Designing Interactions: Repositioning Design in HCI

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ABSTRACT

This paper describes three case studies which discuss different ways in which HCI and multimedia students in the School of Computing at Napier University are exposed to design in its widest sense. This is achieved through engaging students in activities that are both interdisciplinary and collaborative, whilst also encouraging and supporting dialogue. The justification and reflection are not only on the product on but also on the process itself. This allows students to broaden their design experience and mirrors more closely what might be their future working environment. The paper highlights the benefits that students gain from such experiences but also discusses some of the difficulties associated with introducing innovative modules.

Keywords

HCI, design, education, interdisciplinary, collaborative working, engagement, reflection

1. INTRODUCTION

In the past, students on computing courses have tended to focus on design as appropriated by the computing community. The design taught tends to be engineering-orientated, based on software development, and places an emphasis on function. Although the more linear models of development have been given a human-centred flavour through the addition of iterative loops, as exemplified by rapid prototyping in all its many guises, the emphasis is still task-orientated rather than form-orientated. It is clear that requirements generation remains focussed on the nature of the task. Form has become, at best, a secondary consideration. In response to the need for form to be re-united with function, it is vital that students of HCI and multimedia are exposed to design in its widest sense, to areas where the relationship between form and function are central to the essence of the discipline. As interactive artefacts become more portable and personal there will be an increased need to re-unify form and function in the design of interactive experiences that both engage and provoke the user. This approach seeks to reflect what is happening in industry and students need to broaden their understanding of design by exposure to design as practised by the creative industries. Presenting students with case studies from diverse areas of design, such as architecture, product design and graphic design to promote discussion can help provide students with a language with which to rationalise and critique design not only of the areas presented but also to relate the ideas back to those of interaction design. This can be strengthened through requiring students to develop their own designs through collaborating with others and encouraging reflection on their own practice in relation to the work of others.

The three case studies are presented in the following sections describe three innovative modules offered to undergraduate and postgraduate HCI and multimedia students in the School of Computing. All modules are based on the belief that communication and reflection about the nature of design are core skills for a new generation of interaction designers. The modules are designed to engage students by providing activities that require students to apply theory and practice to their design tasks, whilst reflecting and communicating their ideas throughout the process. The modules stress that design is a collaborative activity and most involve group work, in some instances the group work is interdisciplinary in others it is with classmates, however all require students present and justify their work to others and reflect on the design process itself.

2. Case study one: Experiential Design – Engaging with design

In 2000 the programme BSc Hons Human Computer Systems was developed as a named route within the Computing suite of Napier University. As part of the programme a specialist module entitled Experiential Design was designed to

> "expose students to the cultural significance of design. The approach adopts a merging of the scientific and humanistic knowledge and focuses on how designed artefacts fit simply, gracefully and enjoyably into the fabric of everyday life and culture."

This wide brief allows the lecturers to exploit the most appropriate contemporary and current design available at the time of running the module. The module currently runs on the BEng Multimedia Systems and BSc Human Computer Systems and is delivered by lectures, tutorials, outside visits and assessed through coursework.

It was decided that the tutorials should not develop design skills solely by practical work but heighten the students' sensitivity to design and develop their ability to rationalise and critique design through a range of diverse activities. The tutorials consist of a mixture of video and discussion on the design process, critiquing design and active creative exercises. Tutorials are complemented by visits to museums, art shows and visits to other educational institutions.

At the start of the module, students are asked to bring in objects that they considered good and bad design. Usually, the good design examples are described in terms of form and function, looked good, feels right, had memories, was cool and functional. They are able to tell if they think it is good design or bad design but sometimes lack the language in which to express their ideas. Some examples are provided below. Firstly a model created by one of the students depicting a fantasy character from an interactive game. The student was unsure of the design merit of his model but felt it had artistic value (Figure 1a). A key ring based remote control device for a Bang and Olufsen hi-fi system (Figure 1b). The student chose the artefact based on its simplicity, elegance and the tactile qualities of the design. Finally, a mouse produced by Apple Computers which successfully blurs the boundaries between form and function through the conceptualisation of the mouse as a button and the button as a mouse. The result is a mouse the body of which acts as a button.
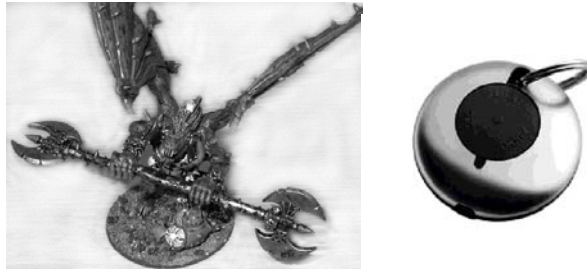

Figure 1a. Dæmon Model created by student and Figure 1b. Key Ring Remote Control, Bang and Olufsen

As part of the tutorial programme the students watch sections from a television series produced by the BBC, entitled 'Designs on Your …..'. This series follows the product designers Richard Seymour and Dick Powell as they attempt to re-design everyday objects, ranging from a bra, an aircraft seat and a toilet. Particular emphasis is placed on the early phase of the design process where the designers seek to better understand the nature of the problem through initial discussions with the clients and then through the production of a series of prototypes.

