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The scholarship of teaching: threshold concepts and research informed design education

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Abstract: This paper considers the growing body of established scholarly research culture in the creative arts: which, it is argued, is in the process of 'catching up' with more established disciplines such as science, history and economics. This slow growth is linked to the need for practitioner-focused lecturers within the discipline, some of whom have little engagement with scholarly theory before entering the academy. The paper then goes onto consider the introduction of a particular theory - the threshold concept framework - to a cohort of industrial design staff at Coventry University and outlines some of the main impacts on both their continuing professional development and their teaching and learning practices. Specifically the main impacts have been an embedding of a threshold concept 'lens' through which the lecturers interviewed now see their teaching and learning practice, which has resulted in both changes in curriculum delivery, and an enhancement of publishing profiles.

Keywords: Research, design education, design curriculum

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Introduction

With its historically firm focus on practitioner expertise, scholarly research cultures within creative arts disciplines are not as well established when compared to more traditional subjects such as science, history and economics. This is reflected by the UK Research Exercise Framework (REF). When referring to the Art and Design unit of assessment (HEFCE 2012) the criteria acknowledges "the diversity and range of related methods of academic study and artistic practice, and therefore adopts an inclusive definition of its remit". This is coupled with a focus on practice: "Practice encompasses all disciplines within art and design, in which methods of making, representation, interrogation and interpretation are integral to their productions".

This recognises that creative arts practitioners are typically, first and foremost, employed for their creative, rather than scholarly writing, expertise.

This often means that staff are unfamiliar with scholarly writing and publishing processes, and in turn do not readily engage with theories which they can apply to their teaching and learning practices.

This paper discusses the impact of introducing one particular theory - the threshold concept framework - to industrial design staff as part of a longitudinal study carried out by the Centre for Product and Automotive Design (CEPAD) at Coventry University between 2005 and 2010.

CEPAD was funded as part of the HEFCE CETL[1] initiative, and as a result of the longitudinal study, *the toleration of design uncertainty* emerged as a first-year threshold concept, defined as "the moment when a student recognises that the uncertainty present when approaching a design brief is an essential, but at the same time routine, part of the design process". (Tovey et al, 2010)

As a result, the industrial design undergraduate curriculum was redesigned in order to offer safe spaces to students within which they could experience the intense uncertainty that is characteristic of the design process. This was facilitated by a re-thinking of the assessment process, which 'loaded' the marks towards the end of the academic year, allowing the students the opportunity to not worry about the marks, and thus learn from this, at the beginning of the year. (IBID)

As well as having an impact on the curriculum, the threshold concept theory also had an impact on the staff of the industrial design department, in that it allowed them to discuss and share their subject expertise with each other, and, for some, to view their subjects through a 'threshold concept lens'. This facilitated adjustments to teaching and learning practices and subsequently - through enhancing research profiles - impacted on continuing professional development.

This paper picks out several, previously unpublished, key points outlining the impact of linking theory to teaching practice, through focusing on four particular members of staff who have published papers using the threshold concept theory.

Creative arts staff and research culture

As has been argued elsewhere (Osmond 2011), there is a paucity of published educational research into the teaching and learning that underpins teaching within creative arts disciplines. The reasons for this are linked to the lack of established

[1] http://www.hefce.ac.uk/whatwedo/lt/enh/cetl/

research culture surrounding the creative arts, which historically were taught within independent art schools or, pre 1991 in the UK, in polytechnics (Bird 2000).

As such, the focus has always been on the practical in terms of employing creative arts staff who are practitioners first and foremost, rather than scholarly academics. Therefore, being practitioners, creative arts staff are - in comparison to more established disciplines such as science, history, and economics - much more likely to bring with them expertise in their *craft*, whether joining from a creative arts educational background, or from industry, rather than scholarly writing expertise.

