IS IT APPROPRIATE TO INTRODUCE REAL CLIENT PROJECTS TO FIRST-YEAR DESIGN STUDENTS?

Hua Dong[1], **Paul Turnock**[2]

[1,2] Human Centred Design Institute, School of Engineering and Design, Brunel University, Uxbridge UB8 3PH, UK

ABSTRACT

Industry based projects play a vital role in engineering and design education. It is common practice to introduce such projects to senior students after they have studied in the university for a couple of years, but is it appropriate to introduce real client projects to first-year students? This paper provides an answer to this question based on a case study at Brunel University where first-year design students were challenged to redesign earplugs for the Royal National Institute for Deaf People (RNID). The project yielded successful results and satisfied all the parties involved: the client, the tutors and the students. Factors contributing to the success of the project are analysed and recommendations are made on how to effectively use real client projects to motivate and to enhance learning of the first-year students.

Keywords: first-year design students, real client projects, earplugs, evaluation

1 INTRODUCTION

Engaging design students with real client projects often motivates students to produce highly professional work and helps them adapt to industry practice quickly [1-2]. It is common practice to introduce industry projects to senior students in engineering and design programmes after they have studied in the university for a couple of years, but is it appropriate to introduce real client projects to first-year students? We explored this through an experiment where we introduced a five-week industry project to the first-year design students at Brunel University in early 2007 when they had just been in the university for a term (12 weeks). This paper focuses on various aspects of the experiment: How we did it? What was the result? How was it evaluated? What did we learn from it? We finally conclude that it is appropriate to introduce real client projects to first-year design students and it would enhance students' learning experience.

2 BACKGROUND

It has been a tradition at the Brunel School of Engineering and Design to engage students with real client projects while they study in the University. Such projects are typically introduced to design students at level 2 and above. For example, in recent years, 7-day live industry projects have been introduced to our second-year design students. These projects are introduced by surprise: no student knows when it will happen, who the client is, what nature the project is; and teaching stops for a whole week to ensure the students' full commitment to the project [3]. Such projects range

from the 2006 Boeing Corporation and British Airways micro and macro innovative concept design to the 2007 BBC Worldwide Teletubbies Innovation project. Short-term industry projects, such as Marks and Spencer's Christmas gift design are also introduced as design course projects to the second-year students. As for the third year students, 92% of them go to industry placement or exchange programmes – a significant feature of Brunel's sandwich courses – many of them work on a number of industry projects during that year. As a result, some of the final year students will choose to base their major projects on an industry brief or an industry context. This year 18% of the major projects are being developed with close collaboration with industrial clients. Our students' feedback to these real client projects has always been positive, but the first-year students seem to have been excluded from such experiences. Since the main aim for level one teaching at Brunel is about 'transition to learning at university' – if industry projects feature future learning in the university, there is no reason why freshmen should not have a 'taste' of it in their first year at University. With this belief, we conducted an experiment. We introduced a real client project to the first-year design students at the beginning of the second term (early spring, 2007). By that time, the students have been through basic training in 2D and 3D sketches and modelling, graphic communication; and they had done some product analysis and simple designs and acquired basic knowledge of design processes and design methods. The brief was from the Royal National Institute for Deaf People (RNID). It was about designing "a manufacturable concept for an earplug of the future, a product that young people will actually want in their lives." The students were briefed to target the 18-30-year-olds market. The product needed to protect hearing but not look like a protective 'safety' product. Packaging and marketing issues were also to be considered and they needed to interlink with the actual concept to produce a whole product.

3 THE RNID PROJECT

The design brief was given to the first-year design students as part of the 'interface' project which focuses on user-centred design and usability analysis. The project last for five weeks, but the actual time allocated for the RNID project was about four weeks (another part of the 'interface' project was a one-day team activity). This project formed one fifth of the students' total academic workload. Each week, there was a lecture and a small group tutorial, and each student had about two hour contact time with the tutors.

3.1 Research methods

For 'interface' projects, we often introduce to students some typical interface analysis methods, such as Hierarchical Task Analysis (HTA), Link Analysis and Layout Analysis (LLA) [4]. In addition, according to the nature of the RNID brief, we also introduced two relevant design research methods to the students: 'personas' [5] and 'scenarios' [6] to help them understand the user and the context of use.

