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**A SMALL DROP OF INK, FALLING LIKE DEW: AN INVESTIGATION  
INTO THE PROCESS OF INTERPRETING THE WRITTEN WORD INTO  
AN ILLUSTRATION**

**A THESIS PRESENTED IN FULFILMENT OF THE REQUIREMENTS FOR  
THE DEGREE OF DOCTOR OF PHILOSOPHY IN EDUCATION**

**AT MASSEY UNIVERSITY, NEW ZEALAND.**

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## **ABSTRACT**

This investigation's origin is one born of pragmatism. It seeks to improve the teaching and learning of illustration, a visual communication design discipline. The specific focus is text adaptation and the process involved in interpreting the written word into a visual image. Common characteristics of poor interpretation, identified after many years of teaching illustration, are the creation of images which are either based on relatively insignificant details from a text, or so removed from a text's theme, that decoding an image's intended meaning becomes extremely difficult. This study therefore seeks to provide insight into the process of interpreting written text into an illustration and offer some suggestions as to how novice illustration students can improve their skills in this process.

The chosen methodology of this study is action research, and within a constructivist-interpretivist framework, work carried out with three groups of novice students, during three linked cycles of investigation has been analysed. Two separate, but linked learning strategies were developed incrementally. These can be thought of as thinking tools. The first one relates to comprehension of text while the second strategy focuses on analogical reasoning as an idea generation method. The data suggests that these learning strategies were successful, allowing students to develop more awareness of their design process and also create concepts which captured the essence of a text. This suggests that, while designing does involve tacit, intuitive thought, explicit methods of thinking can also assist design creativity.

Much of the literature on design suggests that a paradigm shift is taking place within the field, in education as well as design practice. One of the characteristics of this change is a call for design educators to develop an epistemology of what constitutes design knowledge. This thesis is an addition to that ongoing search for understanding.

## Acknowledgments

While PhD study is largely a solitary undertaking, it is not possible without good supervision. I would therefore, first and foremost like to thank Dr Linda Leach for her expert, deft and gentle handling as main supervisor throughout this study. Linda, you have allowed me to take some pride of ownership in this undertaking, but your influence is embedded deeply within this work and it would not have been possible without your expert tutelage. I am so glad you agreed to supervise my study. I am also indebted to Associate Professor, Frank Sligo who I coerced to take on the role of co-supervisor about half way through the study. Frank, you challenged me to think about the significance and value of every single word, sentence and paragraph in this thesis. Whatever clarity and eloquence is evidenced in my writing can be traced to your insightful suggestions. It is also very important for me to thank Geoff Hargreaves, who played a highly significant role as co-supervisor in the first year of this study. I would also like to thank the College of Creative Arts, Deputy Pro-Vice Chancellor, Claire Robinson for her wholehearted support during these past five years.

Without a strong drive to succeed, I doubt a PhD is possible. But certainly, to go against expectations, you need some help along the way. As a working class teenager in the 1970s, the world of school was grey, drab and miserable. Except for one solitary location—the art room. That was an alternative world, a world of psychedelic colour and endless possibilities. A world inhabited by a strange breed of individuals—art teachers! Long haired, cravat wearing, purple flair corduroyed, bearded, pipe smokers! They created a world I wanted to be part of. So, it would be remiss of me not to thank my two art teachers from St Ninian's RC High School, Mr Boyle and Mr McKevenney. If not for them, you would not be reading this. Those men inspired me and even though I left school without university entrance qualifications, it was their powerful influence that encouraged me to go to night school three years after leaving school and get the qualifications I needed for art college.

I also need to thank my mother. My mother was an insatiable reader. There were always books lying around the house. It was her that inculcated my sense of curiosity and love of reading. She bought me a set of *'Newnes Pictorial Knowledge'*

encyclopaedias when I was about ten and I was fascinated by them. I still have them today, I brought them all the way from Scotland to New Zealand. I know my mum would be proud and would say “tell them to put that in their pipe and smoke it”, referring to those who would have doubted her only son would complete a PhD. So, mum, in your memory, here’s tae ye!

*This thesis is dedicated to my two wonderful sons, Calum and Hugh. Boys, anything is possible.*

## List of terms

**Actor:** An active participant in an image from whom a vector departs (see participants and vector)

**Brief:** a written set of instructions and information about what is required of students

**Circumstances:** Participants in an image which enhance meaning but are not essential

**Connotative:** An implied meaning

**Denotative:** A literal or concrete definition

**Experiential:** concepts which describe the text's theme by comparison to physical experiences

**Fragmentary:** concepts based on secondary themes in the text

**Goal:** A passive participant in an image, that which is being acted upon

**Illustration:** imagery which encapsulates, supports and enhances a hegemonic reading of a written text

**Modality:** The extent to which an image represents reality

**Participants:** Separate elements within a picture which are arranged to create meaning

**Salience:** The hierarchical significance of elements within a picture whose arrangement affects meaning

**Source:** That which requires explanation

**Signified:** That which is meant

**Signifier:** That which represents what is meant

**Situational:** Concepts based on literal aspects of the text

**Target:** That which is used to explain a source

**Thumbnail:** A small sketch quickly rendered to explore the key conceptual elements and visual features of an idea

**Vector:** The directional action focus within an image which links participants

**Visualised conceptual analogy:** An image which is a visualisation of a concept created through analogy

**Workbook:** An extensive collection of fleeting, captured thoughts, embryonic ideas, gathered images, research material, analysis, experiments with techniques, media and style, iterations and systematic developments of concepts.

