Learning theory through collaboration, visualization and audience presentation

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Abstract

This study reports on a series of changes involving collaboration, visualisation and audience presentation which were incrementally added to a first year visual communication design theory course taught at the university of Newcastle, NSW. It will discuss novice, first year students' experience of collaborating with peers and also look at how visual media methods were used in the construction of a theoretical argument. It responds to previous observations that many of our students were not engaging with theory at a deep intrinsic level, writing essays that were motivated by the extrinsic demands of passing a course than actual fascination with the theoretical dimensions of design. In contrast, visual communication design students thrive in studio environments where collaboration and immersion in visual methods of working are the norm. We put forward here, the argued position that student learning of design theory can be enhanced through the incorporation of working methods commonly used in creative practice.

Keywords; collaboration, creative practice methods, visual communication design, learning strategies

introduction

In his seminal text *'Designerly ways of Knowing: Design Discipline versus Design Science'* (2001) Nigel Cross talks of the discipline of design's need to:

> *develop domain-independent approaches to theory and research in design. The underlying axiom of this discipline is that there are forms of knowledge special to the awareness and ability of a designer, independent of the different professional domains of design practice (p. 4).*

Further to this he adds "so we must concentrate on the 'designerly' ways of knowing, thinking and acting" (2001, p. 5). It was with this in mind that we considered incorporating creative practice methods into our first year theory course. In the first instance our focus was on collaboration, but as the study developed we began to realise that visual methods of assimilating understanding of theory could be harnessed and incorporated into audience presentations. As regards presenting work orally to peers, we also realised that this method of communication, common in studio environments, but not common in theory classes, may also assist learning of theory.

When it comes to learning theory, visual communication design students are usually confronted with a traditional model of knowledge dissemination through lectures and tutorials. Student learning is assessed through the written academic essay. This is contrary to the norm of design studio activity where the critique of work, and working visually and collaboratively are activities design students are most comfortable and familiar with.

We believe visual communication design students have visual skills, and collaborative abilities, that can be harnessed within a critical studies context to create a deeper and more meaningful learning experience; skills which can be used to present research as a 'visual argument' and certainly act as a support mechanism for text based theoretical discourse.

Literature review

Johnson and Johnson define collaborative learning as "the instructional use of small groups so that students work together to maximize their own and each other's

learning" (1996, p. 786). The theoretical basis for peer collaborative learning derives from the constructivist theories of learning introduced by Piaget and Vytgotsky (Wang and Burton, 2010) as they focus on the making of meaning through social interactions.

The learning benefits of working collaboratively have in recent times become well established in design teaching programmes, Black (2005), and Jones et al (2007). Such studies suggest that collaborative learning activities bring about higher achievement than "competitive and individualistic learning" (Jones et al, 2007, p. 183). And while Sawyer (2008) and Rogoff (2008) argue that the benefits of collaboration may be less about peer learning and the development of effective learning strategies and more behaviourally linked to the strengthening of individual self esteem, the evidence is compelling that design students do enjoy learning collaboratively.

There is an emerging body of literature that explores the problematic relationship between the conventions of academic analysis and writing and creative arts and design education. This literature can be characterised as falling into two key areas. There is literature that explores this relationship and sees its problematic arising from the tensions between institutional academic requirements, on the one hand, and the general disinterest or ability of students in such conventions, on the other. Much of this literature outlines the extent of the problem and / or articulates strategies for overcoming it (Bhagat & O'Neill 2009, Blackler 2014, Collinson 2005, Edwards 2004, Grow 1994, Hockey 2007, Lyon 2009, Roxburgh & Bremner 2001, Roxburgh & Sweetapple 2007). Alternatively there is literature that highlights the variety of personal, cultural, historical or institutional contexts and causes that have lead to the problem arising (Candlin 2000, Elkins 2004, Hockey 2007, Kill 2006, Melles & Lockheart 2012, Wood 1998).

Irrespective of the orientation of the literature, the common theme that emerges is the widespread frustration, and often resistance, that art and design students have towards institutional requirements to engage with conventional academic analysis, be it through reading or writing. The research demonstrates that students who undertake tertiary studies in creative arts and design privilege intuitive thinking and are poorly equipped with the analytical skills required for these forms of reading and writing

(Apps and Mamchur 2009). The literature also often argues that the intuitive approach of these students is a consequence of their preference towards visual learning styles. Collinson describes this style of learning as both emotional and intuitive (2005, pp. 716-717); Lockheart et al. (2004, p. 97) and Yee (2012, p. 471) characterise it as a visual-spatial learning style; Irwin calls it aesthetic knowing (2003, p. 63); McCannon refers to it as tacit knowledge (2011, p. 133); and Blackler 2014, Edwards & Woolf (2007, p. 55) and Grow (1994) use the term visual thinking. Despite the different inferences these various terms connote, in essence what they have in common is the idea that this style of learning occurs through doing and looking, rather than reading and listening and that visual-spatial learners 'tend to think in pictures rather than words' (Yee 2012, p. 471). Within the field of constructivist learning theory this is known as kinaesthetic learning.

Much of the available literature dealing with the tension between kinaesthetic styles of learning, and the more analytical styles of conventional academic discourse, concentrates on the description and efficacy of techniques used to assist creative art and design students develop appropriate writing and analytical skills. Commonly, this literature reports on the success of taking a student centred approach, using their studio practice as the starting point for research and / or writing, and using or developing a variety of writing genres that better parallel the creative process (Apps & Mamchur 2009, Edwards 2004, Kill 2006, Lyon 2009, Preston & Thomassen 2010, Roxburgh & Bremner 2001, Roxburgh & Sweetapple 2007). Additionally there is literature that chronicles specific design-like student exercises or workshops that help them to develop the structure and content of their writing (Apps & Mamchur 2009, Bhagat & O'Neill 2009, Blackler 2014, Charlton 2008, Edwards 2004, Jones 2007, McCannon 2011, Preston & Thomassen 2010, Roxburgh & Bremner 2001, Roxburgh & Sweetapple 2007).

