A New Approach to Understanding Readings for Design Students

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Abstract: In this paper I describe an innovative technique for helping design students to approach and understand reading tasks. There is ample literature on design students' use of visual thinking for design tasks, but less on how they can use their visual skills to apply to their learning in other areas, particularly those that challenge them such as academic reading and writing. I set a cartooning task as a way to get students motivated and involved in doing set readings for a design history course. This has been successful in enhancing students' involvement and understanding, and they have been able to apply their improved understanding to writing tasks based on the cartoons.

Key words: Design History, Drawing, Visual thinking, Design education

1. Introduction

This paper reports on a new approach to set readings in a third year design history, theory and criticism unit within a four year Bachelor of Design (Industrial Design) degree. The unit is called History, Theory and Criticism for Industrial Design and within a 13 week semester includes 5-6 weeks of lectures on industrial design history (Industrial Revolution – end of 20th century, supported by weekly set readings and tutorials), some guest lectures, and six weeks on a criticism project, which involves using a set methodology to criticise design [4]. There are three assessment tasks. One involves writing two discussion papers based on the readings from the set book, another is a graphical timeline based on the design history lecture content, and the third is the criticism project [4]. The set book I chose is "The Industrial Design Reader" edited by Carma Gorman [12]. The book contains contemporary writing from designers, critics and thinkers from the 19th and 20th centuries. It includes authors such as Karl Marx, Charles Eastlake, John Ruskin, Owen Jones, William Morris, Christopher Dresser, CR Ashbee, Henry Cole, Henri van der Velde, Walter Gropius, Le Corbusier, Frank Lloyd Wright, Norman Bel Geddes, and Deiter Rams, among others. This is rich material which can help to enhance students' understanding of contemporary thought and belief, and encourage empathy.

The readings are short so there were several set for each week during the design history part of the unit (the first 5-6 weeks). However, the readings can also be somewhat inaccessible as they were written up to 160 years ago and some have a dense and/or flowery style. In addition, design students often struggle with addressing academic reading and writing tasks and find them de-motivating, although it is essential that they learn these skills as part of a university education.

2. Cartooning Exercise

To assist students in approaching and understanding the content of the readings I replaced a written "reflective journal" exercise with a cartooning exercise. Students were asked to make a cartoon that summed up the main point or theme of each reading. At times two are three readings from the same week may seem to a student to contain similar themes or ideas, in which case I have encouraged them to produce just one cartoon to explain that idea. I used the cartooning exercise as a way of getting the students to articulate their understanding of the content of the weekly set readings, and as a kick-starter for tutorial discussion. At the end of semester they used their cartoons and related notes to write their two discussion papers based on the readings, so they needed to communicate their ideas in writing as part of the assessment. This idea came from an IASDR paper presentation [16], where cartooning and storyboarding was employed in doing participatory design with users. I applied it to assisting students' understanding of texts.

This exercise is somewhat similar to sketchnoting, which involves making sketched or sketch-enhanced notes [21]. Marquardt and Greenberg defined sketchnoting as "hand drawn visual notes of talks, presentations, meetings, or any other kind of event." They are real time drawn visual summaries of the presentation/talk, and content mixes sketches and text [13]. The cartoons differ from sketchnoting in that they relate to readings rather than talks or meetings, and the students tend to produce only one cartoon for each reading or theme, sometimes with notes accompanying it and sometimes without. Also, these cartoons are generally produced after the reading is done and aim to encapsulate the main point of the article, rather than recording the facts or multiple ideas during a meeting or presentation, as sketchnoting does.

Biggs [3] discussed ways in which university teachers can ensure quality learning, and describes the deep and surface approaches to learning. Deep approaches involve theorising, applying and relating, not simply memorising and note-taking, which are surface levels of engagement. However, there is more to encouraging a deep approach than simply motivating students, as levels of motivation and interest will vary along with academic ability. For deep approaches the students typically need to be more active in their learning, so I attempted to encourage a deep approach through appropriate learning activities which allowed students to tap into their visual thinking skills.