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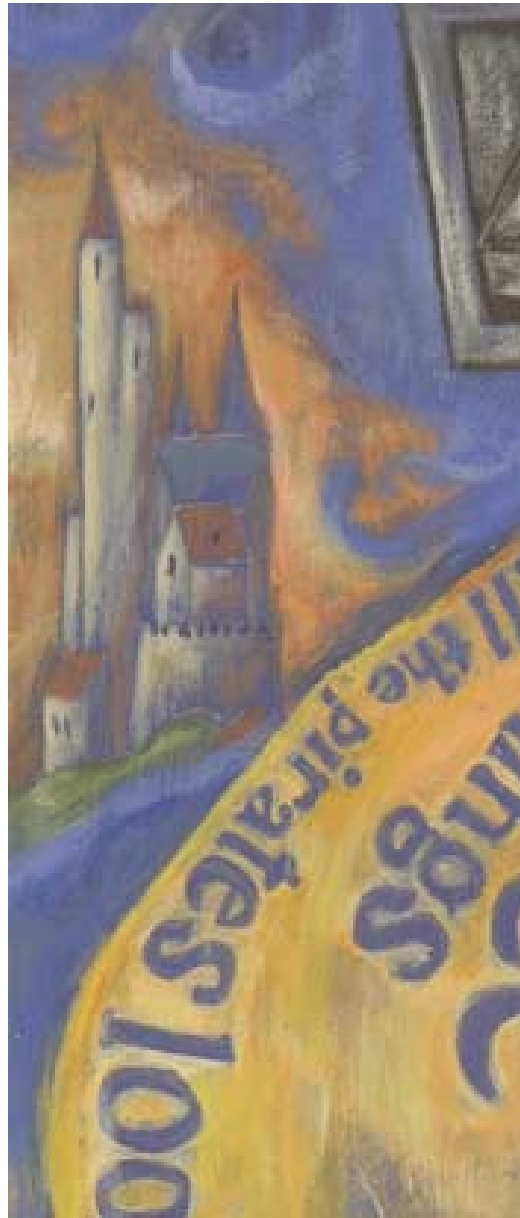
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# 1

## CHAPTER 1: INTRODUCTION



I can remember the day I became an artist. I was six years old. It was a Friday afternoon, the year was 1965 and the location was St Flannan's Roman Catholic primary school in the ancient town of Kirkintilloch, Scotland. In A.D. 142 emperor Antoninus Pius commissioned the building of a fort on the land's highest point overlooking the Campsie Fells, low-lying hills that lead to the Highlands. The early Scots called the structure caer-pen-tulach, which means fort on the hill. This was the most northerly point of the Roman Empire, part of the antonine wall. Over the centuries the settlement developed into the bustling market town Kirkintilloch, and that is where I grew up. Anyway, back to school. Our teacher, Mrs Walsh, as was the norm on a Friday afternoon, asked the class to create a painting. I cannot remember if there was a theme for the painting. Maybe it was about the Romans. What I do remember is that it was a sunny day and there was a blue sky outside. I began my painting, as was the convention for six year olds, by applying a thin ultramarine blue strip about an inch deep to represent the sky. Something happened that day. The thin blue strip representing the sky didn't match what I could see outside. I had a feeling something wasn't right. It was no longer a satisfactory visual explanation for the vast expanse of blue which enveloped me. This next bit I remember extremely well. I dipped my brush into the paint and excitedly added more to the sky. I probably only painted a few more inches of blue, but it seemed as if the whole picture was filled with sky. I can still recall the excitement and furore it caused in class. I can't visualize what else was in the picture. Maybe it was Antoninus's fort, or my house, or a dinosaur. I can't remember. All I can see is that massive blue Scottish sky—yes, we do have them occasionally in Scotland. Other kids came over and looked at it. I had challenged reality or at least how we understand and represent it in our art. The painting alongside all the other paintings from my peers was hung up. I stared at that painting. I knew I had made a discovery and there was no going back.



Forty-three years later I am still making discoveries about the world I live in. My love of picture making has never waned. In 1983 I graduated from Duncan of Jordanstone College of Art, Dundee, with a Bachelor of Design in illustration. Since then I have worked as an illustrator, high school teacher and as a university lecturer. Between the years 1990 and 1995 I worked full-time as an illustrator in Perth, Australia. The bulk of my illustration work carried out then was what is known as editorial art, that is images which accompany written text. In this period I was given great freedom to illustrate expository text and give it a visual dimension. When I came to the College of Creative Arts, formerly Wellington Polytechnic in 1995, I wanted to share with students my passion for illustration in general, and in particular my fascination with text and how it can be illustrated. This study is a result of a lifelong fascination with representation through image making.

Currently I am subject director for Illustration in the Institute of Communication Design (ICD) at Massey University. I co-ordinate seven separate papers in illustration. Illustration is one of five identifiable major subject areas in ICD, the others being graphic design, advertising, animation and digital media. A few years ago I had to write something for Massey's website.

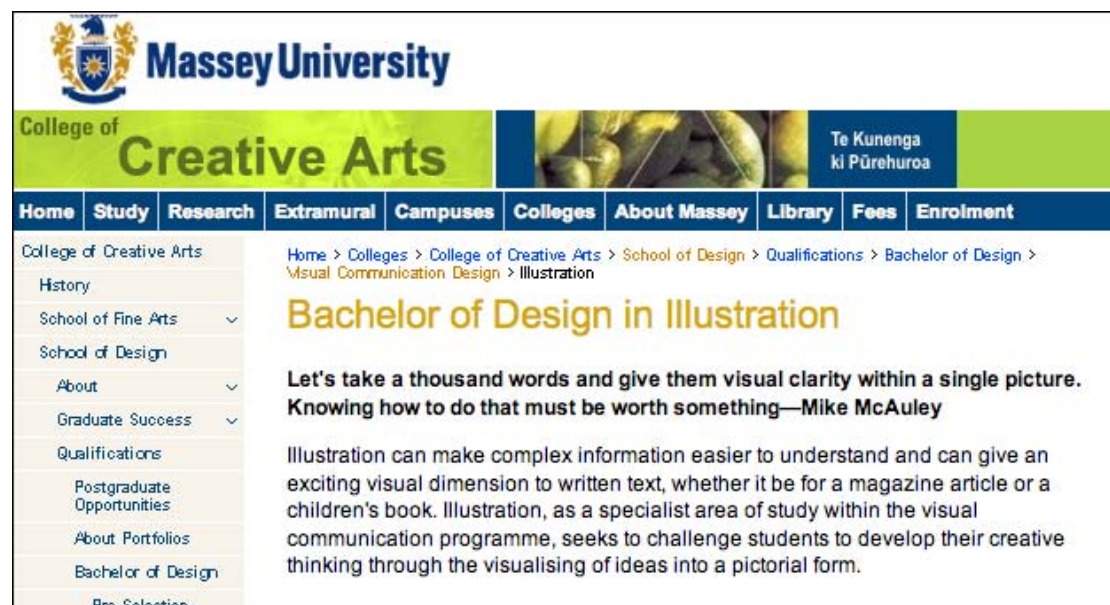


Figure 1.1 Snapshot from Massey's website describing illustration.

