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Design Technology – a platform for creative study ?

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Abstract
In the beginning of 2005 the University of Brighton, in partnership with the University of Sussex, was deemed by the Higher Education Funding Council for England (HEFCE) to be a Centre of Excellence in Teaching and Learning (CETL) for Creativity. The award provides for opportunities for the universities to extend research into the theory and pedagogy behind creativity, and to develop creativity centres to aid in both this process and in creative practice itself.

The award was based significantly on the BSc (Hons) course in Product Design at the University of Brighton. The course has been a joint development between the university's faculties of Arts and Architecture and of Science and Engineering. The intention behind the joint development was to fuse the creative practices of the arts with the problem solving practices of science, producing students who are innovative but practical. Applicants to the course are required therefore to have an ability to be both logical and creative. A-level achievements are used as a significant determinant of this capability as demonstrated through achievement in both an art based subject and a science based subject. It can be argued that the Design Technology A-level, by its very nature, provides the pre-requisite demonstration of both scientific and artistic abilities, and therefore alone provides a suitable platform for assessing an ability to continue the study of design at a higher level. Quantitative assessment suggests that this might in fact not be the case.

One reason for this may be that the Product Design degree course, like many design related courses in higher education, strives to implement a Problem Based Learning (PBL) teaching methodology. It was noted in a previous analysis that level 1 students had performed better when the teaching methodology had switched from Problem Based Learning to Project Based Learning [PjBL] [Morris, Katz 2004].

It is conjectured here that under the pressures of the 'problem' in PBL, all students have a proclivity for referring to entrenched, past or intuitive knowledge rather than using new learning which they might conceive as more 'risky'. Those with a Design Technology A-level background might particularly rely on the design methods that have been previously prescribed to them rather than trying new and alternative methods and ideas advocated at degree level. This could explain why students without a Design Technology background may be more likely to experiment and to be more open to new and alternative ideas in design, increasing their cognitive understanding of design at a much earlier stage in their development as designers. It might also explain why all students performed better in the more structured Project Based Learning environment, which also more greatly resembles the learning format adopted at A -level.

Background
In the beginning of 2005 the University of Brighton, in partnership with the University of Sussex, was deemed by the Higher Education Funding Council for England (HEFCE) to be a Centre of Excellence in Teaching and Learning (CETL) for Creativity. The award provides for opportunities for the universities to extend research into the theory and pedagogy behind creativity, and to develop creativity centres to aid in both this process and in creative practice itself.

The award recognised broad achievements in creative practice that both universities had achieved individually and collaboratively through research and practice, but a significant element of the bid was based on the BSc (Hons) course in Product Design at the University of Brighton.

BSc (Hons) Product Design
There are many variations on the theme of 'product design throughout British Higher Education. Courses in Product Design for example range from industrial design, graphic design and CAD, through to engineering, furniture or jewellery design. The Product Design course at Brighton course is aimed at generating career professionals who can design the next generation of mass produced consumer goods, and was developed jointly by the university faculties of Arts and Architecture, and Science and Engineering. The intention behind a joint faculty development was to fuse the creative practices of the arts with the problem solving practices of science, producing students who are innovative but practical. Applicants to the course are therefore required to have a capability to be both logical and creative, and A-level achievement is used as a significant determinant of this capability as demonstrated through performance in both an art and a science based subject.

There are pedagogic challenges in moulding students to be both creative and logical, and from the outset it was considered that the best way to achieve this would be for the course to adopt a Problem Based Learning (PBL) methodology. PBL is an approach that provides students with a problem-based exercise as the vehicle for learning. PBL shifts the emphasis away from the delivery of programmed information, structured by the tutor, and as such students are helped to set their own learning goals, develop interests and questions and how they will find answers and solve problems [Barrows, 1996]. PBL also provides a real-world context – not just real in the commercial sense of being outside the university - but real in the sense of practical opportunity within the student mindset. It has grown as an approach adopted within the medical profession but support for its wider role within education and the importance of its position in the range of teaching approaches within HE have also gathered momentum within the last 25 years [Katz, 2000]. The approach has been strongly adopted within the creative arts where its reflective, deep rooted interdisciplinary and communication values are well suited.