2.1 Visual literacy and visual thinking

There is a body of research around the idea of "graphicacy" as an important component of literacy [7], increasing calls for it to be applied in education at various levels and to benefit various disciplines and learning styles [e.g. 1], and an understanding or assumption by many authors that designers are visual thinkers [7, 8, 11, 19, 23]. There has been some quite extensive work done on how designers use drawing in design [e.g. 8, 11, 15, 19, 23]. Designers have a high level of interaction with their own sketches [15] and use them as a way of thinking [25] in order to construct meaning [23], as shown by studies which have analysed design processes through sketches and verbal protocols [11, 19, 23]. However, there is surprisingly little literature on how designers may benefit from using drawing for any activity other than designing, and there does not seem to have been much progression of this understanding of design students' drawing into the way that they can use their graphicacy to help them to learn other skills that they need in their careers (e.g. organisation, critical reading, writing), or to absorb other important knowledge (e.g. materials and manufacturing, technology, design history and theory).

Brumberger [6] argued that there are several modes of thought, two of which are visual and verbal, and none of which are superior to others. Purcell and Gero [19] provided a comprehensive review of visual thinking studies. They also found that very similar processes occur when drawings are used, particularly by experts, in design, physics, economics and biology. They said that there are quite striking parallels in using drawings and diagrams for problem solving in many different areas, and experts used both visual and verbal representations, which were closely linked. Poracsky, Young and Patton [17] claimed that they found in their first year multi-disciplinary "Freshman Inquiry" course that doing visual assignments increased students' depth of understanding and knowledge of history. Also, in studying art history, a focus on graphicacy allowed students to increase their ability to make connections between progress in science and social, political and artistic movements. Also, Brasseur [5] suggested that visual thinking helps students to both think about the ideas in their writing and understand how to frame their arguments.

Purcell and Gero's review has revealed that using both visual and verbal thinking simultaneously may be a more expert way of operating [19]. Poracsky, Young and Patton also claimed that combinations of communication modes produce a synergy that makes the combination far more effective than any one mode alone [18]. Brasseur [5] also agreed that association of visual with verbal thinking plays a large part in developing abilities as a writer, and that using two modes of thinking is more effective than one [15]. Brumberger stated that we must strive for flexibility – thinking in both verbal and visual modes and also being able to switch between the two as appropriate [6], and claimed that verbal thinking should be valued in design education as well as visual as verbal skills are needed by designers as well. My cartooning exercise was developed as a way to get designers to apply their generally well developed visual thinking skills to addressing a verbal task, and to start to learn to think and communicate in both styles.

3.0 Outcomes

The cartoons (Examples in Figures 1-10) show a variety of styles, approaches and skill levels. Students have varying skills in sketching and some had already practiced drawing in a cartoon style, while others were very new to it. However, the thinking behind the cartoon and the understanding enabled by the process were more important than the skill shown in its execution. The best cartoons were economical in summing up the content of the reading and often witty, but each had meaning for the student and assisted them in remembering and understanding the content of the reading(s). Many of the students took extensive notes as well as making drawings, to a larger extent than the students in previous years, who kept a reflective journal based on the same readings. Therefore, it appears that as part of doing an activity which they enjoyed (cartooning), they were also engaging more in a less enjoyable activity (writing/note taking), all of which led to a deeper understanding.

However, students do seem to have a tendency to use modern images in their cartoons - eg light bulbs, robots, DNA (Figures 1, 2, 4 and 7). Bringing historical issues into contemporary times is a valid way to conceptually understand them, but in terms of imagery it may help students to absorb the context if they used historical artefacts in their cartoons. Lack of historical motifs in the cartoons may well be indicative of their lack of general historical knowledge. Indeed, in the past when we asked a sample of 198 first year students whether they had previously studied any kind of history at high school, college or university, only 37% said they had [24]. By the

time they reach this third year unit then, the majority have only studied history in one introductory, multi-disciplinary first year unit on Introducing Design History [24]. However, there are some examples of where use of historical imagery has been attempted (Figure 3) and even well done (Figure 9). It is unclear how much this matters to the students' learning although it would be interesting in future years to focus on this when instructing students about the task and see whether it has an effect on the cartoons and learning and design history chronology and facts.