My statement, ‘let’s take a thousand words...’ was really a way to establish that illustration is a visual means of translating written text into a pictorial form. It is of course a play on the proverb ‘a picture is worth a thousand words’. And like any proverb there is some substance to its claim, without us necessarily having to accept it as a truth. But illustrations certainly do have a close, symbiotic relationship with words. I often use an analogy with my students to describe this relationship. I ask them to think of the relationship as one similar to that of a song. There are the lyrics (the words) and there is the melody (the illustration). And while Lord Byron in his unfinished poem ‘*Don Juan*’, which he began in 1819, reminds us that:

*Words are things, and a small drop of ink,  
Falling like dew, upon a thought, produces  
That which makes thousands, perhaps millions, think;*

Perhaps it can be argued that illustrations also make us think and they are in a sense ‘visual words’. Barthes (1977, p.38) talks of this relationship in terms of the written text providing “anchorage”, for the image. And while a text may contain many pieces of information of varying importance “a long text may only comprise a single global signified, thanks to connotation” (ibid). Certainly, the relationship between written and visual text will follow us throughout this study as the prime design task of all participants involved in the research was to illustrate a written text extract which conveyed the author’s message. In the professional world, this type of illustration can be found in magazines and newspapers containing written, expository articles. It is commonly referred to as *editorial* illustration (Heller, 2008, p. 4).

Lawson (2006, p. 4) points out that “we can see design as a generic activity, and yet there appear to be real differences between the end products created by designers in various domains”. This, in some way, confuses the commonalities between design disciplines. Lawson (2006) re-iterates this point a slightly different way by saying design disciplines tend to be identified “by the kinds of solutions they produce”, not the actual problems they encounter (p. 53). However, by thinking of design as a process, we think less of the products being produced and more on problems and how they are solved. Thus, when we think of design as a process, problem solving

arguably becomes an identifying, central activity of all disciplines grouped together as design and the “core of design thinking remains the ability to conceive, plan and present ideas about products” (Margolin & Buchanan, 1995, xv). The view that illustration is a problem solving design activity is certainly widespread among illustration practitioners. Renowned illustrators such as Coburn (2008, p. 82) say “As an illustrator, my job is to solve problems visually”. This is re-iterated by Chin (2008) “Illustration, I think is about problem solving” (p.76) and Baseman (2008, p. 32) “I am a visual problem solver”.

The end product of illustration is usually a drawing or a painting and the problem to be solved when say, a written text is to be illustrated, is one of translation, from textual language to visual language. The problem lies in connotation, finding the right balance between saying too much or too little (Barthes, 1977). So, while it is of perhaps some use to define a discipline in terms of its end product, the focus of this thesis is the idea generation process of illustration, how words are translated into pictures, from written text to visual text, not the end product itself.

Figure 1.2 is also from official Massey university literature. It relates specifically to the work of final year illustration students. However, it also highlights the utilitarian and social function of illustration, a key component of design. Examples given in Figure 1.2 are how it can be utilised to communicate the experiences of Khmer Rouge survivors or assist children with dyslexia. Figure 1.2 also helps emphasise that illustration is a useful and powerful communicative medium and should not be confused with self expressive fine art. The Figure also refers to ‘thinking designers’, another important feature of this study and one of the instigating forces which inspired this study, aimed as it was to assist students to develop their design thinking skills. While, as will be discussed in chapter two, illustration spans a continuum that at times can cross over from popular culture to high culture, design to fine art, it must be stressed that within the context of this study, illustration is firmly placed within Massey university’s own terms of reference as a form of visual communication design. It is an important component of Massey’s Bachelor of Design degree. Referring to visual communication design at Massey University, former associate professor and deputy pro-vice chancellor of Massey University’s College of Creative

Arts, Claire Robinson, says, “Our graduates are experts at using visual language to communicate. They know how to use colour, type, image, composition, text, movement, form, material, time, space, line and tone to convey a message” (2007, p.57). Illustration students communicate through their drawings and paintings. These are the identifying features of illustration as a visual language and form of visual communication design.



## ILLUSTRATION DESIGN

Illustrations are like words—visual words. They are pictorial translations of thought. Whether created out of ink, paint, pencil or pixels, they too make us think, perhaps in a more immediate way than the written word. This year's illustration specialists present a diverse body of highly engaging work. Whether it be to communicate through visual narrative the personal experience of a Khmer Rouge survivor or explore creative options to assist children with dyslexia, this year's graduates demonstrate why illustration is such a powerful communication medium. As design education in the 21st century becomes less about the production of material artefacts and more about reflecting the society we live in, the focus is on how our 'thinking designers' shape experiences. To that end, our illustration graduates have developed highly sophisticated design strategies to engage society with their messages.

**Mike McAuley**  
Illustration Lecturer

Figure 1.2. Personal description of illustration at Massey University, (2007).