3.2 Results

This was the first project that the students were required to consciously apply research methods to their design. Many did not understand the purpose of using 'personas' and 'scenarios' at the very beginning but eventually they all managed to develop 'personas' based on themselves or their close friends, and defined 'scenarios' for their concept design. We helped choose twelve 'personas' for the whole class and gave each a title, for example: 'Indie Boy', 'Hip Hop DJ', 'Skater Dude', 'Singleton', 'Campus Ladette', 'Camden Cyberpunk', 'Goth Emo Girl'.

Some students struggled with HTA and LLA, and some applied them effectively (Figure 1). A wide range of solutions were developed: some focussed more on form creation, some more on integration of technologies, and all on interfaces. A good example is shown in Figure 2 which was the 1st prize winner.

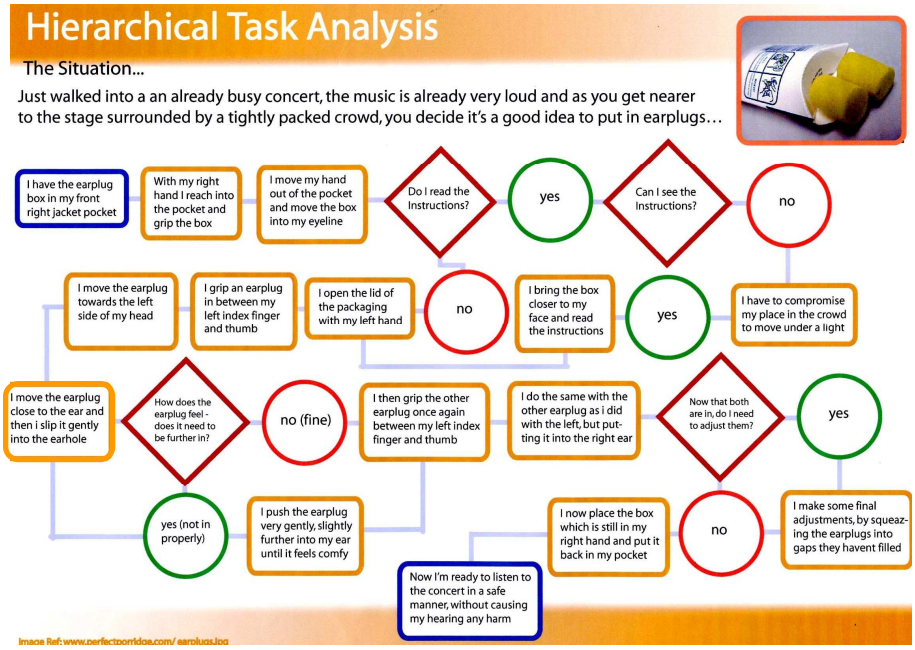

Figure 1 Hierarchical task Analysis (HTA)

Figure 2 An earplug with built-in earphones and LED displays

4 EVALUATION

The client was invited to give their independent judgement. We assessed the student work according to three criteria (research, design, and communication). Students' feedback to this project was collected through an evaluation form distributed at the first lecture after the project submission.

4.1 Feedback from the client

The judges from the RNID were very much impressed by the students' work, and they particularly liked concepts which were simple, manufacturable and marketable. Concepts that made effective use of existing technologies and simple mechanical controls were preferred to those with more complex technologies. The RNID selected ten 'best concepts' to be published on their Web-site and issued certificates to these students. Details of these concepts are presented in [7].

4.2 Feedback from the tutors

As tutors, we were surprised by the overall quality of the students' work. There were many high quality submissions. The average scores were 6 marks higher than the previous projects, and 16% of the students got A Grade for this project (15% in research, 19% in design, and 14% in communication), an average increase of 9% compared with the previous projects.

4.3 Feedback from the students

The students were asked, immediately following the completion of the work, to rank a number of statements relevant to the project using a 1-5 point scale (1: strong disagree; 5: strongly agree), and the result is shown in Table 1(based on 73 voluntary feedback).

Table 1 Students' feedback to the RNID project (ranking)

Statements	Average score
"'Real client' projects are appropriate for the 1st years."	4.2
"The design brief is interesting and challenging."	3.7
"The project helps me understand the design process."	3.6
"Personas helped me understand the user."	3.3
"Scenarios helped me focus on the context of use."	3.3
"HTA is a useful analysis tool for this project."	2.7
"LLA is a useful analysis tool for this project."	2.4

The students were also asked to comment on what they had learned from the project and what was the most challenging part of project. The comments are summarised in Table 2. A few students wrote specific comments about their feelings of working on a live project with industry:

Positive side: "… working for a client helped structure work."