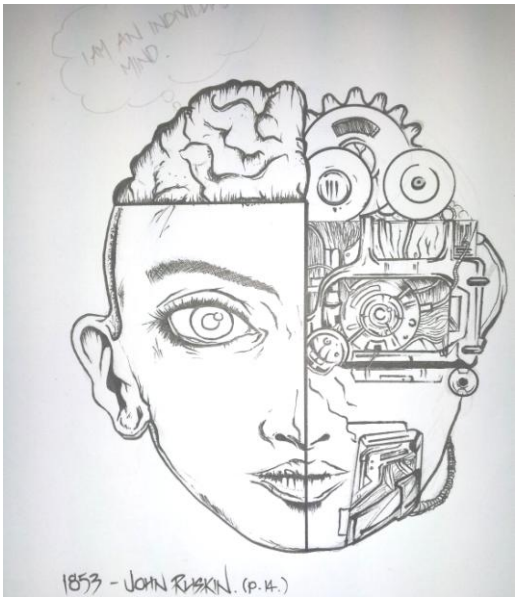

Figure 1. A split image used to illustrate Ruskin's differentiation between a man and an "animated tool" [22, p15]. This type of image was very popular for this reading.

Figure 2. Here the student portrays the designer as a controller of a system or machine for styling (pictured in the form of a robot), inspired by De Stijl thinker Theo van Doesburg's opinion that the "..application of the machine to the new style is a matter of course.." [9, p102].

Figure 3. The student highlights the conflicting opinions about the place of handicrafts in late 19th century Britain, as detailed by Asbee [2]. This cartoon represents another common theme.

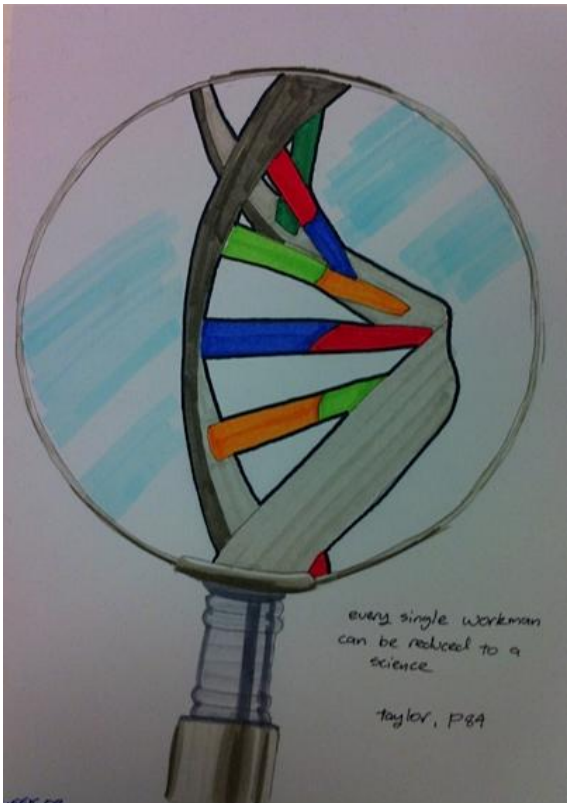

Figure 4. Use of the double helix as a metanym for science in this comment on Taylor's work on scientific management, based on his claim that "…every single act of every workman can be reduced to a science" [26].

Figure 6. A student uses strong graphics to illustrate Marx's comment that machines could go on producing forever if the minds and bodies of humans allowed them to [14]. He shows the downtrodden masses and the rich capitalist making his pile out of them.

Figure 7. A well executed comment on Veblen's hand vs. machine made argument [27]. Almost all cartoons on this reading involved differences between hand and machine made spoons, as this is the major example used in the text. This cartoon does it in a more creative way than many, showing the tension betyween the types of making as well as suggesting differences in quality and value.