### *Reflective practice*

Schön (1983) introduced the term reflective practice as he sought to develop a way of looking at an epistemology of practice based on examining what practitioners do. He argues that reflection-in action is “susceptible to a kind of rigor that is both like and unlike the rigor of scholarly work and controlled experimentation” (1983, p. xi). In saying this he values the insights that come from experience, from being involved directly in that which is being studied. As a reflective practitioner I have always sought to improve my teaching practice. As a matter of course, I, at the end of an illustration project, have looked at the results and considered what went well, what went less well and made plans as to how I could improve future delivery. My actions have sought to improve the learning outcomes of my students. In doing this I have relied on experience, intuition and tacit knowledge. However, as an individual, I am able to see myself as a part of something much bigger—a member of the developing field of design. To contribute, not only to the learning of my students, but to the field of design, requires that I build on my experience, intuition and tacit knowledge and develop a theoretical and scholarly understanding of what I do.

Trigwell (2004, p. 13) talks of “pedagogic resonance” to describe the value of a teacher’s knowledge but suggests that for personal knowledge of teaching to become scholarship it must be made verifiable through a structured and methodologically rigorous approach. I have set out to achieve that. If successful, my work can add to the growing body of knowledge that is being gained about design. But this study is not only about scholarship. It is about learning and I have also set out to improve the learning of both my students and my own learning. To that end, I have embarked on an action research investigation.

### *Scoping the problem*

The first paper in Massey’s Bachelor of Design in Illustration is *Illustration 1*, an unsurprising and somewhat pragmatic title perhaps. The course prescriptor describes the paper as being about ‘The fundamentals of illustration including concept, form, colour, composition and media’. In the last ten years the number of students enrolling in illustration at Massey has increased considerably. The Illustration 1 paper is

enrolled in by, on average, 100 students every year, many of whom treat it as an *elective*, a non compulsory paper. Of those 100 students, on average, somewhere in the region of 12 to 18 will end up specialising as illustration majors throughout their study. The paper therefore has to cater to a wide range of interests and, indeed, aptitudes.

Expanded access to higher education is commonly referred to as *massification*, and can be defined in terms of increased quotas “of new entrant students as the main criterion” in relation to quotas of previous times (Teichler, 1998, p.19-20). In New Zealand, the Office of the Ministry for Tertiary Education’s report (2007), *Tertiary Education Strategy 2007-2012*, shows that massification will continue. The ministry seeks to “increase the number of New Zealanders achieving qualifications at higher levels (e.g. trades, training, diploma, degree and postgraduate education)” (2007, p.6). While this growing situation is welcomed, it does have implications as to how a curriculum should be developed and delivered.

One of the most fundamental principles covered in Illustration 1 is text interpretation. Two types of text are looked at—narrative and expository. Narrative text relates to stories and characters, while expository text relates to ideas, points of view, information (Heller, 1995). This study focuses on the process of interpreting expository text into visual illustration.

As an educator I have held sacrosanct each individual’s design process and have in my classes created situations for students to interpret text in their own way. Prior to this study I have always considered the design process unfathomable, mystical, very personal and not something which should be tampered with. However, from an educational perspective, what does one do when one recognises that some students perform very poorly at interpretation? To compound this, what does one do when, in an era of massification and increased enrolments, one finds that more and more students have difficulty with the interpretation process? Perhaps one answer lies in approaches to learning and the strategies which can be used to improve outcomes.

## **Learning strategies**

Learning strategies can be described as behaviours and thoughts a learner engages in during learning that are aimed at creating and constructing meaning and knowledge. Learners are, to use Mayer's (1996, p. 364) constructivist definition, "sense makers". We can therefore position this to mean that, if learners are sense makers, then learning strategies are forms of meta-cognitive process used when the learner "actively tries to build a coherent and meaningful representation of the presented material" (ibid). This thesis intends to demonstrate that such thoughts and behaviours can be made explicit and that students can co-ordinate the basic cognitive processes of selecting, organising and integrating. I will discuss two learning strategies which were developed during three cycles of an action research enquiry with groups of illustration students. While each cycle had its own particular structure and aims, the main task, that of illustrating a passage of expository text into an illustration, was a constant factor.

### *So what's the big idea?*

Design, as a creative subject, and as one which has emerged from an arts and crafts base, has traditionally been taught and learned by applying intuition and iterative approaches to a problem task. Systematic approaches to learning design are not common (Friedman, 2005, p.3). In my experience, explicit understanding of process has rarely been expected in professional or academic situations. The design process is not formally taught in learning institutions. It is learned as a consequence of the practicalities of addressing, over years of study, numerous design problems provided in a studio environment. According to Lawson (2006), "One of the weaknesses of the traditional studio is that students, in paying too much attention to the end product of their labours, fail to reflect sufficiently on their process" (p.7). However, a paradigmatic shift in design is taking place (Buchanan, 1998; Friedman, 1997, 2005; Norman, 2000; Oxman, 2001) and increasingly design educators and researchers are being challenged to make the design process more explicit and less reliant on tacit knowledge. This argument will be expanded on in the literature review in chapter two. By being more aware of thought processes, it is argued here, students can relate their thinking to strategies of learning. By being aware of strategies, students may be more able to re-use them in different design problem situations. As a means of focusing on this, the design task of illustrating written text into a visual illustration has been

chosen. The task itself has been identified as one which novice students have difficulty with. But design is not simply about problem solving. It is also about problem understanding. To solve a problem, it must be understood.

### *Action research*

I will discuss this at length in chapter two and three but I briefly want to provide a personal perspective on why I believe this methodology is so appropriate to my research design. When I read about action research's iterative and cyclical nature I was struck by its similarity to the design process, which too, is iterative and cyclical. I read a paper by Professor Cal Swann (2002) called '*Action research and the practice of design*'. In the paper he remarks on how similar the processes are between design and action research. In a recent email to me he said that he was "surprised that more had not noticed or commented on it before" (C. Swann, personal communication, May 20, 2008). I mention this only because there is a relationship I wish to call to the fore. I am essentially using a methodology to gain insight into the design process, a process which is itself similar to the methodology used to develop understanding.

## **Overview and structure of the thesis**

I will now describe the structure of this thesis chapter by chapter. There are six chapters in all.