This lack of scholarly writing expertise is compounded by a debate as to what exactly constitutes scholarly writing: as MacFarland (2011), bitingly suggests, it is to everyone's detriment that there is a division between scholarly research and pedagogic research:

> Subject-based research is serious, scholarly and well-respected stuff. It is published in prestigious subject-based journals. This kind of research is what counts in the assessment of research quality in countries like the UK, Australia and New Zealand. Then there is 'pedagogic' research. This is where academics from various disciplines do research about their own teaching, that of others or focus on the way students learn…But apparently, unlike subject-based research, 'pedagogic' research is not 'proper' research. It is not, therefore, any good for the purposes of research assessment.'

Further, this lack of a widely agreed framework for 'proper' research, especially within the creative arts, perhaps reflects its status as an "ill structured and undisciplined domain" (Joseph 2008) which privileges "wicked problems" (Buchanan 1992) at its heart, underpinned by teaching practices based on tacit knowledge.

There is too, within the creative arts, a suspicion that research itself may well kill the golden goose – in other words, that researching creativity will somehow dispel its 'magic'. (Doy 2008, Ritterman 2010)

The Centre of Excellence and Product Design

It was into this backdrop that the Centre of Excellence for Product and Automotive Design (CEPAD) first introduced the notion of threshold concepts as a research framework to industrial design staff in 2005. Threshold concepts are defined by Meyer and Land as:

> akin to a portal, opening up a new and previously inaccessible way of thinking about something [representing] a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress. (2003:1)

The aim of the research was to pinpoint those crucial transformative moments that industrial design students must experience in order to become critically minded, innovative practitioners.

Staff and threshold concepts

However the focus of this paper is the impact that the threshold concept theory had on particular members of staff in terms of their teaching and learning practices and continuing professional development.

The staff were involved in the longitudinal study from the very beginning, starting with attendance at a whole-staff meeting in early 2006. The outcomes from this are detailed in Osmond et al (2007), but in essence the meeting was characterised by staff enthusiasm to share knowledge about their subject. The initial discussion focused on the definition of 'spatial awareness' as this was seen as a crucial ability by staff for the students on the course, but despite extensive discussion it was not possible to define this and thus it was also not possible consider whether it could be a threshold concept. Despite this, several potential threshold concepts were identified, one of which – 'the confidence to challenge' (defined as the ability to inculcate design conventions and expand upon them using information from a variety of sources and experiences) was taken forward for investigation with students.

This meeting represented the beginnings of staff involvement with the threshold concept theory, and at a later meeting in March 2008, they were presented with the findings from the longitudinal study to date, which included data from student interviews showing that there was a level of uncertainty in terms of the 'confidence to challenge' being expressed. Again this meeting was characterised by a lively discussion of potential threshold concepts that students face throughout the course, including the notion of empathy (not just designing for themselves), professional development (increased confidence on return after work placement), and group work (allowing someone else's design to go forward). (Osmond et al 2010). What was apparent at this meeting was that the staff were now routinely engaging in framing student breakthrough moments in terms of threshold concepts.

This engagement by staff is reflected by Irvine and Carmichael (2009) who took part in a similar meeting:

> It is worth stating from the outset that we were pleasantly surprised by the extent to which the participants were willing to critically review their existing practice…these are accounts of concerned, reflective practitioners engaging with educational theory and practice in distinctive ways.

This level of engagement has continued with particular members of the original staff group and four lecturers were interviewed in late 2011 to identify the impact of the threshold concept theory both in terms of their teaching and learning practices and their continuing professional development.

Major Impacts

Framing understanding of the learning process

A major impact for most of the lecturers interviewed was that using the threshold concept theory allowed them to intellectually frame their understanding of the student learning process, with one lecturer linking the threshold concept framework with the notion of bricolage to produce a coalescence of understanding:

> For me conceptual thresholds are a little bit like bricolage in the sense that there are many of them and depending on the individual they may be different, so you can't teach to a formula because people have to discover what threshold concepts are relevant to their own learning. The collage that it creates will be very different depending on the individual.