Negative side: "Very hard to pay ANY attention to other subjects when being set these RNID type projects." "Only slept 6 hours in the past three days before submission."

Uncertainty: "Knowing it was being presented to the real world + still not being confident that I am presenting correctly. Knowing it was bigger than just a mark or grade."

Table 2 Students' feedback to the RNID project (comments)

Comments	No. of mentions
What have you learned from the project?	
Research methods and tools	27
Knowledge about hearing, hearing products/technologies and hearing protection	25
Practical skills (computer software, drawing, model making)	23
How to answer a real client brief	8
Time management and meeting deadlines	7
Communication at a professional standard	6
Better understanding of design process and design	6
Complexity of 'small' projects	3
What is the most challenging part of the project?	
Generating a range of original and viable concepts	15
Deliver complete work within limited time scale	9
Insufficient skills (software, model making, drawing 3D views of fiddly parts)	8
Understand research methods and applying research tools	8
Designing for specific users and scenarios	8
Communication to a professional standards	6
Confusion caused by different tutors' interpretation of the tasks	6
Focusing ideas	4
Understanding the brief	4
Integration (put everything together as 'complete' work)	4
Generating interesting and aesthetically pleasing concepts	3

5 DISCUSSION

According to the students' feedback, "'Real client' projects are appropriate for the 1st years." It is obvious that many students learned new research skills and practical design skills: this has met our general 'educational' purpose. Students also learned some project-specific knowledge, such as hearing products/technologies and hearing protection. The substantial increase of A Grades indicated that students were much more motivated to produce work to a professional standard because of the involvement of real clients.

5.1 Factors contributing to the success

Several factors contributed to the success of the project:

1. The design brief is appropriate. It is focused on form creation and fits the 'interface' project learning outcomes within the module.
2. Students' level of knowledge is appropriate. They have been through basic training on sketching, modelling, product analysis and graphic communication, therefore have the potential to apply all the skills to one integral project.
3. Research support is essential. 'Personas' and 'scenarios' become powerful tools once the students understand their purpose. They helped students focus quickly, which is essential for such short-term projects. Although some students found HTA and LLA difficult, they have learned basic principles from the RNID project and many of them applied these research methods in a subsequent project.

5.2 What have we learned from the project

Real client projects motivate students: they tend to work much harder with external influences. Such projects should be introduced in good time (ideally the second term, if introduced to the first-years). Students should be given sufficient time (four to five weeks) for a project of similar complexity to the RNID project. The complexity level of client projects should be appropriate to the first-year students, i.e. relatively simple, focussed, and manageable. 'Clarity' is very important to the first-year students, so make explicit the criteria and stick to it. The 'actual' involvement of the client makes the client 'tangible' rather than 'remote' to the students, for example, the RNID was invited to give a guest lecture and it was involved in the final judgement. Students were more motivated to design for somebody they know. Rapid debriefing was also important – students were eager to know the result – so give them feedback as soon as possible, especially the comments from the client. The last, but not the least, learning point is that YOU SHOULD NOT UNDERESTIMATE FIRST-YEARS' ABILITIES. They can do so well if appropriately motivated.

6 CONCLUSIONS AND FUTURE WORK

According to the result of our experiment and the students' feedback, we can draw the conclusion that it is appropriate to introduce real client projects to first-year design students. This will highly motivate students and help foster professional maturity. A new strategy for our design programmes is to move critical module elements to lower-level students to give them early experience. We plan to introduce 'client' projects to all levels. This includes building good partnerships with industry and discussing potential projects appropriate for different levels: it is critical to match client expectations with academic requirements. Our 12-year experience in running 'client' projects tells us that constant communication with the client is the only means to achieve this.

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[1] Dr Hua DONG
School of Engineering and Design,
Brunel University, Uxbridge UB8 3PH
Hua.Dong@brunel.ac.uk
+44 (0) 1895 267254

[2] Mr Paul TURNOCK
School of Engineering and Design,
Brunel University, Uxbridge UB8 3PH
Paul.Turnock@brunel.ac.uk
+44 (0) 1895 266339