### *Chapter two*

This is the literature review chapter. There are two distinct sections. Section one starts by casting a wide net over the field of design in general, describing the birth pangs that are being experienced as a consequence of an evolutionary re-birth from an arts and crafts heritage to a research discipline within academia. In section two the discussion moves on to a more focused look at some of the cognitive processes involved when designers design. Both sections act as a contextual and theoretical backdrop to my own fieldwork involving illustration students in the process of text interpretation.



The literature supports an argument that a new design paradigm is emerging, one which demands a more articulated understanding of the design process itself and recognises that research into design education can play a critical role in this new understanding (Buchanan, 1998; Friedman, 1997, 2005; Norman, 2000; Oxman, 2001). The chapter presents the argument that design education is slowly moving away from its traditional arts and crafts base which focused on the idea that design is essentially about making artefacts. The new paradigm is, according to the literature, encouraging a more structured, systematic and scientific approach to design and focusing more on the value of design as a thinking process (ibid). Some of the difficulties experienced in this move towards explicit understanding of the design process are also discussed here. Designing has largely been seen as a tacit activity. The emerging paradigm calls for it to be more explicitly understood (Buchanan, 1998; Cross, 2001b; Friedman, 1997, 2000, 2002, 2005; Norman, 2000; Oxman, 2001). This relationship between tacit knowledge and explicit knowledge is explored here in relation to its significance in designing.

The discussion around tacit and explicit knowledge in relation to theories of learning and design learning in particular, is developed by discussing what others in the field of design have done in this area (Bonnardel, 2000, Goldschmidt, 2001). A number of case studies are discussed which provide insight into student conceptions of design and approaches they take when designing (Drew, L., Bailey, S., & Shreeve, A., 2002; Newstetter & McCracken, 2001; Wilson, 2002). These case studies then lead to a more focused discussion of analogy and comprehension, two areas more closely associated with my own fieldwork. This is where theories which relate to cognition and learning are discussed. The chapter concludes by directing its attention on communication, both as a verbal and visual act. In so doing, it connects back to my own study which is about written text and how it is translated into visual text. It also prepares the ground for a discussion of my methodological approach in my own fieldwork.

### *Chapter three*

In my introduction, I gave a personal anecdote of how I, as a six year old, made a personal discovery about the world and how I represented it. As such I touched on

how ontology and epistemology guide our actions. In chapter three I relate this to how I progressed towards choosing action research as my methodology in this study. This chapter is also in two sections. The first section describes my methodology—action research, and section two describes how I designed my own research enquiry.

Chapter three describes my objectives and places the study within a constructivist-interpretivist paradigm (Cohen, Manion & Morrison; 2005; Guba & Lincoln, 2005).

Briefly, these objectives are:

1. to assist students to develop awareness of their thinking skills when designing
2. to assist students develop their text interpretation skills
3. to explore analogical thinking as a text interpretation method
4. to develop my own image interpretation skills
5. to develop my scholarship of teaching.

A fundamental principle of action research is that the researcher is at the centre of the enquiry, not a detached observer (Dick, 1993, McNiff & Whitehead, 2006). My objectives therefore relate to increased and improved learning of both my students and myself as a learner also. The chapter discusses the differences between tacit and explicit knowledge and then examines the nature of action research and how it can be used to enquire into practice. The structure and methods used to gather data are discussed, as are the analysis methods used.

#### *Chapter four*

This is the largest chapter of the thesis. It focuses on analysis of the data and it is at the epi-centre of my claim to new knowledge. This chapter is based around analysis of three linked cycles of enquiry carried out over a period of twelve months with novice students studying illustration for the first time at university. The iterative, cyclical nature of action research is evidenced in the fieldwork carried out with students. Each cycle is important although they gradually become larger, increasingly complex and include more participants. This is due to the unfolding nature of the methodology. Initial findings from each cycle lead to new understanding. The cyclical structure can be described as *plan-act-observe-reflect* (Lewin, 1946). At the end of

each cycle a period of reflection leads to a new or modified plan. The cycles are analysed separately and summaries of findings are made. On completion of analysis of cycle three, links and patterns are made between the cycles.

Data comes from a number of different sources. Semi-structured interviews were carried out in cycles one and two, while questionnaires formed part of cycle three's structure. All three cycles included design outputs. In cycles one and two, these are in the form of written notes and also rudimentary pencil sketches which are referred to, in this study, as thumbnails. In cycle three design outputs include workbooks which are essentially reflective journals that chart each student's approach to the design task. Cycle three also required from each student a final, resolved, full colour illustration, a written rationale and an evaluation of the project.

#### *Chapter five*

This is my discussion chapter. It lays out the substantive findings of chapter four in the form of seven key propositions. It argues that the learning strategies which were developed in cycle two and implemented into a studio teaching environment over a period of four weeks in cycle three, helped students to develop their interpretive skills.

#### *Chapter six*

The concluding chapter summarises the main findings and contributions from the thesis. From the seven propositions discussed in chapter five, the concluding chapter consolidates by focusing on the two learning strategies concerning text comprehension and analogy. Limitations of the study are discussed and suggestions for further research are made.



# 2

## CHAPTER 2: LITERATURE REVIEW



*The challenge of any evolving field is to bring tacit knowledge into articulate focus. This creates the ground of shared understanding that builds the field. The continual and conscious struggle for articulation is what distinguishes the work of a research field from the practical work of a profession (Friedman, 2000a,p. 13).*

Friedman's opening quote challenges those of us involved in the design field to work towards greater understanding of what it is we do. As a design practitioner and educator I would freely admit that, in the past, I have never needed anything more than tacit awareness of how I proceed when I design or when I teach design at university. However, I have been given the opportunity, through PhD study in design education, to seek explicit understanding and provide articulation of this new and evolving field. Friedman's call is a call for change, a call to action. Action research, as a methodology, is regarded as one which responds to a call for action, a perceived need for change. It commonly starts off with generic propositions and questions, progressing towards a more specific focus—a consequence of the methodology's cyclical, iterative and incremental nature. This literature review will reflect this move from the generic to the specific, identifying crisis points in design research and design education, highlighting some key issues pertinent to my study. I have structured this chapter into two interrelated sections. Section one deals with the broad issues of design as an emerging field and the role design education is playing in its development. Section two connects more closely to my own personal interest in analogy and visual interpretation of written text, the focus of my fieldwork.