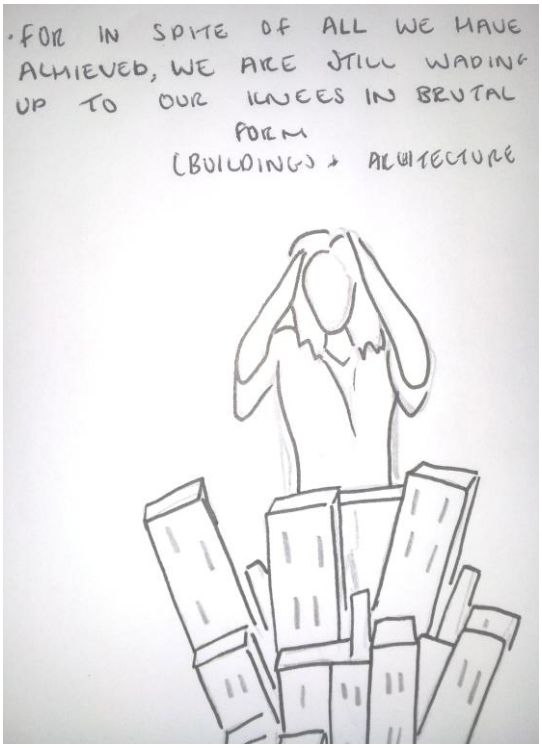

Figure 8. A literal interpretation of a metaphorical statement by Muthesius [17], which creates a striking and amusing image

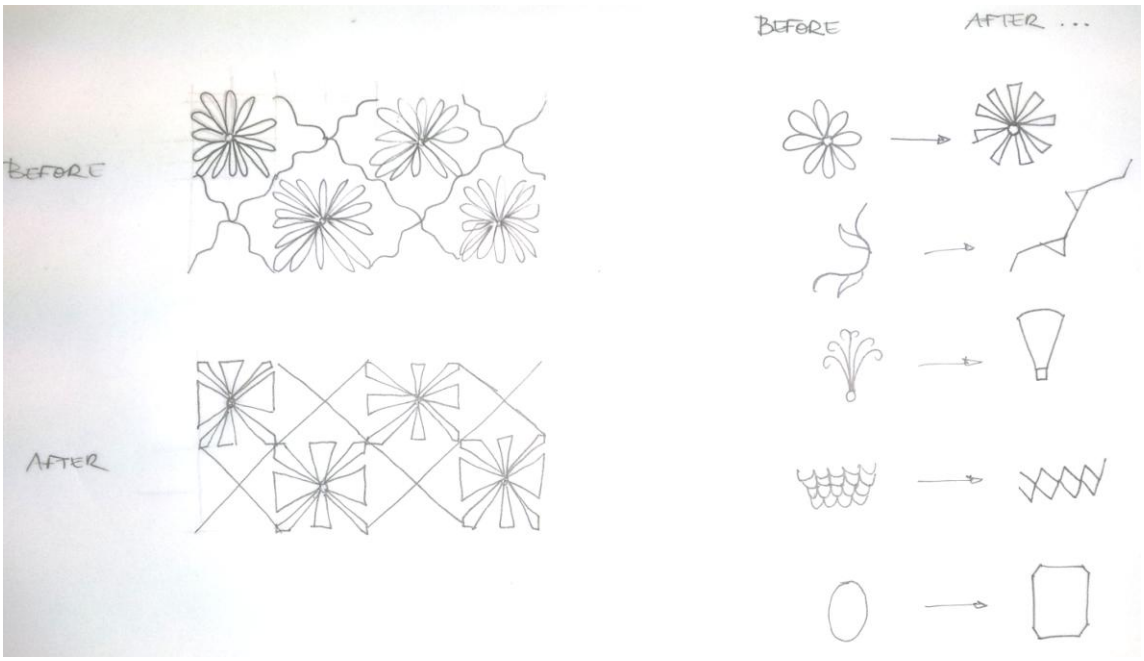

Figure 9. Cartoon showing the evolution of motifs detailed by Read [20] in relation to the 1925 Paris Exposition that started the Art Deco movement.

