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Safe Environments for Innovation
The development of a new multidisciplinary masters programme

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Abstract

In September 2007, three schools at Northumbria University came together in collaboration to create a Masters Programme in Multidisciplinary Design Innovation (MDI). The lead school was the School of Design working together with the School of Computing, Engineering and Information Sciences (CEIS) and the Newcastle Business School (NBS). This innovation was in response to an emerging understanding within the School of Design of the value of 'Design-Thinking' as a multi-disciplinary activity (developed and reinforced through a series of under-graduate pilot projects) and the Cox Review of Creativity in Business: building on the UK's strengths, which was commissioned by the Chancellor of the Exchequer, Gordon Brown, at the time of the 2005 Budget (Cox, 2005). (Design-Thinking is an approach to viewing business and organisational situations from a more interpretative perspective than that of traditional business analysis (Lester et al,1998)) The programme was launched in September 2008.

Keywords: Multidisciplinary, innovation, design, collaboration, team-work

The Designed Programme

Design-Thinking has been shown, most visibly through the work of commercial agencies such as IDEO (a global design consultancy), to lead to more creative and effective business solutions both in organisational structure and strategy as well as new product and service development. To be truly effective, it relies on collaboration between a diverse group of activists typically, but not exclusively, with specialist knowledge of design, engineering technology and business, who are comfortable working with, and have an understanding of, complimentary disciplines. Such individuals have been described as 'T-shaped' (Leonard-Barton, 1995) - having deep knowledge of one subject (the down-stroke of the 'T') and broad experience and understanding of other disciplines (the cross-stroke). Tim Brown, CEO of IDEO and Visiting Professor at Northumbria University states that T-shaped individuals are *'not to be confused with a 'Jack of all trades' T-shaped people have a core competency, but can easily branch out. And they possess curiosity, empathy and aren't afraid to ask why'* (Brown, 2007)

Creating a successful learning environment in which a diverse cohort of students feels safe to ask 'why?' and to 'branch out' required an understanding of the potential impediments to engagement and the supporting curriculum necessary to develop the characteristics of learners as T-shaped individuals. A number of pilot projects were undertaken before the programme was designed to allow staff from each discipline to observe and identify these impediments and to plan and refine a structure which would support individual learning.

Three guiding principles derived from the Pilot Projects were used by a group of senior academics from the three separate schools in order to shape the programme. These were:

- To create a physical and mental environment in which creativity would be nurtured;

- To develop a community of practice in which a 'common language' would be learned;

- To promote shared values through developing self-awareness in pursuit of collaborative learning.

The programme is designed to be three semesters long, delivered on–campus over one year. It involves a multi-disciplinary cohort of students working under the guidance and teaching of a multi-disciplinary team of academic staff, each with expertise in their own field. It is a truly collegiate venture planned around unique ways of working in which the staff teams collaborate to debate and discuss students' emerging ideas in cross-disciplinary plenary sessions.

As much as the development team need to understand the contextual relevance of each discipline relative to the others, so too do the students of the MDI programme. To this end, students take contextual modules in the complementary subjects; 'Understanding the Business Context, Understanding the Technology Context' and 'Understanding the Design Context (see Figure 1). These run through the first two semesters and make the connection between theory and practice, increasingly exposing students to the language and practices of the host discipline.

Figure 1: An original concept sketch for the programme structure
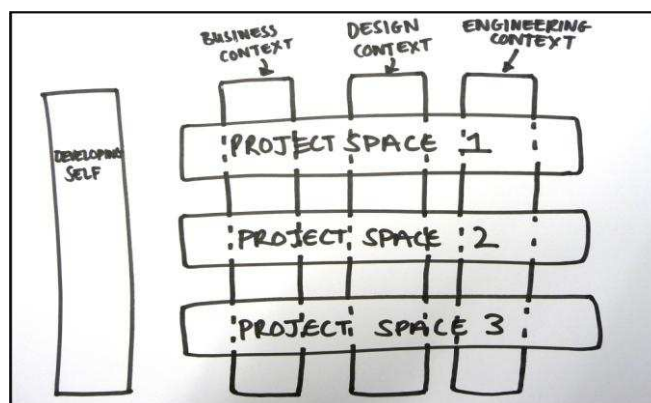
Problem based learning is fostered through three, semester-long, modules involving Familiarisation Projects (Semester 1), Experimentation Projects (Semester 2) and Integration Projects (Semester 3) through which students working in multidisciplinary teams explore problem and solution spaces. These are large modules allowing staff and students the freedom to explore collaboratively. As they progress through the semesters, the client-voice in their projects increases in volume: in the first semester as they learn to work together, projects tend to be internal based around personal projects and theoretical models; in the second they work as teams but with a number of external clients working with the whole cohort; whilst in the third, each team of three or four students has a client to manage themselves. This approach addresses key observations from the pilot studies; students are initially given a 'safe environment' in which to orientate themselves to the demands of multidisciplinary working and to develop the self-awareness necessary to separate 'self' from