In section one I begin with the idea that design is undergoing a paradigmatic change and that design education is central to this development towards a field of research. I discuss how design practice has historically inculcated a focus on design product rather than on thinking processes behind designing and how this has encouraged a situation where design and the cognitive processes which guide it are still difficult to define. This viewpoint taken from the literature is nevertheless balanced by further

discussion around issues defining and understanding unconscious, tacit knowledge processes. I relate this broad context and range of design issues more specifically to design education. This leads to a discussion of some researchers whose work is beginning to show that design educators can bring design and design thinking into more articulate focus. I conclude with a description of the work of Goldschmidt (2001) and Bonnardel (2000) whose work on analogy in design education enhanced the learning of students and inspired my own fieldwork which also set out to improve student learning.

Section two begins by focusing on analogy, describing its features and its role in creative thinking. I then follow this with a discussion of learning structures surrounding the comprehension of expository text. The final two sections are concerned with issues of communication and idea development, areas which are discussed in some depth in my analysis chapter.

One of the key theoretical arguments developed in this study is that tacit knowledge can be used not only as a resource for creativity, but that through reflection and systematic methods it can be explicated and articulated. Through reflection, we can trace our design decisions to the meta-cognitive processes that led to them, identifying causes of both success and failure. Learning structures can be identified and applied to design learning situations. The consequence of this is that learning itself can become more explicit.

I will begin this chapter by retracing some of the historical dimensions which have shaped the contemporary situation in design and design education. I discuss different paradigms and models of design education which lead us to the present day situation.

## Section 1.

### Changing paradigm

Historically the relationship between design practice and design education has been one of cause and effect. Changes in design practice have traditionally led to changes in design education. Today that relationship is changing with design education playing a more active role in the development of design as a field (Buchanan, 1998, 2001; Cross, 2001a; Friedman, 1997, 2000, 2005; Rust, 2004; Swann, 2002). As society has become more complex, so too have the problems which designers have to regularly engage with and provide solutions for. As a consequence, design as a field of enquiry has had to develop rapidly to respond to change. In a 1998 article in *Design Studies*, Buchanan writes:

Design began as a trade activity, closely connected to industrialisation and the emergence of mass communication. After a period of time, professions began to emerge, with traditions of practice and conscious recognition of a distinct type of thinking and working that distinguished our profession from others. However, we are now witnessing the beginning of the third era of design, marked by the emergence of design as a field or discipline (Buchanan, 1998, p.63).

Buchanan talks of three eras in design. The first era was that of the trade schools where teaching focussed on the transfer of skills suitable to and demanded from a particular trade. The second era he describes as one of professional development where design education played a more complex role, contributing to the advance of design thinking, but only as a minor role to its prime function of serving industry by providing students with vocational skills. As to the third era, he says:

In the third era of design—the era that is emerging around us today—education and practice are partners. They are partners for a very important



reason, reflecting the proper role of education in both discovering and disseminating new knowledge as part of the field of design (ibid, p. 65).

Buchanan confronts design educators with the challenge to dispel the misunderstanding, prevalent particularly in the design profession, that design education should continue to follow behind trends in design practice. Not only should we set out to dispel the misunderstanding, but we should demonstrate that design education research, far from following practice may well be able to anticipate new conditions, new forms of practice and knowledge of design that practice itself is unable to produce.

In 2002 a 182-page document *Proposal for a school of design at the university of California, Irvine, (UCI)* was made publicly available to scholars worldwide. The first section contains a ‘vision statement’, containing in essence a call for change in how we should plan for design teaching in the twenty first century. It discusses the purpose of a new School of Design. The vision statement says that the objectives of a new school, free from the traditions of the past, “will be to advance our intellectual and scientific understanding of the theory and practice of design” (Proposal for a school of design at the university of California, Irvine, p. 1). It suggests that today’s new designers require a new kind of training that goes beyond the traditions of practice-based programmes (p. 2). The vision statement also suggests that the field of design is presently undergoing a “profound transformation” (p. 4) that is changing what designers do and how they think about their work, but that the “transformation lacks the conceptual coherence and intellectual vision that can only be developed through scientific research and scholarly enquiry” (ibid). The UCI document further suggests that design as a field is at a point comparable to where medicine and law were in the nineteenth century when they began “more systematic training in the conceptual foundations of practice” (p. 8). Of the need for a new approach to design teaching The vision statement says:

Training will focus less on the dramatically diverse products of design and more on the processes of design leading to their production. These processes have many common elements that can be the focus of research and a

coherent educational programme (Proposal for a school of design, 2002, p. 9).

While Buchanan talks of a move in design education towards a third era, one which the University of California, Irvine would seem to support, Oxman (2001, p. 273), referring to how design has been taught in institutions over the centuries, uses the term “the third paradigm” to describe where design education should be headed. Referring to the atelier system as practised in L’ Ecole des Beaux Arts as the first paradigm, she outlines how the model developed in the eighteenth century can still be recognised today. In this model the studio simulated the professional environment with the tutor as master setting the problem to be solved by the students. While this educational structure was teacher centred, it has not been totally replaced, with some design schools still retaining elements of the master-student relationship—with the tutor passing on his knowledge to the student. Oxman describes the second design education paradigm as that developed at the Bauhaus and the Russian State Higher Art and Technical Studios (VKHUTEMAS). Structured visual exercises which contained design principles to be learned was the basis of this model. Thus, visual literacy and problem solving expertise would be attained through the exploration of general design principles. However, says Oxman, while these two systems were rich and diverse, neither of them was concerned with the design process itself. Narvaez and Feher (2000) comment that ever since the Bauhaus, design has inherited a legacy such that it is still in many quarters seen “as a ‘mixture’ of art and craftsmanship (*techne*)”, (p. 39). Oxman continues by saying that both models (atelier and Bauhaus) concentrate on the design object rather than on the knowledge to be gained from the educational process. With recent knowledge of the cognitive processes being gained by cognitive psychologists, there is now a need for a third design education paradigm.

