

Overcoming disciplinary boundaries in undergraduate design education: Preparing digital media design students for collaborative multidisciplinary research practice

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Abstract

The increasing complexity of digital media design technology has moved the creative industries away from work by individual designers towards collaborative teams. This change is not always reflected in digital media design education where effective, collaborative and multidisciplinary learning and teaching environments are the exception rather than the norm.

Recent educational models such as schools of design thinking (d.schools) emphasise that radical research and innovation are most successful in multidisciplinary teams. Because facilitation of collaboration across disciplines is a challenge for educators in the university environment, it tends to occur at the postgraduate level. An earlier introduction to multidisciplinary practice is recommended in order to prepare students for postgraduate design education and work in the design industry.

The *POOL Model*, a new learning and teaching model for digital media design education, is currently being developed and tested at the School of Creative Arts at James Cook University. It is a multidisciplinary system of interdependent collaboration and exchange of expertise across university, industry and community, implemented at undergraduate level with the aim of preparing students for collaborative multidisciplinary research practice.

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Introduction

With the development of advanced information technologies (IT), an entirely new industry has emerged, producing extensive hi-tech projects such as online shopping, social networking, and new methods for information categorisation and retrieval. Interactive multimedia projects have moved from simply linking static content to allowing virtual living in an online space (e.g., Second Life).

The complexity of such projects has seen a switch to multidisciplinary teamwork in the digital media design industry, with today's designers mostly working in collaborative environments.¹ The profession of digital media design has changed considerably in just a few years: "Many design problems require specialized expertise residing in many individuals.... In complex collaborations, design is a robust social activity that demands new kinds of relationships and organizational structures."²

While multidisciplinary design studios have become the structural norm,³ these collaborative multidisciplinary environments are rarely reflected in most digital media design programs, which still adhere to a curriculum model developed for and applicable to the practice in the 1990s. This discipline-based approach to teaching and learning in digital media design struggles "to make room for an ever-expanding wave of media skills that our students seem to want and need."⁴

The need to prepare design students for a multidisciplinary work environment in the creative industries is identified by a number of authors.⁵ Based on extensive research in the United Kingdom (UK) since 2003, the Design Council (UK) even formulated specific recommendations for design schools and universities with this goal in mind. One of the recommendations is the "promotion of multi-disciplinary programmes" that would "equip design graduates with a broader set of professional skills [given] ... designers are increasingly expected to work alongside engineers, technologists,

marketers and management consultants.”⁶ In order to prepare undergraduate digital media design students for collaborative multidisciplinary practice and research, “new models for learning, teaching and collaborations...will need to be formulated, tested and evaluated.”⁷

Collaboration across disciplines in Design Education

“Although multidisciplinary teams occur frequently in design practice, they are much rarer in education, where the subject ‘silos’ make collaboration more difficult.”⁸ The willingness of academics to collaborate with other disciplines and thus different departments or schools within a university, is shown by a survey of design school teachers across North America in 2004 where 71% of the 325 respondents “completely agree” and 24% “agree” that interdepartmental collaborations are an important part of the design curriculum. However, only 18% initiated collaborations with other academic departments on a regular basis and 33% never did. They ranked time constraints, faculty attributes and university infrastructure as highest of the recognised barriers to interdepartmental collaboration.⁹

Nevertheless, recent educational models such as schools of design thinking (d.schools)¹⁰ emphasise that radical research and innovation are most successful in multidisciplinary teams and that this collaboration across disciplines is key. “The concept of ‘design thinking’ is based on the belief that true innovation can only happen when strong multidisciplinary groups get together to form a common culture and explore the interfaces between the different opinions and perspectives.”¹¹ Using an approach developed by IDEO, one of the world’s most successful design companies, d.schools (e.g. at Stanford University and University of Potsdam) teach ‘design thinking’ to students from diverse disciplines in order to foster innovation at postgraduate level.

At d.school at Stanford University (US) that includes design, engineering, education, social science, business, medicine/biology and the industry. All students are enrolled in a master degree program and could additionally participate in a 10 or 20-week multidisciplinary d.school class. Participants receive a d.school certificate supplementary to their post-graduate degree after completion.