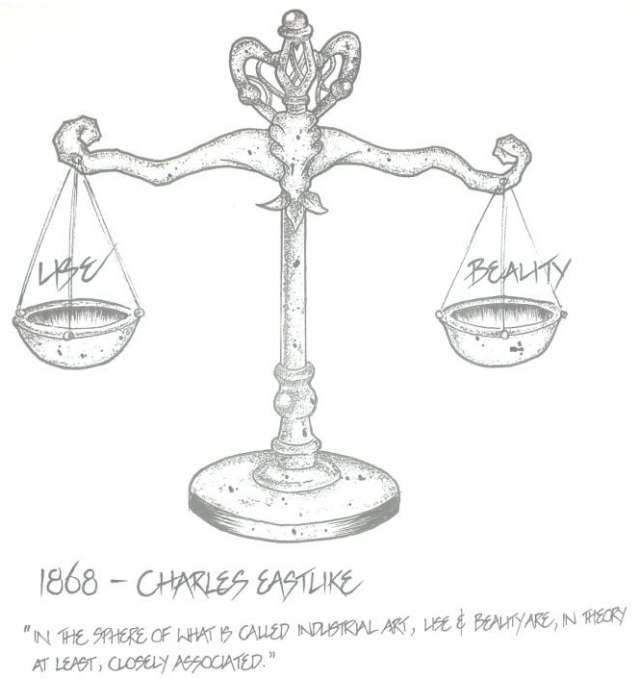

Figure 10. Student shows the association of use and beauty discussed by Eastlake [10] as a balancing act.

3.2 Feedback

A survey was issued to students to gain feedback about the cartooning approach. Using a Lickert scale, they were asked to rate the cartooning process from 1 (not at all informative/engaging) to 5 (very informative/engaging). They were also asked an open-ended question about whether they believed the cartooning process to be a successful way to understand set texts and why. 68 out of 98 students in the 2012 and 2013 cohorts responded to the survey (69%).

Feedback was very positive, with a mean scores (out of 5) of 3.8 for informative and 4.2 for engaging in 2012, and 3.5 for informative and 3.8 for engaging in 2013. Over the last two cohorts (2012 and 2013), 72% of students have said they "believe the cartooning process to be a successful way to understand the set texts", 17.4% have said they do not believe so, and 10.3% of answers are unclear or missing.

In answering the open-ended questions, students stated that the cartooning approach tapped into their strengths, helped them to read deeper into the text and really understand it, helped them to remember the content and made them think critically about history. However, some clear reasons have emerged that show why some students did not find the task so helpful. Nine themes were identified from the open-ended questions, and simple coding was performed to explicate these (Table 1).

Table 1. Examples of coded responses to open-ended questions

Comment	Theme
(cartooning) made us think about the text, not just read and take notes	Task induced deeper thinking
helps cement the things we have learnt. Tapping into our strengths. As design students (we) connect strongly to visuals.	Task relates to preferred (visual) way of thinking
(Cartooning) made us think critically about history in an engaging, stimulating and creative manner	Task induced deeper thinking Task made readings more interesting/enjoyable
I love this (cartooning). All aspects are perfect. The readings can be very dry, but when you have to convert that into a cartoon, you find yourself really understanding the concepts in the text.	Task induced deeper thinking
For me (cartooning) was perfect in the sense that I could remember much more information that was key to the course.	Task improved retention
I liked the cartooning idea. It was something different and enjoyable. It was a fun and enjoyable way to learn	Task made readings more interesting/enjoyable
I preferred (cartooning) as I participated more than if we were writing as I am more confident drawing.	Task relates to preferred (visual) way of thinking
we can look back at it later. Cartoon quickly reminds and explains the text	Task improved retention
I am focussing on things to draw rather than digesting reading properly	Task distorted understanding
(cartooning is effective), if the cartoon is able to represent the accurate vision	Hard to cartoon some of the readings
Not good at drawing so found task challenging	Task too hard
Very time consuming to do readings and cartoons	Task was time consuming
Yes. It was useful but time consuming	Time consuming
the option to write a short descriptive analysis would help me retain knowledge better	Would prefer writing task
Found sometimes the meaning of the reading became distorted to be more cartoon-able	Distorted understanding
Some weeks a bit too difficult to illustrate	Hard to cartoon some of the readings
Found it difficult to communicate through images – would prefer to write summary	Would prefer writing task Task too hard