For two of the lecturers, the theory enabled an articulation of what they instinctively 'knew':

> Before I wouldn't have put a title on it – you can tell when a student has achieved a certain level of ability or a certain way of critical thinking and at the time it would be just part and parcel of that student learning how to be a designer. I think having the framework is putting a title on some of the things that they are actually doing. You can happen across [threshold concepts] all the time and they seem to occur to different students at different times… I think you can see it in the level of confidence that they have.

Another lecturer also experienced a threshold concept moment of his own during his recently completed MA degree:

> I started to develop more of an interest in teaching design to students during [my MA] because when you are on the receiving end of it you think differently and you understand how long it takes to do things that you are asking the students to do.

The lecturers also began to identify threshold concepts, for example reflective sketchbooks were problematic for some students "because they can't deal with that whole idea of looking back". Also interesting were student difficulties with the difference between rendering and a piece of art:

> Trying to get the student to understand the difference –any good designer will tell you that they will spend three hours on a rendering and if they don't like it, it is screwed up and thrown in the bin. You often see the shock on [the students'] faces, but they need to realise that it is just a communication tool, it is not precious like the Mona Lisa!

This was an issue that had emerged during the longitudinal study, where students reported wasting hours on trying to produce a perfect render in their first year, but progressed to a much quicker sketch by the end of their second year.

Empathy

The recognition of threshold concept moments led to a more empathetic mode of teaching for one lecturer:

> In the past I would probably have thought 'oh this student probably just isn't a good designer' or 'they are just not getting it/don't draw very well'. I don't think that is true now: understanding that they will go through gateways at different levels helps you to have more empathy towards them and help them to play to their strengths. I think for me that is probably the most important.

This is echoed by Dewey, who, as far back as 1963, proposed that "The key element which facilitates the transition from a good education to a transformative one is empathy." Further, Ramsden (1992) suggests that interest in and empathy for students are necessary components of good teaching.

In addition, the notion of empathy as a threshold concept led to one lecturer to make the connection between design empathy and the concept of the 'other' (after Said 1991), taken from cultural studies. This link was used to present students with the concept of the 'other' during an ergonomics module with first year students which also used personas to encourage them to think 'outside themselves' (Osmond & Mackie 2012). This is felt to be important for design students as, typically, when they arrive,

they tend to want to design for themselves, and the concept of identifying with someone who is 'not them', is a difficult phase in their design identity development process. As this lecturer states:

> When they can think like an old lady trying get a bag onto a bus I think that is the breakthrough moment when they can achieve interesting design because it is that ability to think outside [of themselves]

This empathetic recognition of the different journeys that students undertake in their learning process is seen as student-centred teaching, a threshold concept in itself according to Blackie *et al* (2010):

> …we suggest that student-centred teaching is a threshold concept [and it] is not just a different style of teaching. It requires that the academic really understands and appreciates the need to pay attention to the students and their learning. It involves a shift from measuring one's success as a teacher by how much of the syllabus is successfully covered to measuring one's success by how much the students actually learn and with what depth of understanding.

Changing teaching practices

For two of the lecturers the identification of specific threshold concepts led towards a change in teaching practice. A Year 2 lecturer found that students were unused to defending their research process due to a focus on the formulaic 'presentation mode of assessment' typified by the standard 'pin up and leave' crit. This method of assessment meant that students did not need to defend their designs and thus demonstrate the journey from research to designed artefact.

> It is where they pass through this threshold as well - the idea that research is not just something where you do nice slides and put it on screen, and then do something completely different.

Meanwhile, for an MA lecturer, there was the recognition that some students had difficulty in thinking creatively when formulating their research proposal:

> I went through a systematic step-by-step delivery each week and at the end they got a mark and they were unhappy because they felt that 'I did everything you told me to do so I should understand, I should get it why have I not got 95%'. So clearly the threshold concept had not manifested itself in that module.

