

# Learning Theory through Collaboration and Visualization

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## Abstract

*This study reports on a series of changes involving collaboration and visualisation which were incrementally added to a first year design theory course taught at the university of Newcastle NSW. Theory teaching values explicit knowledge and focuses on analytical and critical thinking. It can be defined as a form of deductive reasoning in that it seeks to unearth that which exists, as determined through close analytical reading of research literature. Students who study visual communication design do so because of their interest in creativity and visual media. Creative thinking and tacit knowledge are highly valued. It would therefore seem that design studio teaching, with its reliance on creativity, tacit knowledge and inductive or abductive reasoning is misaligned with design theory teaching which values explicit knowledge and deductive reasoning. However, this paper will argue that student learning of theory can be enhanced through the incorporation of working methods commonly used in creative practice.*

## 1. Introduction

The learning benefits of working collaboratively have in recent times become well established in design teaching programmes, Black [3], Jones et al [15]. Such studies suggest that collaborative learning activities bring about higher achievement than “competitive and individualistic learning” [15]. And while Sawyer [28] and Rogoff [25] 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. However, when it comes to learning theory, design students are usually confronted with a traditional model of knowledge dissemination through lectures and tutorials. This is contrary to the norm of design studio activity where working visually and collaboratively are activities design students are most comfortable with.

In a traditional theory environment learning tends to be assessed through individual written discourse, i.e. the written essay. And yet, visual communication design students have visual

skills, and collaborative abilities, that this paper argues can be harnessed within a critical studies context to encourage a deeper experience of learning; skills which can present research as a ‘visual argument’ and certainly as a support mechanism for text based theoretical discourse. However, using visual thinking tools and techniques from design practice, or what Cross [8] describes as ‘designerly ways of knowing’ have, until quite recently, rarely been seen as appropriate in a design theory context that has historically privileged the written word.

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 [2, 4, 7, 9, 12, 13, 19, 27, 28]. Alternatively there is literature that highlights the variety of personal, cultural, historical or institutional contexts and causes that have lead to the problem arising [5, 11, 13, 16, 21, 30].

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 [1]. The literature also often argues that the intuitive approach of these students is a consequence of their preference towards visual learning styles. Collinson [7] describes this style of learning as both emotional and intuitive; Lockhead et al [18] and Yee [31] characterise it as a visual-spatial learning style; Irwin [14] calls it aesthetic knowing; McCannon [20] refers to it as tacit knowledge while Blackler [4], Edwards & Woolf [10] and Grow [12] 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' [31]. 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 [1, 10, 16, 19, 24, 28]. 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 [1, 2, 4, 6, 10, 15, 20, 24, 27, 28].

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 [2, 4, 17, 22].

## 2. Methodology

As teachers we felt that as the 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 "The reports of heuristic researchers are filled with the discoveries, personal insights, and reflections of the researchers" [23]. 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 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 describes it well, "The phenomenon of interest unfolds naturally in that

it has no predetermined course established by and for the researcher" [23].

## 3. 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. Eighty three 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. 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 that they were comfortable and familiar with. A number of students took this approach even further and in their formally assessed presentation created fully animated, 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 and that these presentations successfully demonstrated a good understanding of the theoretical underpinnings of the prescribed topic and readings.

The first collaborative activity required students to place a variety of quotes about design into one of seven 'design is' categories: anthropology, sociology, science, artificial, thinking, sociology, art, perception. 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 list and each group had to cut out the quotes and paste them on A2 sheets underneath each of the seven 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.

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). 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. This was still carried out with the reportage thematic permeating throughout.

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 and, within the reporter framework this seemed a logical progression as to how our design students, familiar as they are with visual means of communication could enhance the progression of their ideas and theoretical understanding. This led to some students asking if they could for their formally assessed presentation give an entirely digital animated presentation complete with recorded voice over sound.

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. Visual presentations (powerpoint). 4. Multi-media presentations.

Of the 83 students who enrolled in the course 49 returned the questionnaire. Only one student did not do a powerpoint presentation. Four students did an animated voice over presentation. One of these will be described as a case study.

## 4. Analysis

### 4.1. Collaborative sheets and collaborative presentations

As a sample, eight collaborative A2 sheets were analysed. 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.

### 4.2. Questionnaire

In weeks two and five of the twelve week course the student groups had to present a reading of two separate papers which were linked to the theme of the lectures. Each group discussed the readings and then determined their individual role in the group. In week five a number of the groups began to present their findings on the digital screen with visuals, key headings and quotes. Feedback at this stage was still formative as students prepared for their individual presentation in week eight. A questionnaire was given out to students at the end of the course. Two questions were asked.

Q1. 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 question 1. 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 four 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.*

*Collaborative working has helped me through the course as I know so little and I have gained more knowledge with working with everyone.*

The overall pattern that emerged from question 1, as regards why collaboration assisted student learning was that the experience allowed students to hear 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*

*It provided different insight/perspectives on design*

Forty four students replied to question 2. This question also looked at what effect collaboration had on the student experience, focusing on analysis and presentation. While there were no common recurring verbs or adjectives, the overall pattern to emerge was that it broadened student understanding. Other themes to emerge were that it reduced stress, helped students gain confidence and it allowed for specialisation and co-creation.

2. In week 3 you were asked to present as a group your understanding of two academic papers. (Forty, The First Industrial Designers, 1986, Pevsner, Theories of Art From Morris to Gropius, 1949). What effect did collaborating

and then presenting as a group have on your analysis process?

*This really brought into view the different interpretations of the texts, which both broadened my understanding and helped me form more developed interpretations*

*Hearing others understanding expanded my own understanding of the papers*

*It allowed a collaboration of everyone's thoughts which saw everyone being able to expand upon their knowledge*

As to why it broadened student's perspectives:

*We each had different ideas and insights, so there was more analysis to be shared*

*We all had a part to do, but we all shared what we were doing and learning as we went along*

*Everybody had different views as well as different manners of reading and analysing papers*

From week eight, until the end of the course students had to make individual presentations to the class. In essence then they were delivering the course content further underscoring the idea of peer learning. These presentations were summatively assessed and one third of the grades were ascribed to the presentations. The students had previously given presentations in groups, now they had to present as individuals. Each student was given one of seven contexts to present on, all prefixed with the term Design is: (anthropology, sociology, science, artificial, thinking, art, perception). As a consequence of some of the groups requesting that their earlier group presentations were supported by visual imagery, students were encouraged to use visual means to support their position on the topic they had been allocated.

The assignment itself required that: students could orally present findings about theories of design practice in a scholarly fashion and also demonstrate an ability to critically analyse academic texts within a context. While scholarly rigour was paramount, it was felt that as a consequence of the visual approach in the preliminary group presentations that students could use visual methods to support their critical perspective on their topic.

Four students made multi-media presentations for their research topic and incorporated recorded voice over narratives and animated sequences. Figure 1 acts as a case study example:



Figure 1. Screenshot from animated 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'. 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, 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 than 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.*

## 5. Conclusion

The call to action of this study was a perception that there was a disjuncture between how students interact with theory and practice, tending to think of them as very separate, distinct activities. And certainly traditional methods of teaching theory would, it can be argued, facilitate the idea that they are very

distinct entities with little in common. The interventions that occurred in the theory classes witnessed how working creatively, collaboratively and visually, methods common in creative practice, can be introduced to a theory course with outcomes that appear positive. Future work will now seek to implement further interventions using the methodology of action research to purposefully enhance student learning.

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