Where the literature concerning the use of visual skills and designerly learning techniques in art and design theory courses is growing there is scarce literature on the use of collaborative learning within them. The limited literature that has been published often only mentions the collaborative dimension of learning in theory courses in passing. Blackler (2014) makes reference to a group criticism project in her design history course but the focus of her paper is on the designerly techniques used

in exploring and critiquing that history, not upon analysing the pros or cons of collaborative learning.

Lydiat discusses writing as a "making process" central to the 3rd year visual arts dissertation subject she ran (2003, p.1). She implemented the use of both informal and formal peer feedback and support, the latter through the use of proforma sheets, as a way of assisting students overcome the isolation they felt in grappling with the demands of writing a dissertation. Students found the feedback a "revelation" and "were genuinely engaged with and palpably surprised at the recognition of a shared sense of enquiry" and "found it a surprisingly empowering experience" (Lydiat 2003, p.1). However, there is no detailed analysis of either the collaborative techniques used or actual evidence of the students' feedback on, or experience of, this peer learning process. Rather the techniques and feedback are discussed in anecdotal terms only, hardly surprising, as the paper is a short case study and not a comprehensive research paper.

In one of the few papers explicitly dealing with collaborative learning in design theory courses, Bhagat and O'Neill discuss collaboration in the implementation of a workshop run in a "writing intensive module" for "all practice-led design courses" at their institution (2009, p.179). Interestingly the notion of collaborative learning occurs on two levels. Firstly there is the collaboration between the design "subject specialist staff" and "writing specialist staff" delivering the workshop that had learning benefits for the former because it encouraged them "to engage with an aspect of pedagogy - teaching subject based writing" that they were normally reluctant to embrace (Bhagat and O'Neill 2009, p.179). Secondly there was the group writing task students taking the module had to complete. Student groups had 40 minutes to discuss a set topic and then allocate an aspect of that for each member to write a short paragraph on. The groups then combined their paragraphs and these collectively formed the structure and content of a "mini-essay" (Bhagat and O'Neill 2009, pp.179-180). Each group essay was then displayed to the class and the strengths and weaknesses of each piece of writing, and each paragraph within it, was discussed, resulting in a collective understanding of the features required to write a good essay. Despite the innovative approach of this work the benefits of collaborative learning are mainly anecdotal and implied as the limited analysis of student feedback was focused solely on whether the

workshop helped them with their writing - it did and this is no small achievement - and was not focused on whether it helped them in their understanding of design history of theory.

Like many others, Orr and Bythman (2002) argue for the efficacy of designerly, making, techniques as a way of developing the writing ability of art and design students. In addition they specifically address the importance of the role of peers in developing both the students' design and writing practice. Their research involved interviewing final year fashion design students about their reflections upon the writing and design processes used in both their dissertation and design work. What they discovered was that peer discussion about their design work "supported their design process" with the focus being on the discussion of ideas and how to resolve them in design form (Orr & Bythman 2002, pp.44-45). In contrast to this they discovered that the same students, "instead of talking to each about the actual content of the writing, as they do with design, they focus on word length and other surface features of the text" (Orr & Bythman 2002, p.45). In identifying this disjuncture, they argue that where students "benefit from formulating and clarifying their ideas through dialogue with each other and with lecturers", in relation to their design practice, they could "do the same for their writing assignments" (Orr & Bythman 2002, p.50). Whilst they make a sound case for this approach, and their research points to the analogous potential between peer discussion of design work and writing, they provide no evidence of successfully doing so.

The literature outlined above clearly points to some level of recognition of the significant role that collaborative approaches between peers can play in understanding design theory and developing writing ability but it is evident that their is a paucity of published material that examines concrete instances of doing so in any detail. The remainder of this paper will seek to start to address this paucity.

Methodology

As teachers we felt that as our first year theory course progressed we were witnessing something valuable, something which we had not predicted or planned in depth. Therefore we position this research as a phenomenological heuristic enquiry. This

type of approach seeks to unearth the essence of personal experience of participants and also the personal insights of the researcher. According to Patton, (2002) "The reports of heuristic researchers are filled with the discoveries, personal insights, and reflections of the researchers" (p.107). The phenomenon of using design studio methods involving collaboration and visual media methods to develop a theoretical argument acts as the study's focus. The heuristic aspect is important when the researchers have empathetic insight and personal experience with the phenomena under scrutiny, what Weber (1947, cited in Clark, 1997, p. 34) defines as *verstehen*. Both researchers involved in this study are design practitioners and design theorists. This provides them with empathetic insight into their student's experiences of learning theory collaboratively and through the use of visual modes of communication.

The research design strategy can be described as a retrospective naturalistic inquiry. Naturalistic inquiries study real life situations as they unfold. They are non controlling and non manipulative. Patton (2007) describes it well, "The phenomenon of interest unfolds naturally in that it has no predetermined course established by and for the researcher" (p. 39).

To ensure there were no ethical issues, the researchers clearly separated their roles as teachers and researchers. During teaching time no actual formal research took place. It was not until the project had been assessed and handed back to students that a request was made to use the student work as data for a research project. The naturalistic element is therefore retrospective.

The learning structure

The first year theory course *DESN 1001_Design Contexts: What—Definitions, Theories and Practices of Design* was structured around a deceptively simple question, 'what is design?' This provocation was further elaborated on with a weekly series of 'design is' lectures: *anthropology, sociology, science, artificial, thinking, sociology, art, perception*. The lectures were followed by tutorials where the discussions revolved around the lecture and the prescribed readings. This was where the group work began. Sixty seven students were enrolled in the course and this was

split into five tutorial sessions with two lecturers. Each week students had to read one or two prescribed readings prior to the lecture and tutorials. Students were also provided with a number of recommended readings which supported and expanded on the key themes of the main texts. In class the students worked in groups of three or four and their role was to discuss and then present their understandings of the texts as a group. This approach assisted students to prepare for the first formally assessed component of the course where they had to make a presentation to the class on one of the 'design is' topics. As the teaching studios have large screens for digital presentations the students were very comfortable with the idea of presenting their work via various programmes such as Powerpoint and Keynote.