The third paradigm is the education of designerly thought processes in design reasoning and design strategies. This includes how designers think in various characteristic design domain problem types, in reasoning, in exploiting graphical representations, in employing multiple forms of reasoning in design strategies (Oxman, 2001, p. 273).

Cognitive science can, says Oxman, provide us with a theoretical framework for the development of the third paradigm. Categories of cognitive phenomena can be identified which demonstrate the unique cognitive aspects of design. These can be incorporated into the current studio environment. Cognitive models of thinking such as analogical reasoning can be empirically verified and used by students to determine what learning has taken place. Cognition has, of course always taken place in design learning. Oxman is proposing that these structures be made more explicit so that students can see how they influence their approaches. This offers design students a means to be more analytical of their actual thinking processes and to develop knowledge structures (ibid). Oxman sees no particular need to replace the first two paradigms, but does call on design educators to enlist the third one as an explicit, complementary method to their other teaching approaches. I will return later to analogical reasoning, a knowledge structure which I explore in my study.

Norman (2000) points out that, for centuries, the works of designers have been referenced as visible evidence of innovative thinking and creativity. Such design thinking has not, says Norman, been translated into educational practice. While she doesn't define, as does Oxman, two preceding educational paradigms, Norman also calls for the development of a third paradigm in design education where "making process rather than product [becomes] the logical emphasis for students' education" (p.95). She goes on to say that students must learn to understand their modes of thinking and develop analysis skills which enable them to "explore creative options, plan and organise a potential solution" (ibid).

Findeli (2001) says, "Let me just say that I tend to agree with the idea that we are in a paradigm shift" (p. 5). Within his framework he is referring to a societal paradigm shift as seen through design. Our current paradigm is, according to Findeli, largely driven by materialism. He is of the view that many of us still think of design in definitional and operational terms developed during the industrialisation of the nineteenth century. Design was used "to make industrialised products culturally—socially, economically, symbolically, and practically—acceptable. Aesthetics was then its privileged rhetorical tool" (p. 15). Findeli's concern is that our preoccupation

in design practice, as well as in design education, with the artefact has created an “object fetishism” (ibid). He attributes this to consumerism, which is a powerful force, not only in shaping attitudes, but also in how designers’ see their roles. The implication for education is that without critical practice, design students will readily accept their function solely as product makers. One solution he offers is to encourage students to think of the human context of designing and to see design as a human centred activity and a form of action. Then, “the making of an artefact, which usually is considered as the normal outcome of a design project, is no longer taken for granted. Within these complex systems [anthropological and cosmological] designers are expected to act rather than to make.” (p.14).

Referring to context in design and too much reliance on the object, Findeli (2001, p.10-11) says, “Whereas an object has a visible presence, relationships are by essence, invisible. Therefore, the kind of visual intelligence needed in such a case is of a different quality”. Findeli asks the question, how will this intelligence of the invisible be taught? On this question, he offers few tangible answers. And this is perhaps the weakness of his paper. The changing paradigm he refers to is one of spiritual awareness. Students should be taught a series of “spiritual exercises”, (p. 16) designed to transform self-awareness of the world. He is not forthcoming with details as to what such exercises should contain. Nevertheless, Findeli’s work is relevant to this study as it supports my developing argument that design students need to be less preoccupied with product, which as I will argue later, can encourage surface learning; instead they should strive to be more in touch with their thought processes.

In relation to Buchanan’s three eras, Oxman’s three paradigms of design education, as well as Norman and Findeli’s call for a new paradigm, Friedman (1997, 2002) talks of our current situation as one where there are two ‘models’ of design education; one is craft based and the other is theory based. He believes design education is divided into two camps based on different philosophical premises; one which “treats design as the skill of making an object or artefact”, (1997, p. 58) and the other philosophy which sees design as a “knowledge-intensive process that involves selecting goals, then developing and executing strategies” (ibid). The first model is “craft education” (p. 58), and, according to Friedman’s 1997 article *Design Science and Design Education*

(also echoed in his 2005 paper *Building theory. What, how and why*, p. 8) this is the model that the majority of design educators still use. Design education can, says Friedman, “no longer be based on exercises [in the Bauhaus tradition] intended to teach students how to reproduce or improve selected objects” (Friedman, 1997, p. 58). Instead, (and this is often implied in Friedman’s writing), design students must be equipped with intellectual tools, analytical tools, logical tools, rhetorical tools, problem solving tools—encapsulated in what he calls “the tools of science” (ibid).

Friedman has written extensively on the changing role of design practice and design education (1997, 2000, 2002, 2005). His call is for a theory-based approach to all design teaching, something which is only in recent years beginning to emerge. He blames our old methods of ‘rules of thumb’ and our arts and crafts and product focussed approach to teaching as the reason for our developing field’s inability to articulate itself. On the failure of craft and a continual product focus in design education he says:

This is understandable. Schools and their culture are shaped by faculty, and design faculty generally come from an art or craft tradition. Reading and research have not been prized in the art and craft tradition (Friedman, 1997, p.56).

Friedman is sympathetic to those who cherish craft and product, “the practice of design —making things with a useful goal in mind — actually predates the human race. Making things is one of the attributes that made us human in the first place” (2000a, p. 5). By predating, I am assuming he is referring to our predecessor homo erectus.

Friedman traces and parallels the history of design education to that of technology, singling out our development of specialised tools such as spears as a pre-occupation of design—making things and trying to make them better than before. He makes the point that design problems in today’s world are “far too complex for the older forms of education” (2002, p. 43), those that we associate with craft skills and tacit knowledge. The modern university has, says Friedman, given design educators a new

opportunity to engage with research, the creation of knowledge and a means of enhancing curricula content (ibid). The past though, is not easy to shake off. Friedman says, “The past holds many of our colleagues prisoner” (1997, p. 56). He goes on to say that even design lecturers who teach in university “are prejudiced against the university tradition of education based on science and theory” (ibid, p. 56).

