How Do We Learn to Love Innovation?

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It was in September 2010 towards the end of my full-time academic career that I was fortunate to be invited to be a Visiting Professor at UTM (Universiti Teknologi Malaysia). This was a fascinating journey at many levels, but, perhaps curiously, one of the more enduring memories was that of the young woman who, at the end of an undergraduate class that I had been privileged to take, asked the question that forms the title of this Editorial. The class had centred on 'creativity and designing' and, unsurprisingly, I had decided to speak in relation to my teaching experience at Loughborough. Looking back at the PowerPoint slides, I structured my talk around these themes:

- *Having found a good design context*
- *You need to be...*
    - *Determined modellers*
    - *Independent thinkers*
    - *Experiential in approach*
    - *Analytical*
    - *Skilful*

So far so good. I started the class by showing the Malaysian students a video film that had been made by the Loughborough students for the 2008 Degree Show. It showed the progress of some of their projects and the activities they had taken, edited and set to music. After observing that the facilities and resources available to the Loughborough and UTM students were very similar, and following a class discussion, we listened to 3 or 4 video recordings of the Loughborough students talking about their projects. I then talked about 'Designing in recycled polymers' as a context for innovation. There were a number of straightforward questions, and then the much more telling – "How do we learn to love innovation?" – to which I don't remember giving an adequate response.

The projects being completed at UTM showed excellent technological capability, but the key difference which I had observed, and which presumably my hosts had also observed and thus provided the motivation for the invitation, was that Loughborough's design students were consistently striving for innovation. Project-based learning as a means of developing technological competences and design projects within which students can express their creativity and strive to achieve something 'new' were evidently not the same thing, as the videos had demonstrated effectively. But why were the Loughborough students striving so hard to be innovators? Is technological competence not enough? Reading some of the papers submitted to this Issue of the journal brought these questions back to my mind.

The first paper by Colin M. Gray, concerns the factors that shape design thinking. Quoting the conclusions of this paper:

> While existing factors identified in the literature were found to be present in the context of this design program, the critical perspective of this study recontextualized these factors, along with the identification of new or underrepresented factors. Taking on the perspective of a student's experience of pedagogy foregrounds issues of uncertainty and ambiguity, highlighting the social interactions between fellow students, and the role of communication and individual effort in learning to think in a more designerly way. (Gray, 2013: 17)

The researchers reporting in this paper are working within the context of design in higher education where innovation and creative responses to ill-defined tasks are expected.

The second paper by Lewis C.R. Jones, John R. Tyrer and Nigel P. Zanker concerns the application of laser cutting techniques through horology for teaching effective STEM in design and technology. Comparing these two papers reveals something of the contrasting objectives that design and technology education can be expected to embrace, albeit that this research concerns general education. In the abstract for this paper, the authors indicate their intentions:

> The central aim is to strengthen the application of the underlying technology of mechanisms and the manufacturing capability of laser cutting technology in D&T. (Jones et al, 2013: 21)

Here the researchers were essentially pursuing objectives related to the development of competences in particular technologies, although within a design context.

The paper by Dr Katja Fleischmann and Prof Ryan Daniel concerns the management of increasing complexity in undergraduate digital media design education. In the abstract to their paper, the authors comment as follows:

> In order to manage the increasing complexities of design problems and technology a learning and teaching approach that facilitates the interaction of multiple disciplines was implemented and trialed over a period of two years in an undergraduate digital media design programme. (Fleischmann & Daniel, 2013: 35)

The researchers here were again working within higher education, but taken together these 3 papers reveal something of the issues that are facing those who must design and implement pedagogies appropriate for the 21st century. There are many factors to get right simultaneously. Readers of the journal will reach their own conclusions about the way the different researchers are approaching the curriculum complexity, the strength of the evidence they present and their conclusions, and the important point to make here is that it is essential to be very clear about the aims for which you are designing a curriculum. Recent discussions relating to STEM, and indeed revisions to the National Curriculum in Design and Technology in England have been focussed on developing some form of technological competence, which is not sufficient in my view, or indeed that of my Malaysian hosts. The Malaysian students were entirely competent technologically, but that was not the point. Far more significant was the hope of providing the opportunity for the next 'Apple' to be Malaysian.

And it was of course the paper by Mai Neo and Tse-Kian Neo that brought these issues back to my mind. These researchers were exploring students' creativity and design skills through a multimedia project using a constructivist approach in a Malaysian classroom. As the authors state:

> Research has shown that students have graduated from institutions of higher learning with a lack of creativity and critical-thinking thinking skills. This mismatch in skills has resulted in a nationwide initiative in using technology in the classroom to create a learning environment that would stimulate students' creative and problem-solving process, and to cultivate an engaging and media-rich design learning process. *(Neo & Neo, 2013: 48)*

One of the fascinations of reading about this research is the way in which it parallels the discourse surrounding Design and Technology in England. Clearly the Malaysian Government is strongly advocating and supporting positions from which the English Government is retreating. Reading these papers provides an opportunity to re-visit these challenges of curriculum design. As I have indicated in previous Editorials, these are not for me matters purely of economic survival, but relate equally to social and environmental sustainability. It is about getting to grips with 'sustainable design' to use a term that seems to be going out of fashion. Innovation is what humans do for better or worse and Design and Technology education provides one of the most direct routes for educators to engage with the issues surrounding it. Loving innovation is about loving humans for what they are. It is not about loving all aspects of every innovation, any more than we love everything done by all humans, but technological competence without innovation loses its human context.

The final paper by Raymond S Pastore and Florence Martin discusses the design and development of mobile based instruction: from a designer's perspective. These researchers introduced their work as follows.

> Mobile devices are increasingly being used in classrooms and corporations as a means to deliver instructional content. Currently, there is limited research on how to best design and develop mobile based instruction. As a result, the purpose of this research study was to examine students' perceptions of designing and developing mobile-based instruction (Pastore & Martin, 2013: 60)

In this ever more complex arena the span of design continually increases and research that explores mobile learning environments clearly falls within its compass. They might not fall within traditional perspectives of what 'design and technology education' embraces, but as design thinking comes to the fore, and service and experience design become increasingly important, that traditional perspective will need to widen as well. Exciting, and ever more complex times lie ahead providing rich contexts for increasingly challenging research.

This Issue also contains a review of *A Practicum Turn in Teacher Education* (Edited by Matts Mattsson, Tor Vidar Eilertsen, and Doreen Rorrison) by David Barlex, a review of *Project-based Learning: an Integrated Science, Technology, Engineering, and Mathematics (STEM) Approach* (Edited by Robert M Capraro and Scott W Slough) by Torben Steeg and a review of *Design Education: a Vision for the Future (Edited by Ken Baynes*

and Eddie Norman) by David Spendlove, as well as the Reflection piece '*21st century…19th century…6th century BC skills*' by Richard Kimbell.

References from this Issue 18.3, 2013

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