From a teaching perspective, while this visual media approach had not been planned it became increasingly clear during the following weeks that students enjoyed this means of assimilating their understanding of theories about design into a format which they were comfortable and familiar with. This became one of our early heuristic discoveries. A number of students took the visual presentation approach even further and for their formally assessed presentation created documentary style, voice over presentations on their 'design is' topic. While, as educators we had reservations that such an approach might lead to visually interesting but content devoid presentations, we were pleasantly surprised that this was not the case. All presentations followed the academic protocol of 'claim' followed by 'evidence'.

The learning activities

Collaboration

The first collaborative activity required students to place a variety of provided quotes about design into one of seven 'design is' categories: *anthropology, sociology, science, artificial, thinking, art, perception*. These categories were the basis for a series of weekly lectures which cumulatively provided students with a rich and varied overview of the field of design. The purpose of the activity was to help students contextualise the quotes in relation to the various categories. This was also a means of easing students into the positions of prominent design theorists such as Simon, Buchanan, Cross and Papanek. The quotes were provided as a random list and each

group had to cut out the quotes and paste them on A2 sheets underneath each of the categories.

At the end of the session we looked at what each of the groups had chosen as the most appropriate relationships between the quotes and the categories under which they had to place them. We quickly realised that it generated a lot of discussion within the groups and also led to class discussion when all the sheets were critiqued at the end of the class. This was our first heuristic discovery; students can learn theory by engaging in physical activities and by comparing and discussing differences and similarities of their conclusions with those of the other groups. The simple group activity of cutting out quotes and arranging them in relevant categories allowed students to work collaboratively, iteratively, kinaesthetically and visually.

The second collaborative activity carried out the following week required the groups to present a report on the content of two prescribed readings by Forty (1986) and Pevsner (1949). Four weeks later a similar activity was carried out with papers by Plowman (2003) and Strickler & Neafsey (2006). As the weeks progressed student presentations became increasingly visual and some of the groups became very efficient at structuring the presentations through visual media into key ideas, key figures and used the case study method as a means of demonstrating ideas in depth.

Visualisation

The concept of acting as a reporter rather than as an academic allowed the first year students to have a bit of fun as to how they presented their findings each week. The notion of the visual argument as a support mechanism for the verbal/written argument developed. Within the reporter framework this seemed a logical progression as to how our design students, familiar as they are with visual and oral means of communication could enhance the progression of their ideas and theoretical understanding. This approach encouraged students to think of their audience; a very familiar concept in a design studio environment. It led to some students asking if they could, for their formally assessed presentation, give an entirely digital, multi-media documentary style presentation complete with recorded voice over sound. Student enthusiasm for what was essentially the presentation of theoretical positions from the literature was high. This co-creative, visual and oral approach allowed students to

directly communicate to an audience, an experience which would have been more detached and impersonal if delivered in an essay format.

Data

The data is based on:

1. Collected collaborative sheets which placed quotes from the literature on design underneath stipulated categories which contextualised design.

2. A questionnaire with two specific questions relating to collaboration and presenting research.

3. Analysis of digital presentations

4. Case study of multi-media presentation.

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Analysis

1. Collaborative sheets

As the A2 collaborative sheets were used only as a formative non assessable exercise, only eight were handed in by students at the end of the course. However, during the actual course all sheets were looked at and discussed as part of teaching and learning. The eight sheets which were analysed as research are a homogenous representation of the full student cohort.

Each student group had to cut out 31 quotes about design from a wide range of design theorists and place each quote under one of seven categories: art, science, artificial, sociology, anthropology, thinking, perception. The quotes themselves were not provided in any specific context, so students had to determine which category appeared to be the most suitable. There was much discussion between the groups as to which quote was best suited to the provided categories. While there was some discrepancy between the groups as to where each quote should be placed, there did emerge some universal patterns of understanding. Through class discussion it was agreed that some quotes were equally valid under different categories. This helped to get across the idea that context plays a highly significant role in determining the value

of a quotation. As this exercise was carried out at the very beginning of the course we were pleased at the outcome and student willingness to work in groups. This led us to consider incorporating collaboration into other exercises carried out during the course.

Even though collaborative learning was not outlined in the course objectives or learning outcomes we, as educators realised that this somewhat *ad hoc* measure seemed to play a very positive role in getting students to engage with theory. Our students, as is typical in design studio practice, used an iterative approach when placing quotes. Decisions as to where a particular quote should rest were often re-visited and sometimes amended. The kinaesthetic and visual approach enabled students to analyse the quotes in relation to the headings categories. This was then synthesised through discussion and trial and error, leading to final decisions as to the appropriate placement. Once final decisions were made the quotes were then glued down.