To date, there has been a tendency to offer multidisciplinary courses at postgraduate level: “The general consensus of opinion from European examples was that students at undergraduate level should continue to focus on the development of ‘core’ skills and multi-disciplinary activities should be introduced at post-graduate level.... This was not a view shared by everyone – with some arguing skills such as teamwork and co-creation should be introduced earlier in the curriculum.”¹²

Introducing a collaborative multidisciplinary learning and teaching environment at undergraduate level better prepares students for their future work environment where practical and research tasks are executed in collaboration with people from other disciplines. “The contemporary designer must identify and focus on the distinctive areas where their skills will make a contribution and allow other specialists to take primary responsibility for others. The demise of the individual designer will be acute in some areas as the design of multi-technology products is simply too complex for an individual to comprehend”.¹³

BusinessWeek's October 2007 ‘Global List’ of design schools worldwide showed that the 60 most innovative and forward-thinking of them (inclusive of all design disciplines) offer programs with interdisciplinary classes “as core, not the fringe elective... programs that use the real world as their classroom.”¹⁴

Collaboration as integral to undergraduate design education

Many undergraduate design programs already “focus on new technology and writing, while including a comprehensive, research-based course program in design theory,”¹⁵ and some have recently attempted to make multidisciplinary collaboration an integral part of the curriculum. One example, which began in 2008, is the Bachelor of Creative Technologies at the Wellington Institute of Technology (WelTec) in New Zealand. The program offers five majors in Digital Media, Interior Design, Visual Arts, Cultural Design, and Product Design Engineering. Each year, beginning in semester 1, the subject *Collaborative Projects* is taught across all majors as a core subject. Collaborative teamwork procedures and theory are explored through practical projects, with industry collaboration planned in the third year. The integration of the collaboration is scaffolded, with a progressive intensity of collaboration theory and practice over three years.

Another example is the Bachelor of New Media Arts at the School of Creative Arts at James Cook University (JCU). The 3-year program offers five majors: Digital Imaging, Digital Sound, Digital Visual Arts, Digital Media Design and Performance. Third year students of all majors enrol in a “Creative Exchange” subject and work collaboratively across disciplines on a project. Daniel refers to the rationale for this approach:

All the time, we’re pushing students to think about where technology is heading ... and how that might drive the creative industries. We want to make sure they don’t spend three years learning how to build Web sites; they need to spend those three years working in teams, where [they have] image specialists, designers, sound experts, and others – in a creative team-based approach that’s underpinned by the latest and greatest in technology.¹⁶

These two degree programs provide an example of a multidisciplinary approach at undergraduate level. While the success of each approach is yet to be determined, given the first cohort of graduates for each institution will be the end of 2009 (JCU) and 2011 (WelTec), they do illustrate that new approaches are necessary and possible. While these examples illustrate the potential for multidisciplinary teamwork, they remain based in the area of creative arts, hence collaboration beyond this is an additional area of consideration and opportunity in undergraduate education. For example, collaboration with business, information technology and engineering may create new opportunities for students to extend their learning and preparation for their future workplace in the industry.

Collaboration beyond the creative disciplines

Digital media design today involves the management of increasingly complex information technology when creating multimedia projects or interactive applications. At the same time the use of such technology allows the creation of more innovative interfaces, user experiences and information architectures. Early research into this issue at James Cook University has revealed that students from the disciplines of digital media design and information technology stated that they would benefit from collaboration between these disciplines. Undergraduate design students surveyed in 2007 agreed strongly that working in cross-disciplinary teams would be beneficial, with 85% of the 25 respondents stating that they would prefer working on multimedia projects with students who have an IT background. Similarly, 81% of students (16 of 20 enrolled in the subject participated) in an IT subject titled “Multimedia Web

Design”, argued that working in a team would be beneficial. Indeed 70% stated that they would prefer working in multidisciplinary teams with students from the areas of digital media design, digital imaging and digital sound. While the sample of students above is arguably small, it is indicative of the willingness of students to work across disciplines.

Preparing digital media design students for collaborative multidisciplinary research practice

The value of collaborative multidisciplinary learning and teaching approaches in tertiary design education is recognised worldwide.¹⁷ In terms of the development of a model for digital media design education that integrates collaborative learning and teaching across disciplines, it is argued that it is important “not to add to the curriculum but to restructure it entirely.”¹⁸ While this is sound in theory, it is clearly important for design educators to consider the available resources and intended outcomes.