Both lecturers changed their teaching practices as a result. The Year 2 lecturer redesigned the assessment method for a year-long module. In essence, the assessment method – entitled the 'buddy system' (Osmond and Clough 2012) – is now much more closely aligned to the crits found in industry.

The focus is now extensively on the feedback element of the crit, rather than the final mark, and ensures that during each assessment session, the students are expected to demonstrate the link between their research and their final design by entering into a dialogue about their thinking processes. The lecturers, freed from taking notes by a system of student note-takers, can maintain eye contact and walk around the design: in other words, the lecturer and student enter into a professional dialogue about the work. Due to this change, the student focus on the 'mark' has lessened:

> Students are suddenly saying that the mark is less important now, because they are realising you know when something is a good piece of design - the whole thing is far far greater than the sum of the individual boxes you are ticking.

In the meantime, the MA lecturer moved towards a teaching model that emphasised conceptual thinking, rather than a linear step-by-step process (Bull 2013). Early indications are that the students are beginning to make connections between different ideas much more quickly and some have begun to experiment with this.

This change of focus which takes student understanding as the impetus to redesign teaching practice, is recognised by McLean (2009):

> Threshold concepts provide a lens through which teachers can view teaching in their discipline from a different perspective and, along with this, consider areas where their students 'get stuck' and why – areas that may emerge as threshold concepts… clarifying 'what' it is that students should learn and why it is important, where they effectively shift the focus from teaching to learning and from content to understanding.

Research profiles

Another big impact of the threshold concept theory has been on individual research profiles, with all the lecturers interviewed writing up pedagogic research framed by the theory for publication. Using the threshold concept to frame their research, carry it out, write it up and submit it for publication gave these lecturers the knowledge, skills and confidence to continue to publish. As one lecturer stated: "Threshold concepts allows people to write about their teaching and the theory allows it to be taken seriously".

For these lecturers – practitioners all – this change is important as previously engaging with theory and pedagogic research was felt to difficult enough due to the time pressures of teaching, and was, at best, perhaps perceived as just another 'demand' something echoed by D'Andrea *et al* (2000).

Also, engaging with the publication process was previously felt to be daunting, with one lecturer stating that he 'didn't see pedagogic research as being research for me' and another feeling that she was expected to 'simply know' how to research and publish: not only this, but also to demonstrate that she had done so in yearly appraisals. This hesitancy resonates in Stierer and Antoniou's work, when they found that HE lecturers often felt hesitant in carrying out pedagogic research as 'they lack confidence in their skills to cross-disciplinary boundaries and come out of their disciplinary comfort zone'. (Quoted in Brewer *et al* 2011) In addition, D'Andrea *et al* posit that those who *are* interested in pedagogic research can sometimes be isolated within their own department as 'the member of staff interested'.

To date then, three of the lecturers have inculcated the theory into their teaching and learning practices and have subsequently raised their research profile through publication. This focus on theory has continued with a newly appointed lecturer, arriving directly from industry, already on board with the theory, "recognising in his teaching that there are these kind of moments". This willingness to engage by a new lecturer is perhaps a reflection of a changing culture in which lecturers within the department are beginning to feel more comfortable in thinking about their teaching and learning practices in terms of theory. Therefore, in contrast to D'Andrea *et al*'s 'only member of staff interested', this engagement by a newly arrived lecturer signifies

that he is being brought into an existing culture of expectation in relation to pedagogic research, and thus evidencing an overall shift in departmental thinking.

To date, only one of the lecturers interviewed has not taken the theory fully on board, and this could be because, unlike the other three, she was not present at either the introductory session in 2006 or the follow-up in 2008. This appears to point to the importance of being part of the initial exchange of views, or the sharing that characterised both sessions, something that Skelton and Wisker comment upon:

> Striving for pedagogic excellence should be about learning and teaching development; sharing practice; promoting staff equality; and reuniting the separated research and teaching identities (Skelton, 2009; Wisker et al 2005: quoted in Skelton 2009).