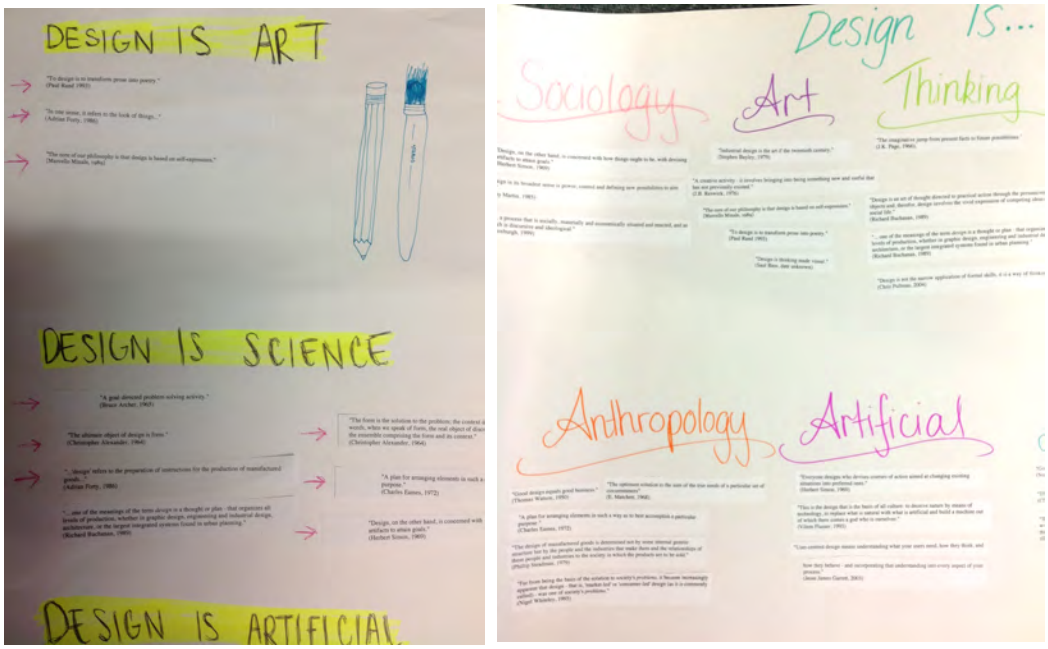

Figure 1. Example of collaborative sheets.

Learners are, to use Mayer's (1996, p. 364) constructivist definition, "sense makers". The co-creative, kinaesthetic exercise can perhaps be described as a sense making learning strategy. We can position this to mean that, if learners are sense makers, then learning strategies are processes used when the learner "actively tries to build a coherent and meaningful representation of the presented material" (ibid). A

comparison between learning and the design process can be made here. Krippendorf (1995) talks of design as a sense making activity. He discusses the etymological basis of the term from the latin *de+signature*, *giving significance* and says "Based on this original meaning, one could say: design is making sense (of things)" (p. 156).

Certainly our students had to go through a sense making process when provided with the task of contextualizing 31 quotes about design. Procedurally they worked through this process using iterative methods of working. However, they were not tasked with coming up with anything novel or new. If we were to place this activity within a design process model such as Swann's (2002) *problem— analysis— synthesis— execution— production—evaluation*, we could argue that the activity is comparable to the early *problem/analysis* stage. As such, the objective was to understand the material, not generate something new. Nevertheless this is still an activity that students would engage with in a studio project at the beginning when they start to scope the design problem and gather examples of precedents, prior to focusing on more creative activities.

2. Questionnaire

Of the 67 students who enrolled in the course 49 returned the questionnaire. The questionnaire was given out to students at the end of the course. The key question on collaboration was.

1. *Please describe what role working collaboratively with your peers played in assisting your own personal understanding and ability to articulate what design is?*

Forty nine students answered this question. The most commonly recurring verb used to describe their experience of collaboration was *helped* (15) with variations including linked adjectives such as *helpful* (5) and *helping* (2) help (1). Students who didn't choose these words chose associated words such as *useful, broadened, good, allowed, allows, assisted, enabled, expanded, liked, engaged*. Only one student response to question 1 was not positive, describing the experience of collaboration as *difficult*. The student explained that while they see the benefits of working in groups the actual experience in class caused anxiety.

The following three excerpts encapsulate the overall pattern of experience of collaboration in the course. This can be seen as demonstrative of 'what' the experience facilitated. Each excerpt is from a different student:

My personal understanding and ability to articulate what design is was broadened and extended through working collaboratively with my peers.

I found that working in groups allowed me to gain more clarity with many of the topics.

Working in a group really kept me engaged in what I was learning, ultimately enhancing my own understanding and ability to articulate what design is.

The overall pattern that emerged from this question, as regards why collaboration assisted student learning was that the experience allowed students to hear and discuss different perspectives about the texts they all had to read:

Points of view and hearing points I had missed are invaluable to my understanding

They brought personal introspects and thought paths into my perspective which I may not have thought of myself

The ability to inform someone else allows you to remember what you've done and also allows your ideas to expand

While the collaborative exercise and group presentations focused on articulating ideas about design theory, they were not fact finding missions with fixed answers and solutions. A number of the quotes were equally at home in different categories and the presentations were constructions of understanding which allowed for personal interpretation. All that was asked from the students was a convincing 'argument' on their topic. As with any design task the students were goal oriented and solution focused, the solution being a convincing argument articulated through a visual presentation.

The group discussions and iterative, kinaesthetic activties were very effective in enabling students to reflect, express and hear different perspectives, what Schön (1983) would perhaps describe as, "a conversation with the materials of the situation" (p.78). Polanyi (1958, p. 87) talks of the process in which "the tacit cooperates with

the explicit", suggesting that with the appropriate use of language, some, but not all of this knowledge can be shared. Kahneman and Frederick (2005) refer to dual-process thinking in relation to how intuition and reasoning operate in unison. They describe intuition as system 1 and reasoning as system 2 thinking. They discuss how initial intuitive judgments can be confirmed, modified, extended or overridden by reason, "There is broad agreement that mental operations range from rapid, automatic, perception like impressions to deliberate computations (p. 288). If system 1. ideas are confirmed, they will be implemented. This is where collaboration and discussion becomes valuable. Ideas are debated through group discussion. Some ideas get adopted, some go through modification and extension and others get rejected by system 2 thinking.

We can certainly argue that the group activities in our study relate to Kahneman and Frederick's dual reasoning theory; students did work intuitively and through discussion make reasoned decisions as to the format of the collaboration sheets and also as to the structure and content of their group presentations.

3. The role of visual images in explaining theory

The questionnaire did not ask questions about the role visual presentations played in assisting students develop understanding of theories about design. However, we did carry out a content analysis of the presentations. What we noticed was that some of the images used by students acted as metaphors to explain ideas that came from the theoretical literature. We had never up to that point considered how images in a theory class could act as metaphors for theoretical concepts. This was another heuristic discovery for us.