'team'. As their awareness develops, so does the role of the client in their work until, in the final semester, they are able to focus much more on the project than on team-behaviour.

From the outset, there was the expectation that students would work outside their comfort-zone. In support of this, the programme has adopted a strong self-reflexive approach (Schon, 1997) where students engage in the module 'Understanding the Interdisciplinary Self' spanning two semesters that allows them to relate their project-based experiences to a theoretical framework so that they may understand where they fit in and how they can contribute to the multidisciplinary team. This strand feeds into the Design-Thinking Thesis in which they explore and define this position during the final semester.

Safe Environments

In order for true creativity to flourish, participants need to operate free from inhibition and confident that their contribution will be valued. Through committed engagement in creative, explorative and reflexive activities deep learning is achieved and new opportunities can be discovered. Essential to ensuring this, is the establishment of a community where understanding is nurtured and freedom to create is celebrated. The programme is built upon a recognition that it must support the potential for "creative abrasion" through which a deeper understanding is achieved (Karjalainen and Salimäki, 2008)

In the following section, we explain that there are three 'safe environments' that we have created to support the physical, mental and curricular confidence essential to ensuring that the programme nurtures this fundamental pursuit of collaborative creativity.

Whilst design graduates are familiar with poster presentation and externalising their ideas, this is not always the case with those from other discipline backgrounds. With this in mind, the physical environment in which the programme is delivered is designed to encourage and support collaborative learning through formal and informal project spaces and the use of the walls as a key learning tool (Bailey, 2000). Students are guided through initial introductory activities that require them, in the first instance, to use a template approach to expose early ideas. This is developed through the guided activity to more freeform exploration through the provision of resources and project spaces that become a physical working document of the emerging project at hand. The design of this physical environment is key to supporting the community of practice essential in encouraging the confidence to participate and share, (Figure 2).

Equally important in this respect is the confidence that industrial partners feel in engaging in this space. This is achieved by providing a secure environment where projects can be openly displayed as works-in-progress and the space is used to mediate the activity between client and students. An example of this is a recent project undertaken with the BBC where students created 'Radio Stations'; genre-based listening environments designed to allow deep immersion in different radio genres in order to provide the students with an opportunity to expose and explore aspects of listener experience in a way that made this explicit to the client.

Figure 2: Adaptive Learning Environments

Establishing an equality of voice is essential to establishing equality of value (and confidence) within the group. From a disciplinary perspective, this necessitates the promotion of honesty in acknowledging what activists don't know as much as what they do. Seeking a common language as disciplines emerge is necessary for effective working (Kimbell and Seidel, 2008) and as equality of voice is established, students can start to identify true collaborative value. One student commented at the end of a recent project;

> *"The group provided another effective result by letting all of the disciplines have a say, we incorporated each other's criticisms and ultimately created three concepts that all originated from different group members. The innovation we each saw here was that no-matter what the idea; each member added something to it to turn out the concepts."*

Another observation from a designer, speaking of his working experience with a business graduate related to the frustration that both felt when they eventually realised that many of their professional 'disputes' were not, in fact, disputes at all; they were talking about the same issue, but using different words to express their meaning, they felt as though they had wasted a lot of time.

> *"One of the biggest problems at the beginning of the task for those not of a design background was to understand the nature and role of the 'brief'. We must have repeated this word hundreds of times and for fear of looking stupid I didn't really take the time to question my understanding of it".*

Human nature dictates that in a group situation, people tend to avoid asking the 'dumb question'. To this end, an MDI 'Wall of Words' has been created upon which students (and staff) are encouraged to write-up the terms and phrases, acronyms and methods that are unfamiliar to them. Peers are required to explain these (Figure 3).