Consideration of the literature, in addition to the data gathered from students, has led to a complete redesign of the learning program for digital media design students at James Cook University. The key feature of the new approach is described as the *POOL Model*, a multidisciplinary system of interdependent collaboration and expertise exchange across university, industry and community sectors. It is implemented at undergraduate level in order to prepare students for collaborative multidisciplinary research practice beyond the university.

The *POOL Model* consists of a learning pool and a teaching pool with specialists (students, academics and industry professionals) from diverse but related disciplines. In each “pool”, multidisciplinary groups work together to either define a problem (teaching pool) or solve a problem (learning pool). In the teaching pool, educators work in collaborative teams to define a problem or project and create a learning environment for the student teams to either solve a problem or develop a project. The learning environment may consist of mixed-discipline lectures with all students participating, specialised knowledge teaching, mixed-discipline seminars, and team or discipline-specific consultations, as well as individual or team-based research, project presentations, workshops, and other forms of knowledge exchange.

The implementation of the *POOL Model* will be stair-cased. Undergraduate digital media design students will be gradually introduced to collaborative multidisciplinary practice and research, with each step increasing their discipline-specific and collaborative research and practice, and ability to exchange knowledge and transfer it into the project development process. Beginning in 2009, a formal collaboration between the School of Creative Arts and the School of Maths, Physics and Information Technology will take place, involving three sequential subject that are increasingly advanced in terms of content and learning outcomes (year 2 and year 3 at undergraduate level).

Step 1

Bachelor of New Media Arts digital media design majors and Bachelor of Information Technology students will learn, research and work together in semester 1 in their second year of study in a web page design subject. Since the subject is at an introductory level for both disciplines, the learning and teaching environment will be the same for 80 percent of the subject. Only 20 percent of content and a practice-based research exercise will be discipline specific. These stand-alone sessions are tailored towards the tasks each discipline would have to perform when working on a web page project in industry.

Students will have to meet the challenge of developing an understanding of their discipline-specific content, communicating it to students from the other discipline, contributing their own discipline-specific knowledge to the team project, and also developing an understanding of the intricacies of the other discipline.

Step 2

In the advanced multimedia subject in semester 1 of the third year of study, the learning objectives and outcomes are more discipline-specific:

- Information technology students, for example, should be able to design and implement Internet client and server applications, understand the operation of frequently encountered Internet application layer protocols, and understand how web servers interact with back-end systems;
- Digital media design students should gain the ability to construct advanced

Joint learning outcomes are, for example, the ability to engage in collaborative projects using web-based technologies; the demonstration of high levels of professional autonomy and interpersonal skill sets while engaging in collaborative and team based projects, and an understanding of contemporary issues related to interactive project development and commercial settings.

In order to facilitate joint and discipline-specific learning outcomes the collaboration will initially involve lectures with content in user experience, navigation, virtual space, etc. essential for digital media design students and information technology students alike (40 percent of the course). Next are discipline-specific lectures followed by a team-based project requiring students to engage in multidisciplinary collaboration, communication, learning and research.

Step 3

The final semester of the third year introduces the most advanced step of collaborative multidisciplinary practice and research in the subject “Creative Exchange”. Six disciplines will participate to create their final project as a synthesis of their undergraduate education: information technology, digital media design, digital sound, digital visual arts, digital imaging and performance. Students will engage in a collaborative multidisciplinary team-based learning environment to directly experience the planning and production of a large project. Educators from all disciplines will mentor and supervise the process. Consultations, workshops and research tasks can be discipline-specific or team-based, dependant on what is required during the project development process. All the students will encounter a higher research and self-directed learning component. Project development and documentation of the process is expected to be in compliance with industry standards. Projects may be either “real-world” in the sense of being provided by industry or directly designed to resemble a typical industry project in the current environment.

Implications and directions

Whenever “knowledge increases in any field, there are several possible responses: increasing use of reference materials and systems, increasing specialisation, and increasing need for collaboration among those specialists.”¹⁹ The *POOL Model* facilitates discipline-specific learning while simultaneously engaging students in multidisciplinary research, learning and practice as an integrated part of the undergraduate curriculum.