We wish to briefly touch on the role of metaphor in understanding and explaining concepts. Lakoff and Johnson claim, "The essence of metaphor is understanding and experiencing one thing in terms of another" (2003, p. 5). Because it is so frequently used in everyday language we are hardly even conscious of how metaphors operate. They say, "The most important claim we have made so far is that metaphor is not just a matter of language, that is, of mere words. We shall argue that the human conceptual system is metaphorically structured and defined" (p. 6). They add that an

understanding of one kind of experience through another shows that they are structured by "natural dimensions of experience" (p. 235).

Metaphors are therefore not simply creative mechanisms; they are based on how we experience the world and are linked to cognition. We argue here that some of our students spontaneously used them as a means of making sense of things, both for personal understanding and as communication mechanisms. By enabling our students to use visual images as support for the research literature, they were able to use their communication skills to effectively explain their ideas about theory (see figure 3). We believe it would be unlikely that students would use an illustrative, metaphoric approach in an essay.

Clark (2004, p. 14) says that the basis for all communicative acts is meaning and that it is created through "a complex interplay of codes or conventions of which we are normally unaware". He also describes it as a participatory act between speaker and addressee. Clark further describes this joint action as an illocutory act (the speaker's act of explanation) and an illocutionary effect (the addressee's understanding) (2004, pp. 133, 134). In an essay, it can be argued that the relationship between speaker and addressee is detached. Certainly for an undergraduate design student, the only audience they are aware of when they write an essay, is their lecturer. In a scholarly visual and oral presentation there is room for dialogue. Tyler (1995) says "audience considerations are integral components of the process of visual communication" (p. 104).

The basic academic premis of 'claim' followed by 'evidence' was enforced during the presentation preparations and students were encouraged to incorporate quotes which helped contextualise their topic. They were encouraged to refer to the academic literature where appropriate. Students were also told to speak to the quotes and explain their significance. We emphasised the need for scholarly rigor and that it should be as rigorous as would be expected in a written essay.

Students were also asked to consider their presentation title as providing a contextual overview of the presentation. Kintsch (1998) describe titles as *macropropositions*, a short selection of words which capture the 'gist' of an idea or text. All group presentation titles attempted to capture the essence of the presentations. Possibly as a

consequence of the visual nature of the presentations, students put a lot of effort into the opening slide which contained their title. Another important consideration was the chosen aesthetic for the presentation and how it could also be used to provide context, something which would not be expected in a written essay.

As discussed earlier, students when engaged in a learning task can be described as sense makers. Visual communication design students are familiar and comfortable working in the visual domain. On the whole, the literature supports the view that the learning preferences of visual communication design students are oriented towards the visual-spatial. We believe this approach helped our students make sense of the theoretical material they were dealing with. Figures 2-5 provide a picture as to how students integrated type and image into their presentations.

The oral element is also important to mention as the students talked throughout their presentation, explaining the relevance of each slide. Talking allowed students to communicate their ideas directly to an audience. A significant alternative to what previously would have been a written essay. This oral and visual element was significant to student engagement and we believe it played an important role in student learning. This was another significant heuristic discovery for us as researchers.