To complement this, a number of more participative exercises were undertaken as part of the tutorials. One such activity involves a graphic design problem that does not rely on draughtsmanship skills. Students have to create graphic images using four black squares of the same dimension that best expresses the meaning of words such as order, tension, playful and bold. The task purposely limits the variables to encourage students to be creative and to develop 2D design skills such as framal reference, illusory space, contrast and dynamics of relationships. It also requires the students to select the most effective solution developing their critical and reflective skills. Some examples of the output of the tutorial session are provided in Figure 2.
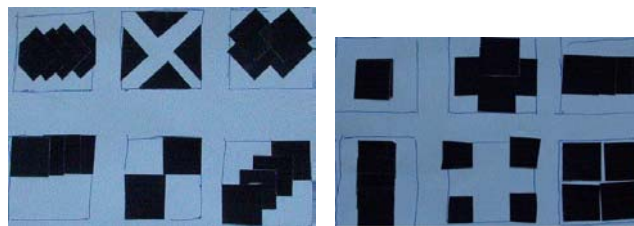

Figure 2. Examples of Graphic Design problem undertaken by students as part of tutorial programme.

Tutorials were run as 'show and tell' and some students at the outset were apprehensive in discussing their work and ideas with the rest of the class but after a few weeks, the tutorials became a much more sociable event. Halfway through the course, the students had to cut and paste different material from magazines to produce colour schemes to represent adjectives such as urban, sensuous, happy and technical. By then, students enjoyed chatting to one another whilst doing the activity and tended to automatically show their work to one another describing what they were doing.

Visits have included the "Game On" exhibition at Royal Museum in Edinburgh which traced the history of computer games and contained many playable games [2]. Students have also visited the Masters of Design Exhibition by students of the Edinburgh College of Art. This provided the opportunity for the students to be exposed to both the ideas of the art students but also the variety of methods which those students had chosen to communicate their ideas through the medium of their designs. Students visited the Interactive Design Lab at the University of Dundee where they had the opportunity to discuss with students there the practicalities of inter-disciplinary working in the field of Interaction Design. This experience made tangible many of the themes discussed during the lectures.

3.Case study two: Future Media – Interdisciplinary Working.
Future Media is a module offered on the MSc Multimedia and Interactive Systems programme delivered within the School of Computing at Napier University. The aim of the module is to introduce students to the concept of media and,

in particular, how the use of different media can impact on the interpretation of information. Throughout the delivery an emphasis was placed on the role of design during the creation of interactive artefacts and experiences. Students were presented with the vision of an environment populated by interactive and interacting artefacts, as articulated by ubiquitous computing [6] and tangible media [4]. Debate centred on how such a vision might offer the opportunity to reclaim the interface and return it to the physical world. Form and function will be reunited leading to the design of artefacts that both engage and provoke interaction.

A central tenant of the module's philosophy was that students should actively engage with the presented subject matter, the associated coursework enabled this to be achieved. The coursework consisted of a design brief set within the Interaction Design category of the Design and Art Direction (D&AD) international student design competition. Over a six week period each Masters student worked in tandem with an Undergraduate student enrolled on a design course within the School of Design and Media Arts at Napier University. The project required the design students and the multimedia students to produce a concept and software prototype for an interactive installation for Wembley Stadium[1] museum. To complete their relative modules, the undergraduate students needed to produce four presentation boards that conveyed their team's concept. The graduate students were required to produce a software prototype using that concept. The project brief was stated as:

> "*Design an interactive installation for the Wembley Museum. Your concept will celebrate Wembley's rich and diverse history and present the new Wembley as an iconic landmark to inspire the next generation of fans and host the world's greatest players. This interactive experience should juxtapose a glorious heritage with the venue's future potential in a unique and engaging form.*"[2]

The Wembley Stadium museum aims to capture past glories held in the old stadium while looking to the new stadium for future triumphs[3]. It is in this context that the students embarked on their coursework. A more detailed study of one groups was reported in Joel, Smyth and Rogers [5].

The coursework had three main assessment points, the first at week 2 required each group to provide a three minute verbal 'pitch' of their concepts for the design brief. Students generally found this exercise challenging, in particular, the need to be concise given the time constraints. The second assessment point was in week 5 and required each pair to deliver a 10 minute presentation outlining their design concept to lecturers from both Schools. The coursework concluded in week 6 when the final presentation boards and software prototype were submitted. At this point a number of submissions were selected for entry into the D&AD competition. For the Masters students the coursework concluded with a debriefing session where the students were able to openly discuss their personal reactions to the coursework experience. While undoubtedly the majority of students found it a rewarding experience, it was clear that working with students from another discipline was at times both difficult and frustrating.

In June 2005, students and lecturers from both Schools attended the D&AD awards ceremony in London. In the Interaction Design category, four of the six entries included in the Annual came from the collaboration between students at Napier and while no first place was awarded, two of the pairs were awarded second equal place in this prestigious international design competition.

