team provided the necessary support for the diverse weekly tasks in order to enhance the learning outcomes of the students.

DISCUSSION

The described course passed organisational hurdles and gained institutional recognition. It has succeeded in developing a cost-effective framework for addressing industry needs and future skills required for international collaboration. Universities can mix and match their strengths for collaborative projects relatively easily. The course development provided learning opportunities for the involved staff, both in terms of IT skills and the content, colleagues were contributing. A key success factor was the small core team in both places. However, it has still to be tested for feasibility and student approval. If deemed successful, the intention is to expand the approach to other institutions and to open the course to larger classes.

CONCLUSION

In summary, the authors experienced that the development of a joint course between two universities is similar to the co-development of a design between two industrial organisations. Similarly, there was a need to find a project champion and to gain support from the top management for the project [14]. A substantial amount of face-to-face contact between the involved persons is crucial to gain a common understanding of the differences and similarities. The result is the development of a course that actively takes advantage of these similarities and differences in order to achieve the overall learning objectives.

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