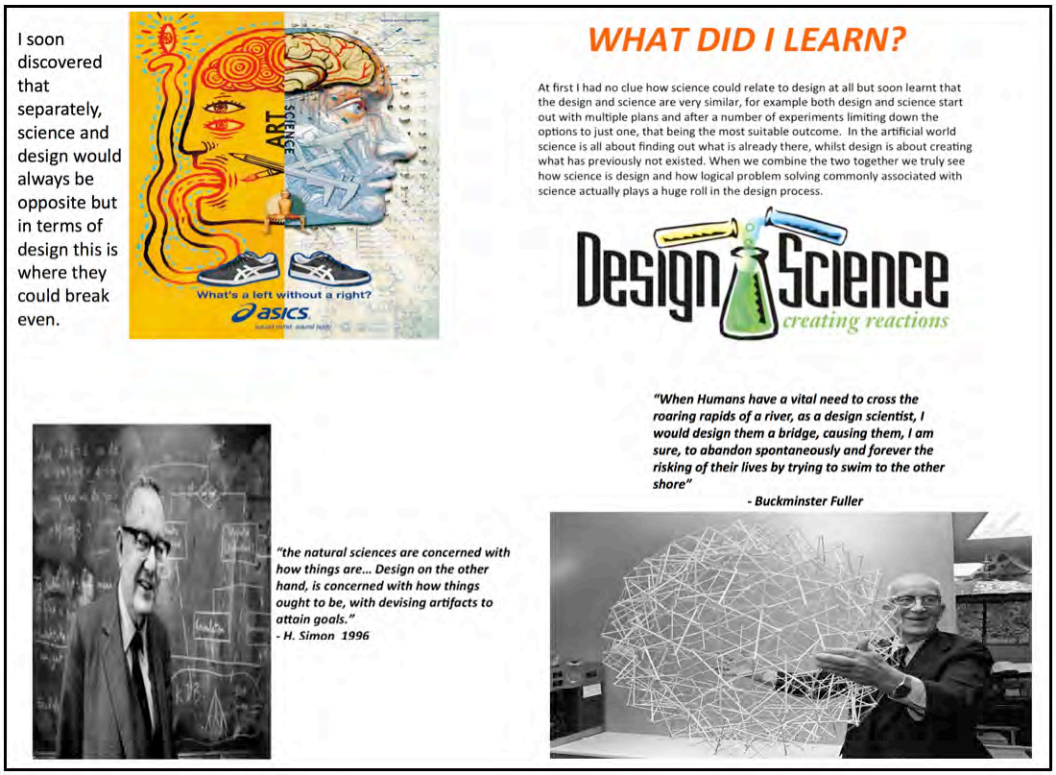

Figure 2. Excerpt from Design is Science presentation

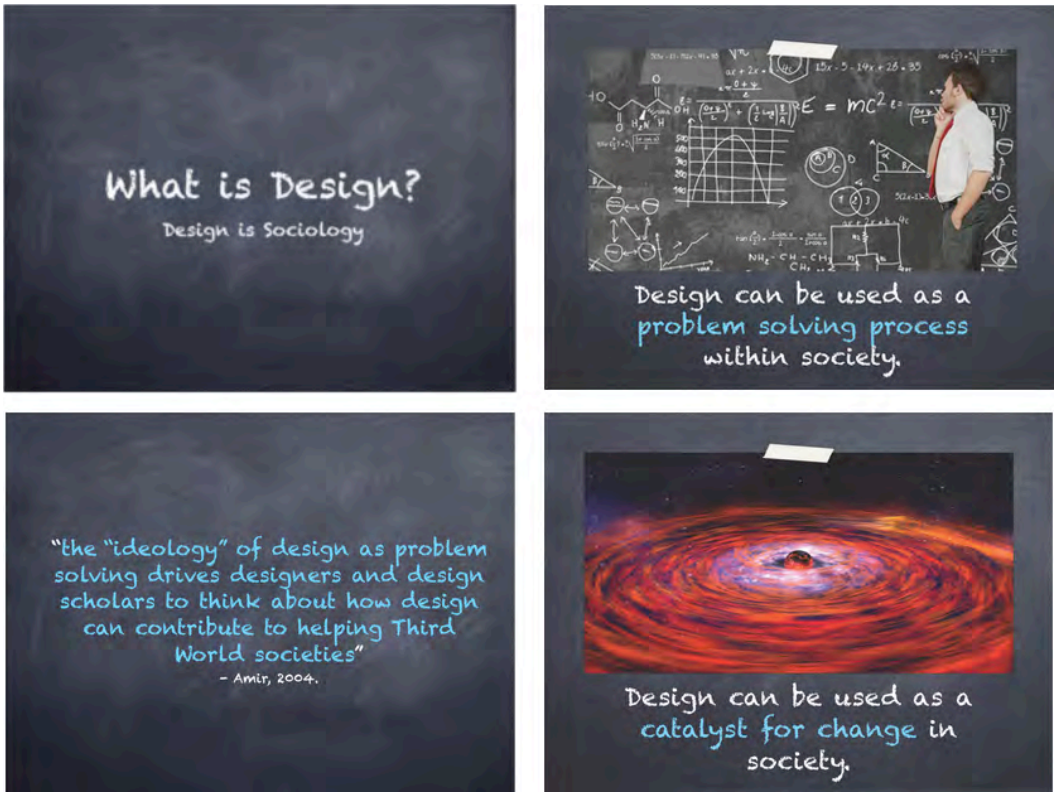

Figure 3. Excerpt from Design is Sociology presentation. Metaphors used to contextualise quotes.

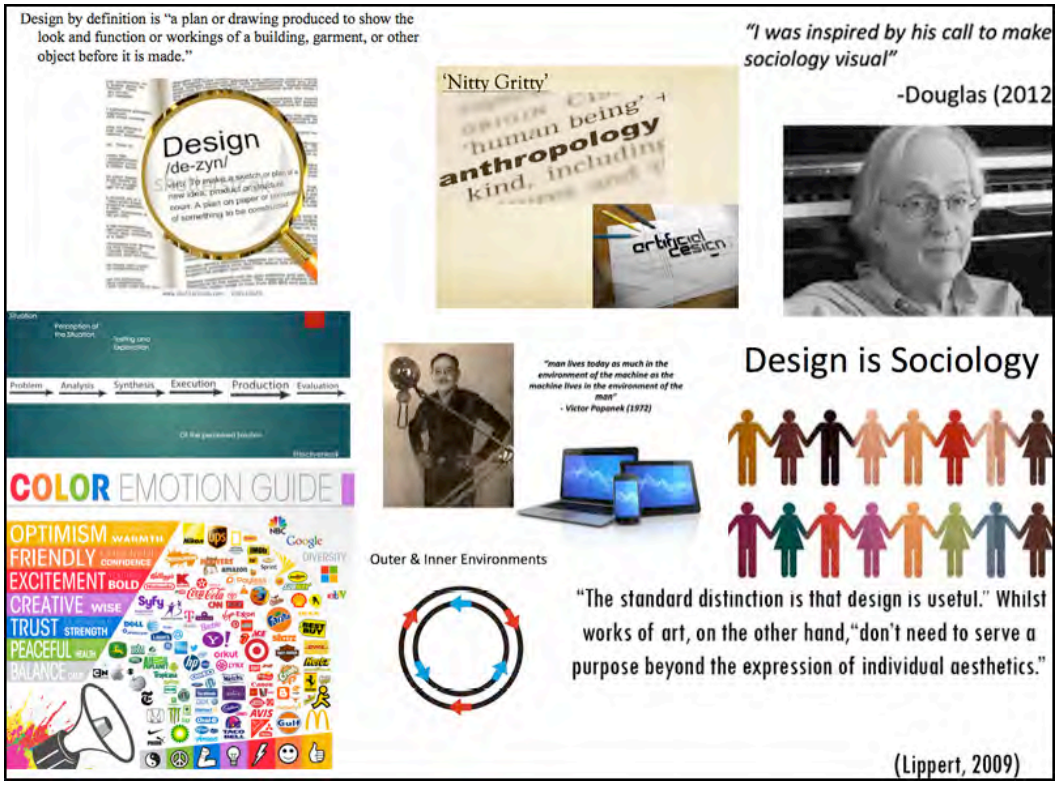

Figure 4. Composite example of images prepared by students for presentations.

4. Multi-media presentations

Four students made multi-media presentations for their research topic and incorporated recorded voice over narratives and animated sequences. One student went so far as to present himself as an animated character who talked us through the presentation. The following includes screenshots and an abridged transcript of his recorded narrative:

Figure 5. Screenshot from animated, documentary style presentation.