Performance
Within the course, the PBL process starts with the tutor acting as a facilitator to help a group analyse a realistic problem that is nominally beyond their combined expertise at the start, and develop learning outcomes necessary for its resolution. In practice, the course established a central project as "the problem." Students then investigate independently, or in groups, using whatever resource are available and feed back their responses at review meetings, where critical reflection reinforces the learning. In this case, projects are also supported by structured lectures in subjects that aid the resolution of the design, including subjects such as appropriate materials or manufacturing processes. This allows the process to iterate with more refined task set. Eventually, when the problem of creating the design has been "resolved" (or at least understood and maximised), a full review and formalisation of the learning is carried out (the design is produced and critiqued).

Since design is creative, fun, and leads to a variety of career possibilities, and PBL is characterised by being motivating, participative and challenging, it was always expected that students would relish the learning experience. It was however always disappointing to find performances at level 1 characterised by poor attendance rates and lower than expected levels of achievement. It was demonstrated that switching the methodology at Level 1 from Problem Based learning to the more structured Project Based Learning was shown to improve the levels of achievement [Morris, R. Katz, T, 2004].

Project Based Learning (PjBL) is however considered to be less desirable than PBL in this case because it removes some of the high value learning features of PBL, and reflection has therefore been made to try and understand the reasons behind this disappointing performance.

Analysis
Quantitative analysis looked at level 1 degree performance, initially for correlations between strong performers and background factors such as nationality, gender or age. Few notable observations were apparent, however, some trends were observable with respect to students who had studied A-level Design Technology and those that had not. This showed that students without a DT A-level start do in fact start from a weaker base but are able to show higher levels of improvement:-

2002 intake	A level average	L1 score average
with DT A-level	254	60 %
without DT A-level	245	61 %

2003 intake	A level Average	L1 score average
with DT A-level	245	59
without DT A-level	195	58

Intuitively this might suggest that tutors are easily able to improve the design skills of students without the experience of Design Technology (DT) A- level. However, the results might also suggest that A-level DT students do not perform as well as they could.

Qualitative analysis through the examination of student work and discussions with students suggested that all level 1 students faced severe pressures when faced with new and unknown peers, surroundings, and expectations. Under these pressures and that of the PBL problem (which is often deliberately vague or cognitively challenging) students may adopt low risk coping strategies and to rely on intuition and prior learning rather than new, more risky learning being taught.

Students equipped with design experience through a Design Technology A level, would naturally implement prior knowledge as quickly as possible in order to focus on other subject areas, perhaps missing the integrative purpose of the project more than colleagues who had not studied design. Students with a Design Technology background might also more naturally rely on the design method that has been prescribed to them at A Level by the national curriculum and that students without this background may be more likely to experiment and to be more open to new and alternative ideas in design, increasing their cognitive understanding of design at a much earlier stage in their development as designers.

Further qualitative analysis, of the DT A-level itself, makes it feasible to note that the curriculum tackles i) ideas, ii) tools and iii) evaluation whilst not tackling the essential integrative nature of design and that the PBL methodology may be quite alien to the prescriptive, staged approach to design by the DT A-level.

Conclusions
There are too many indeterminates and sample sizes are too small to ensure an accurate diagnosis at this stage. It is not possible to extend the analysis to the 2004 since all students in the current 30 strong level 1 cohort have a DT A-level (compared to the 50:50 ratio of the 2002 and 2003 intakes).

Nevertheless, the reflections offered might explain why under PBL students devoted little time to projects, created low attendance levels, produced low grades and unimaginative products, and why the more structured PjBL worked better. It would also help to explain why performances improve at levels 2 and 3 where students are more comfortable with experimenting and trying new approaches.

Whilst still conjectural therefore, it is felt to be sufficiently noteworthy to preclude accepting an A-level in Design Technology as a solely sufficient demonstrator of capabilities in both the art and the science of design, and to continue to look for supporting achievement in traditional art and science A levels. This year also, the number of level 1 projects is being reduced from 2 to 4 in an attempt to move students into the preferred learning methodology and into the sphere of responsible, independent learners at an earlier stage in their development.

References

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