Digital media design students will be able to develop their specialist design skills along with engaging in collaborative teamwork with students from other disciplines, while all participating students will learn to communicate ideas across disciplines, and to lead, manage and contribute effectively to teams: thus developing an understanding of professional requirements in adjacent areas. Students will also be better prepared for their future collaborative multidisciplinary work environment and research practice in the creative industries, and also for postgraduate education.

The *POOL Model* is ambitious and will continue to require significant effort and resourcing to be implemented successfully. One of the challenges will be for the teaching staff in ensuring that the learning environment is seen to be enriching of each student’s individual discipline, as well as complementing and broadening their learning by exposure to and working with students of other creative and non-creative disciplines. It is a challenge that is being embraced by those involved and one which is expected to lead to significant and evidence-based benefits.

Endnotes

¹ Lanny Sommese, “Graphic Design Curricula: Another Reconsideration,” *Novum* 10 (2007): 37; Jennifer Whyte and John Bessant, *Making the Most of UK Design Excellence: Equipping UK Designers to Succeed in the Global Economy* (2007), http://www.audidesignfoundation.org/files/ReportSummary_Jan07.pdf.

² Loretta Staples, “The New Design Basics,” in *The Education of an E-designer*, ed. Steven Heller (New York: Allworth Press, 2001), 6-9.

³ Teal Triggs, *Curricula of Collaboration: Educating Postgraduate Students for the Workplace*. (2004): 64–82, http://www.arts.ac.uk/docs/cltad_2002triggs.pdf.

⁴ Geoffrey Fried, “The Wrong Horse?” in *The Education of an E-designer*, ed. Steven Heller (New York: Allworth Press, 2001), 10-13.

⁵ Linda Ball, *Future Directions for Employability Research in the Creative Industries* (2003), <http://www.adm.heacademy.ac.uk/resources>; Design Skills Advisory Panel, *High-level Skills for Higher Value. UK Design Industry Skills Development Plan* (2007), <http://www.designcouncil.org.uk/en/Design-Council/3/Publications>; Whyte and Bessant, *Making the Most*.

⁶ Design Skills Advisory Panel, *High-level Skills*, 42.

⁷ Ball, *Future Directions for Employability*, 1.

⁸ Design Skills Advisory Panel, *High-level Skills*, 26.

⁹ Susan Szenasy, “School Survey 2004 – Do America’s Design Schools Encourage Interdisciplinary Collaboration?” *Metropolis*, August/September (2004): 88–91.

¹⁰ d.schools or schools of design thinking use design thinking to facilitate multidisciplinary innovation. Design thinking is based on a process which undergoes the following stages: define, research, ideate, prototype, choose, implement, and learn. Designers, as part of the team, are identified as key in order to drive innovation in such multidisciplinary collaboration based on the process of design thinking. There are currently two schools which implement the concept of design thinking at postgraduate level. One is part of Stanford University (USA); the other is part of the University of Potsdam (Germany).

¹¹ Bettina Schulz, “New Avenues in Education – Design Thinking,” *Novum - World of*

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¹² Design Council, *Lessons from Europe. Report on the Design Council/HEFCE Fact-finding Visit to the Netherlands, Denmark and Finland*, (2007)

<http://www.designcouncil.org.uk/en/Design-Council/3/Publications>.

¹³ Whyte and Bessant, *Making the Most*, 15.

¹⁴ Maha Atal and Elizabeth Woyke, "Talent Hunt: The Methodology," *Business Week online*, October 4, 2007, <http://www.businessweek.com> (accessed April 4, 2008).

¹⁵ Thomas S. Rasmussen, *Danmarks Designskole – Plan For Research and Artistic Practice, 2003 -2006*, (2003), <http://www.dkds.dk/Forskning/Publikationer/>

[Copenhagen_workingpapers_on_design](http://www.dkds.dk/Forskning/Publikationer/Copenhagen_workingpapers_on_design).

¹⁶ Ryan Daniel, "Reinventing Creative Arts at James Cook," *Wheels for the Mind*, AUC, Winter 2007: 6.

¹⁷ Atal and Woyke, "Talent Hunt: The Methodology"; Design Council, *Lessons from Europe*; Design Skills Advisory Panel, *High-level Skills*.

¹⁸ Fried, 11.

¹⁹ Fried, 10.