In this student's ten minute presentation he referred throughout to the literature which allowed him to talk about the 'design is sociology topic'. This was in keeping with our edict that students, as a matter of academic protocol, must follow a 'claim' and 'evidence' approach. He refers to quite a number of academic readings and offers critical insights into their relevance with the topic. He discusses Forty (1986), Flusser (1999, 1993), Strickler and Neafsey (2006) and Simon (1969). He refers to important historical figures such as Wedgewood and William Morris who were covered in papers by Pevsner (1949, 1936). It was evident that as educators our concerns over multi-media presentations being visually interesting but devoid of in-depth engagement with the literature were not founded. The student made significant references to the literature covered in lectures and tutorials. Below is an excerpt from reflective comments the student made in his concluding remarks:

As Simon stated 'Design is concerned with how things ought to be, with devising artefacts to obtain goals', and one of the most fundamental goals that we must

achieve is maintaining a habitable planet. My outlook on the world has slowly changed over the last few months. I understand that design is more than just an artistic practice used to make things more visually appealing. Design is much larger that I had at first thought. If I had to answer the question now, what is design? I would say that it is hard to define in just one line. But in saying that I think that design is more than a process. It's a way of change, a way to evolve our community. Design allows us to move forward.

The multi-media presentation as captured in figure 5's screenshot demonstrates how a first year visual communication design student was able to contextualize theory through his own design practice. The student had begun to study animation and wanted to incorporate his developing skill as an animator into his perspective of design within a sociological context. His concluding comments suggest he has learned much about design. In this short extract we see that his understanding of design transformed in only a few months. Initially he thought of design as an aesthetic, product focused activity and finishes by discussing design's capacity to change society and make it a better place to live. This personalized expression of what design is may not have been so effectively communicated in an essay format. As Cross (2007, p. 20) says "education must be designed deliberately to enhance and to develop students' intrinsic cognitive processes and abilities".

Conclusion

We introduced this study as a phenomenological heuristic enquiry which followed a retrospective naturalistic structure. It essentially captures our developing understanding of how certain unplanned changes in delivery led to enhanced student learning. As educators we learned so much about this unfolding heuristic situation; heuristic in the sense that what we learned was not simply confirmation of existing beliefs, but possibly the affirmation of hunches from prior experience teaching theory and studio classes. We believe that by enabling students to use learning strategies and behavioural activities common to how they operate in design studio classes, they were more able to connect with the material of the course in a personally meaningful way. The presentations were no less rigorous or scholarly than if students were given the task of writing essays. Many of them were full of citations and references, either presented on screen or discussed orally. By enabling novice, first year visual

communication design students to use their own 'designerly ways of knowing' a deeper, intrinsic and personal level of engagement with theory is, we argue, an achievable and observable outcome.

References

Apps, L. and Mamchur, C. (2009). Artful Language: Academic Writing for the Art Student. *The International Journal of Art and Design Education,* 28, 3: 269-278.

Bhagat, D. and O'Neill, P. (2009). Writing Design: A Collaboration Between the Write Now CETL and the Sir John Cass Department of Art, Media and Design. *Art, Design and Communication in Higher Education, 8, 2: 177-182.*

Black, A. (2005). The use of asynchronous discussion: Creating a text of talk. Contemporary issues in technology and teacher education. Retrieved June 11, 2014. (Online serial), *5*(1). http://www.citejournal.org/vol5/iss1/languagearts/article1.cfm.

Blackler, A. (2014). Using a visually-based assignment to reinforce and assess design history knowledge and understanding, Design Research Society Conference Proceedings, Umea: DRS.

Candlin, F. (2000). Practice-based Doctorates and Questions of Academic Legitimacy. *International Journal of Art and Design Education*, 19, 1: 96-101

Charlton, J. (2008). Behind the Lines and Lines and Lines: Student Studio Solutions to Projects that Facilitate the Exploration of Visual and Textual Languages Within Fine Arts Practice. *Journal of Writing in Creative Practice,* 1, 3: 237-259.

Clark, H. (2004). *Using language*. Cambridge: Cambridge University Press.

Clark, J. (1997). Educational research: Philosophy, politics, ethics. Palmerston North: ERDC Press.

Collinson, J. A. (2005). Artistry and Analysis: Student Experiences of UK Practice-based Doctorates in Art and Design. *International Journal of Qualitative Studies in Education, 18, 6: 713-728.*

Cross, N. (2001). Designerly ways of knowing: design discipline versus design science. *Design Issues*, 17(3), pp. 49–55.

Cross, N. (2007). *Designerly ways of knowing*. Basel: Birkhauser,

Edwards, H. (2004). Art and Design Students Employing Aspects of the Visual and Metaphoric to Structure and Create Meaning in Writing. *Art, Design and Communication in Higher Education, 3, 2: 119-136.*

Edwards, H. and Woolf, N. (2007). Design Research by Practice: Modes of Writing in a Recent PhD from the RCA. J*ournal of Writing in Creative Practice, 1, 1: 53-67.*

Elkins, J. (2004). Theoretical Remarks on Combined Creative and Scholarly PhD Degrees in the Visual Arts. *Journal of Aesthetic Education*, 38, 4: 22-31.

Flusser, V. (1999[1993]) About the word design. In *The Shape of Things: A Philosophy of Design*, London: Reaktion Books

Forty, A. (1986). Introduction. In *Objects of Desire: Design and Society 1750-1980*, London: Thames and Hudson.

Grow, G. (1994). The Writing Problems of Visual Thinkers. *Visible Language, 28, 2: 1134-161.*

Hockey, J. (2007). United Kingdom Art and Design Practice-Based PhDs: Evidence from Students and Their Supervisors. *Studies in Art Education, 48, 2: 155-171.*

Irwin, R. (2003) Toward an Aesthetic of Unfolding In/Sights Through Curriculum. *Journal of the Canadian Association of Curriculum Studies*, 1, 2: 63-78.Johnson, D. W., & Johnson, R. T. (1996). *Cooperation and the use of technology*. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 785-812). New York: Simon and Schuster.