Figure 3: 'Wall of Words'
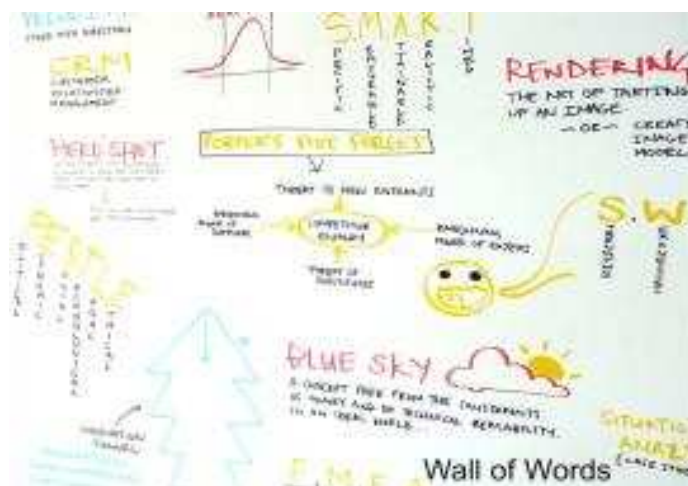
Gen Doy explains that students and researchers who move from one discipline to another "*encounter languages and cultures which may seem alien, or perhaps welcoming. They feel uncertain and lacking in confidence sometimes, because they do not feel "at home" in the new discipline...".* (Doy, 2008) As a greater understanding of each others' language is gained and the prototype is refined, not only will a common language be learned, but a common vernacular for multidisciplinary innovation practice will develop and become an 'at home' in a space tailored to support this development.

Liberating the students to explore the new approaches and methods of complimentary disciplines requires re-thinking the way in which students are assessed, ensuring that they are encouraged to strive for more than simply safe solutions. In this pursuit, assessment for learning needs to take a supportive role. To this end, the development of self-awareness and confidence that the first two semesters promote is supported by these projects being un-graded. Using the self-reflexive approach students become aware of the strength of their contributions, where they can afford to take risks in pursuit of the project objective and how to take best advantage of collaboration. This approach is supported across many disciplines, for example concerning mathematics, where Winkel states:

> "the formative assessment takes place in the interaction among students and between students and teacher. Basically, the students "expose" their unshaped ideas and strategies, get feedback from classmates on their ideas, hone their articulation, and reject false notions. In so doing they clarify and move to a higher level of development. Observing and interacting with students who are going through this problem-solving process is an excellent way for the teacher to assess what students really understand" (Winkel, 1999, p.121)

What is essential is that the academic structure is supportive enough to encourage this 'exposure', particularly in the early days of the cohort forming. Assessment is not, therefore, of project outcomes, but of the individual's learning derived from the various project and team activities undertaken through the modules. This is presented in a 'Portfolio of Practice' as a factual account of what took place and a personal reflection of the consequent learning. Client organisations understand that projects undertaken in the second semester are likely

to reveal as much about multidisciplinary innovation as they are about the topic of the brief and appreciate the value of this in relation to developing their own experience in this area.

A similar portfolio approach is adopted in the 3rd Semester Integration Projects at which stage students have largely overcome the team working challenges and are confident to focus on collaborative innovation practice in service of the project, rather than themselves.

Shared Values

It has been shown how this new programme has been developed from sound principles and direct observation of multidisciplinary innovation practice in action. To date, students have worked successfully with such organisations such as The MS Society, BBC, Mars, Unilever, Berghaus and Sonoco Alcore as well as a host of regional SMEs. Fundamental to sustaining this success is the honesty and commitment of stakeholders learning how to communicate and work together. It is important to look to our students as partners in this research, working with them to determine their Terms of Engagement (Figure 4); the factors that they believe are essential to support their multidisciplinary innovation practice.

These shared values are displayed within their project spaces as a point of reference at moments when tensions run high. As and when direction within a team is lost, or "creative abrasion" ceases to be productive, students are encouraged to "give the problem to the wall."

Figure 4: Terms of Engagement

Perhaps the most relevant of these to conclude this paper relates to "active listening and adaptive behaviour" and "respect for individuals". The programme focuses on developing the individual and their confidence to participate through the 'safe environments' described. The importance of the individual cannot be over-stressed as it is only through self-awareness that the individual can become an effective team member. Staff and students have to be adaptive and flexible in their approach and willing to admit when they don't know the answer! This approach has allowed the building of a strong dialogue between students and staff that will guarantee mutual reflective, innovative and creative learning.

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