Concerns

As outlined earlier in this paper, one of the immediate impacts of the presentation of the threshold concept theory to staff at two points during the longitudinal research process was how enthusiastic the staff were in talking about their subjects.

However there were concerns expressed about how to 'really' identify threshold concepts. As one lecturer stated, "everyone has a slightly different interpretation of what [a threshold concept] might be", and another was uncertain about "how accessible portals and thresholds are". This uncertainty is common in relation to threshold concepts, as the five characteristics defined by Meyer and Land are often seen as definitive. Therefore if a potential threshold concept does not fit all five characteristics, people sometimes struggle with identification:

> I am not sure about how much conviction or justification you would need to provide something that is justifiably a threshold concept - it is quite subjective in the sense of what is in and what is out - it feels like you can make a case for it but not necessarily one that I am 100% convinced about in my own mind.

But as Irvine and Carmichael point out, threshold concepts are "better thought of as pointers or framing devices or as evidence of their 'value-for-use' rather than as defining characteristics", or, for Meyer and Land as "ways of thinking and practising in a discipline".

Added to this uncertainty is the criticism that threshold concepts are 'just another theory': as one lecturer put it: "it feels like it is one of those things that I have come across: different theories that are descriptive but are not terribly useful in telling you what to do"

This is something that Glynis Cousin tackles in her keynote address at the *Threshold Concepts within the Disciplines Symposium* in 2006. Entitled 'Old Wine in New Bottles', Cousin acknowledges that the threshold concept framework can be seen as just another theory, but for her its importance is that it allows what she calls "transactional enquiry". In essence this is a move away from a teacher-centred/student-centred traditional binary opposition and towards a constructive, constantly shifting dialogue, between lecturers and students.

This is reflected by three of the lecturers, who despite their concerns, are still engaged with the threshold concept theory and continue to think about their teaching and learning practices through a threshold lens, constantly questioning and re-framing their understanding, whilst at the same time interacting and engaging with their students in order to improve their educational experience.

Conclusion

This paper has considered a lack of established scholarly research culture in the creative arts, which, it is argued, is linked to traditional practitioner-focused lecturers, some of whom have little engagement with scholarly theory before entering the academy.

The paper then goes onto consider the introduction of the threshold concept framework theory to a cohort of industrial design staff at Coventry University and outlines some of the main impacts on both their teaching and learning practices and continuing professional development.

Specifically the main impacts have been an embedding of a threshold concept 'lens' through which the lecturers interviewed see their teaching and learning practice: even though there were concerns expressed over precise understandings of the threshold concept theory, three of the lecturers are still iteratively engaging, thinking and pursuing their knowledge in this area. Other impacts were the subsequent development of a more empathetic teaching approach leading to changes in curriculum delivery, and the enhancement of individual research profiles.

This willingness to engage in theory was kick-started by CEPAD, which came into being as result of the HEFCE CETL initiative. That CEPAD has survived beyond the HEFCE funding stream (which ended in 2010), and that newly appointed lecturers are now buying into an expectation of pedagogic research, is a testament to Coventry University's willingness to perpetuate the nascent research culture that expanded during the five years of the project. As a result, two roles were subsequently consolidated – the Directorship of CEPAD and Director of Design pedagogy. More recent appointments include a research-active Dean, and a professor of design research. Therefore, there is a clear indication that such funding streams have a great deal to offer universities in this area.

As it is, the legacy of CEPAD is that it is constantly adding to the growing research culture within the creative arts, underpinned by publications such as *The Design Journal, Design Studies* and the *International Journal of Design*; the presence of the Design Research Society (DRS) and its bi-annual conference, and the (also bi-annual) DRS Cumulus conference which focuses exclusively on design pedagogy. This coupled with the recognition within the REF that practiced-based artefacts are as valuable as scholarly outputs, indicates that the creative arts are finally beginning to establish a research culture of its own.

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