Jones, C., Cook, J., Jones, A. & de Laat, M. (2007). *Collaboration*. Chapter 12 in G, Conole and Oliver, M. (eds) Contemporary perspectives in e-learning research. London: Routledge Falmer: 174 – 189.

Jones, H. (2007). Bisociation Within Keyword-mapping: An aid to writing purposefully in design. *Journal of Writing in Creative Practice*, 1, 1: 19-31.

Kahneman, D., & Frederick, S. (2005). *A model of heuristic judgment*. In K.J.,Holyoak, R. G. Morrison (Eds.), The Cambridge handbook of thinking and reasoning. Cambridge: Cambridge University press. (pp. 267-293).

Kill, R. (2006) Coming in From the Cold: Imperialist Legacies and Tactical Criticalities. *The International Journal of Art and Design Education, 25, 3: 308-317*.

Lockheart, J. et al. (2004). Writing Purposefully in Art and Design (Writing PAD). *Art, Design and Communication in Higher Education, 3, 2: 89-102*.

Lydiat, A. (2003).*Writing as Practice - practice as writing*. Case study paper downloaded from the Writing PAD resources library. Accessed July 2, 2014, http://www.writing-pad.ac.uk/index.php?path=photos/21_Resources/05_Case%20Studies/&keyword=*

Kintsch, W. (1998). *Comprehension, a paradigm for cognition*. Cambridge: Cambridge University Press.

Krippendorf, K. (1995). *The essential contexts of artifacts or on the proposition that 'design is making sense (of things)*. In Margolin and Buchanan (Eds.). The Idea of Design.156-186. Cambridge: The MIT Press.

Lakoff, G., & Johnson, M. (2003). *Metaphors we live by*. Chicago: The University of Chicago Press.

Lyon, P. (2009). Writing About Design Pedagogy and Designing Pedagogical Writing. *Art, Design and Communication in Higher Education, 8, 2: 151-156*.

Mayer, R.E. (1996). Learning strategies for making sense out of expository text: the SOI model for guiding three cognitive processes in knowledge construction. *Educational Psychology Review,* 8(4), 357-371.

McCannon, D. (2011).Towards the Hybrid Essay: The Visual Essay Project. *Journal of Writing in Creative Practice, 4, 2: 131-140*.

Melles, G. & Lockheart, J. (2012). Writing Purposefully in Art and Design: Responding to Converging and Diverging New Academic Literacies. *Arts and Humanities in Higher Education*, 11, 4: 1-17.

Orr, S. and Blythman, M. (2002). Designing is almost like writing an essay. *Writing Center Journal*. *Volume 22 Number 2 p39-54*.

Patton, M. Q. (2002). *Qualitative research & evaluation methods (3rd ed)*. Thousand Oaks: Sage Publications.

Pevsner, N. (1949). Theories of Art From Morris to Gropius. In *Pioneers of Modern Design*, New York: The Museum of Modern Art.

Polanyi, M. (1958). *Personal knowledge: Towards a post-critical philosophy*. London: Routledge.

Plowman, T. (2003). Ethnography and critical design practice. In Laurel, B. (Ed.) *Design Research: Methods and Perspectives*. London & Cambridge (MA): The MIT Press.

Preston, J. and Thomassen, A. (2010). Writing Through Design, an Active Practice. *Journal of Writing in Creative Practice, 3, 1: 45-62*.

Rogoff, I. (2008).*What is a theorist?* In J. Elkins and M. Newman (eds) The state of art criticism, London: Routledge: 97-109.

Roxburgh, M. and Bremner, C. (2001). Redoing Design: Comparing Anecdotes About Design. *International Journal of Art and Design Education, 20, 1: 65-74*.

Roxburgh, M. and Sweetapple, K. (2007). T*he Cartography of Theory and Practice*. (CD Rom) Conference Proceedings of ConnectEd: International Design Education, Sydney: University of New South Wales.

Sawyer, K. (2008). *Group genius, the creative power of collaboration*. New York. Basic books.

Schön, D. A. (1983). *The reflective practitioner. How professionals think in action*. US: Basic Books.

Simon, H. (1969). The Science of Design. In *The Sciences of the Artificial*, Cambridge (MA) & London: The MIT Press.

Swann, C. (2002). Action research and the practice of design. *Design Issues*, 18 (2), 49-61.

Strickler, Z. & Neafsey. (2006). *Visual Design of Interactive Software for Older Adults*. In Bennett, A. (ed.) *Design Studies: Theory and Research in Graphic Design*, New York: Princeton Architectural Press.

Tyler. A.C. (1995). *Shaping belief: The role of audience in visual communication design*. In Margolin and Buchanan (Eds.). The Idea of Design. 104-112. Cambridge: The MIT Press.

Wang, F. & Burton, J. (2010). Collaborative learning problems and identity salience: A mixed methods study. Journal of Educational Technology Development and exchange, 3(1), 1-12.

Wood, J. (1998). The culture of Academic Rigour: Does Design Research Really need it? *The Design Journal, 3, 1: 44-57*.

Yee, J. (2012). *Implications for research training and examination for design PhDs*. In R. Andrews. et al. The SAGE Handbook of Digital Dissertations and Theses. London: SAGE Publications: 461-492.

Mike McAuley's career as an academic began in 1995. Prior to that he was a full time illustrator. His research interests focus around creative processes and interpretation, particularly the process of interpreting words into pictures. Within an educational context he is interested in helping de-mystify the design process as a means of assisting students to develop stronger meta-cognitive awareness of their approach to design as well as helping them understand the symbiotic relationship between critical and creative thinking. He regards the relationship between his teaching and research as a nexus whereby each informs and enriches the other.

Mark Roxburgh has been an academic in the field of visual communication design for the past 20 years. His research interests include: design research; design theory and practice; photographic theory and practice; user experience design; visual storytelling; and visualisation and writing. His most recent research has been exploring design as a form of perceptual synthesis as part of his ongoing crusade against the tyranny of the design problem solving metaphor. He is currently working on a book that examines the impact photographic images have on the imaginative and projective act of design.