After coding, the nine themes were quantified and final counts for each theme for 2012 and 2013 cohorts are shown in Table 2. These results reveal that positive comments outnumbered negative ones by 58 to 23, which reflects the fact that 72% of students have said they believe the cartooning process to be a successful way to understand the set texts. The positive comments reveal what the students valued about the exercise. Interestingly, the theme mentioned the most was deeper thinking, which appears to be more important to students than visual thinking and enjoyment of the task. This suggests that students valued the opportunity to engage in deeper thinking. Although visual thinking is mentioned less often, it is likely that use of their visual skills was the mechanism which allowed the deeper thinking, as suggested by some of the responses. In addition, some students mentioned that cartooning led to better retention of the information than note-taking. All of the positive themes relate to a deep, rich learning experience, especially as compared to the previously used reflective journal.

Table 2. Tallies of the nine themes emerging from open-ended questions.

Theme	Type	Tally
Task induced deeper thinking	Positive	21
Task improved retention	Positive	8
Task relates to preferred (visual) way of thinking	Positive	13
Task made readings more interesting/enjoyable	Positive	16
Task distorted understanding	Negative	4
Hard to cartoon some readings	Negative	4
Task too hard	Negative	4
Would prefer writing task	Negative	6
Task was time consuming	Negative	5

In terms of negative responses, some (such as those relating to time consuming nature of the task) could be expected from any student feedback on any unit, and in my experience there are always some responses of this nature. The most important issues to address are those relating to prefer learning style and the distortion of understanding through cartooning. In future years, I will need to remind students that they are very welcome to use text/summaries as well as cartoons (and indeed many already have), and provide more support for students who are finding the drawing task difficult. Those students who do prefer a verbal learning style may need support to develop visual skills. There are two reasons for this. Firstly, as design students they will need to learn effective visual communication in order to succeed in the design field. Secondly, as suggested by some of the literature, the ability to learn in more than one way is related to development of expertise [19, 18]. A few comments suggested that the task biased or distorted understanding of the texts. This will need to be addressed by making sure students

focus on the whole text during cartooning, and not only one idea. Using storyboard style cartoons and/or extra notes may help to address this issue. However, some comments suggest that some readings are harder to cartoon than others, and it may be that this approach is inappropriate for a few of the readings. In future years, the option to use written summaries for some of the readings may improve outcomes.

The success of the cartooning exercise was reflected in higher quality discussion papers. The papers were written on topics selected from a list provided by me. They were based on the readings and students were instructed to use the understanding they had developed through the cartooning process to develop their papers. The average grade for discussion papers in 2011 was a "pass", whereas in 2012 and 2013 it was a "credit". This constitutes an increase in the average grade for the discussion papers when cartooning was used. It is likely this is due to increased engagement with the reading process throughout the six week period of the set readings, better understanding of the content of the readings and greater willingness to interrogate the texts in depth. This demonstrates that the innovation improved both learning and engagement.

4. Conclusion

The inclusion of this exercise engaged and involved these visual thinkers in addressing and interrogating the set texts, despite the fact that they were complex and sometimes difficult to read. It may also help them to develop their ability to utilise both visual and verbal thinking simultaneously. This technique has allowed the students to benefit from reading contemporary writings, which are a primary source for historical information. Without this, based on previous experience, they would have found it difficult to motivate themselves to do the readings week by week, and sometimes struggled to really get to grips with the content. Finally, they have been able to apply this deeper knowledge to their discussion papers, resulting in superior papers.

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