4. Case study three: Interaction Design – Linking theory and practice through collaboration and reflection

The module is taught to direct entrant students at stage 3 and is compulsory on BSc Multimedia Technology and BSc Software Technology programmes, which are direct entry programmes aimed at students with HNDs or equivalent. In addition to being taught at Napier, the module is taught at partner colleges in the UK and Malaysia.

The module aims to provide students with an understanding of the techniques and issues involved in promoting usable interaction design, and an awareness of new and emerging platforms for interaction. The module promotes a user-centred approach to design, in order to design interactive applications that are easy and enjoyable to use. Students are encouraged to reflect on and share their own experiences of both well-designed and poorly-designed applications, thereby relating design theory to previous experiences. Discussion is used both in lecturers and tutorials to clarify understanding. Students are engaged in activity, through working in groups, to produce prototype designs and are also expected to carry out independent research into emerging trends in Interaction Design.

Fowler and Mayes [1] model learning as an on-going process of conceptualisation, construction and identification. Essential to this is promoting understanding through the linkage of new knowledge to existing knowledge, involving the student in activities, and encouraging and supporting dialogue throughout. This is at the heart of this module which seeks to show students that design is about ideas, and collaboration, and that good design ideas can be expressed in a variety of

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[1] Located in London, Great Britain, Wembley Stadium has a long and glorious history, not only for sporting achievements but also as a music venue. It has hosted Football Association (FA) cup finals, the live aid concert, and world cups for both rugby league and football. Struggling to meet public demand, the old stadium was closed in 2000 to be replaced by a larger capacity venue. The new Wembley Stadium, with 90,000 seats, will be the largest arena in Britain and the largest under-cover football stadium in the world.

[2] http://www.dandad.org/education/studentawards/pdf/Interactive_SACFE2005.pdf

[3] www.wembleystadium.com

ways. The relationship between theory and practice is emphasized and stress is placed on design as a collaborative activity.

All teaching is classroom-based: students are discouraged from using computers, especially software development tools, in order to encourage then to explore and consider different design ideas. In the past, when authoring tools had been integrated into the module, we found that students spent time learning how to use these and were less open to exploring different approaches, tending to adopt a technology-driven solution rather than a user-centered approach.

The module is assessed by a written examination, worth 40% of the overall mark, and a group-based coursework. The examination includes a mixture of seen questions and unseen questions. For the coursework, students are asked to develop a paper prototype for a given scenario.

Students are encouraged to use a variety of different techniques, informed by theory, to design a prototype to illustrate their design vision. This is then presented to the rest of the class. Each group is also required to submit a report with a reflective commentary on their design and on the process of doing that design. Discussion, collaboration and reflective practice are at the heart of this. This is vital if our students are to become reflective practioners, engaged in ongoing and lifelong learning, working with fellow professionals, that is, to become fully-fledged members of relevant Communities of Practice [7].

Independent study is the focus of the seen question, which is compulsory. Students are asked to research selected topics with a view to exploring how these advances will impact on the design process. Time is set aside in class to explain to the students why they are being asked to do this and to explore with them how they might approach this. Support is given in the form of surgeries and on-line discussion. Through exploring emerging trends in interactive devices students are developing as independent learners. This is felt to be important because it is our belief that part of being a design professional is keeping up to date with trends and theory and thinking how that impacts on one's own practice. It was found that by making the independent study the focus of an exam question students engaged more deeply with the task. This helps in preparing for future study, such as their Honours project, and for lifelong learning in the workplace.

The module has been taught by the author in association with other colleagues for over three years and is delivered twice each year. In that time the nature of the coursework and the examination has changed in light of experiences in teaching and assessing the module, and as a result of student feedback.

Some students were initially skeptical about the paper-based approach and asked if they could develop computer-based models. Time was taken to explain students the rational behind this approach and, whilst requests to develop simulations met with a negative reply, a more liberal approach was taken to paper prototyping which was extended to include lo-fi representations created in PowerPoint™. In general students then engaged with the task and applied theory taught in class to the design and development of paper prototypes.

However it was noted in the first delivery of the module that some designs were informed by theory only to a limited extent. To encourage students to focus more on this aspect of the course, an examination was introduced and more attempts made during class time to encourage students to explore, through discussion, how theory could be applied to practical work. Students were also encouraged to justify choices made and to reflect on the process they used with reference to theory.

Feedback from students is positive and the presentations and documentation submitted demonstrate that the students are engaging with the module and, in so doing, enjoying themselves as well as developing as autonomous learners and soon-to-be professionals.

5. Conclusions

The modules are popular with most students, although there has been initial resistance from some at the outset of the modules. For many students these modules represent a noticeable change from their previous educational experience. They have not only had to produce their own designs but defend these design decisions to other individuals. This can feel quite threatening to students and the lecturers need not only to provide an environment in which students feel safe and their views valued but also to ensure that 'safety nets' are in place for students who find the experience too alien or uncomfortable. Students have stated that they have been able to apply what they have learnt in these modules to other areas of their university work and it is hoped that it has also prepared them for the world of work.

As industry changes so often education mirrors these changes. So as industry has developed closer links between technological advances and the creative industries, so too have universities built stronger links between computing disciplines and those of creative industries. A challenge for the future is to further capitalise on the existing work outlined in this paper.

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