### *Design as a discipline*

While Friedman talks of a need for design education based on science and theory, Cross, (2001a) cautions us about thinking of design as a scientific activity. He describes design methodology as containing (1.) the study of how designers work and think, (2.) the principles, practices and procedures of design (3.) the establishing of appropriate structures for the design process, (4.) the development and application of new design methods and procedures, (5.) reflection on the nature and extent of design knowledge and its application to design problems. Studying design does not itself dictate the actual nature of design or suggest that it is a science. “So let me suggest here that the *science of design* refers to that body of work which attempts to improve our understanding of design through ‘scientific’ (i.e., systematic, reliable) methods of investigation” (ibid, p. 53).

Cross also goes on to make clear that a *science of design* is not the same as a *design science*. He argues that design as a discipline can mean design studied on “its own terms” but within its own rigorous culture based on the reflective practice of design—design that is a separate discipline, not a field of science (p. 54). He claims that the underlying axiom of design as a discipline is that there are forms of knowledge special to a designer, independent of any specific design practice specialism. He clarifies this by saying that designers have special knowledge of the “artificial world”—the world of the human made artefact. The knowledge lies in the techniques of the artificial, not the sciences of the artificial. These form the basis for what Cross describes as “designerly ways of knowing, thinking, and acting” (Cross, 2001a, p. 55).

Rust (2004) talks of the seeming incompatibility between the natural sciences and design. He argues that, in the natural sciences, enquiry concerns itself with discovering or uncovering that which exists, while “invention” is neither a feature of

scientific enquiry and is perhaps incompatible with the supposed dispassionate relationship with knowledge that scientists have traditionally claimed (p.76). Design is, in comparison, says Rust, based around a central principle that has invention at its core, “so it is difficult to see where the two traditions can overlap” (ibid).

Schön (1983) also cautions us about thinking of design in positivist terms, a throwback to nineteenth century technical rationality, “For according to the Positivist epistemology of practice, craft and artistry had no lasting place in rigorous practical knowledge”, (p. 34). However, Schön does say there exists, “a need of inquiry into the epistemology of practice”, (p.viii) which he characterised as “reflective practice”. Schön suggests that practitioners “usually know more than they can say” (ibid). His sentiment here is very similar to Polanyi’s (1967, p. 4) early statement in *The Tacit Dimension*, “I shall reconsider human knowledge by starting from the fact that we can know more than we can tell”.

### *Design thinking*

Schön says that through reflection-in action which responds to the belief “that our knowing is *in* our action, (p. 49) we can gain verifiable insight into our thought processes. “I shall argue that it is [reflection] susceptible to a kind of rigor that is both like and unlike the rigor of scholarly research and controlled experiment” (p. ix). He suggests that we can harness aspects of scientific methodology and include them in our search for an epistemology of practice, but that science alone is insufficient to understand and explain process. Schön also goes on to say that “professionals have been disturbed to find that they cannot account for processes that they have come to see as central to professional competence...We are bound to an epistemology of practice which leaves us at a loss to explain, or even describe, the competencies to which we now give overriding importance” (p. 19). Cross (2001a) also draws our attention to the difficulty faced by design researchers because essentially we are seeking to develop an epistemology of the logic of creativity, something which has proven to be very elusive to science (p. 51).

Polanyi (1958) addresses the issue of the relationship between enquiry and creativity. In his seminal work *Personal Knowledge*, he describes the gap between existing

knowledge on one hand and discovery and innovation on the other. While the book itself pays attention to scientific knowledge, it can be related to the epistemology of design knowledge. Logical reasoning or iterative processes, no matter how firmly they are based on strong factual knowledge, are insufficient, says Polanyi, to cross the gap between knowledge and discovery. He suggests there must be some kind of “illumination” which leads to discovery. He says, “Illumination...is the plunge by which we gain a foothold in another shore of reality. On such plunges the scientist has to stake, bit by bit, his entire professional life” (p. 123). While Polanyi is referring to science, we can see that what he refers to are situations which require imagination and the envisaging of new scenarios.

### *Tacit knowledge*

One of Polanyi's (1958, 1967) main concerns was with what he refers to as the *tacit dimension* and the idea that all knowledge is personal and indeed all knowledge has a tacit component. He talks of the process in which “the tacit cooperates with the explicit” (1958, p. 87) suggesting that with the appropriate use of language, some, but not all of this knowledge can be shared. He called for an appreciation of processes of thinking which may result from a rich understanding and knowledge, but which in themselves cannot be easily explained through explicit methods. At the time his perspective was contrary to the then dominant position held in science that scientific knowledge was value-free. He termed the stage of knowing which precedes logic as tacit knowledge and suggests that it can be brought to bear to make sense of phenomena and experiences (Smith, 2003, p.1). Tsoukas (2002, p.1) on the other hand claims that tacit knowledge is “ineffable”. He suggests Polanyi's ideas are unsustainable. On the idea of converting tacit knowledge to explicit knowledge he says, “we cannot operationalise tacit knowledge... Tacit knowledge cannot be ‘captured’, ‘translated’, or ‘converted’ but only displayed and manifested in what we do” (ibid).

Goel (2001) provides an explanation as to why tacit knowledge may be ineffable on the basis of neuropsychological evidence. He reports a study carried out with an architect who developed a lesion in his pre-frontal cortex. The architect was given a design problem to solve. A control subject was also used, an architect with



comparable expertise. One thing that was found was that the architect with the pre-frontal lesion developed preliminary design drawings which were totally unrelated to each other, unlike the control subject whose sketches were iterations. Goel says, “Designers do not generate several independent fragments and choose between them. They generate a single idea/fragment and develop it through transformations (lateral or vertical) to a point it is complete” (p. 231). Goel suggests that at the preliminary stage of design when alternative ideas are being generated and explored, information is of course, incomplete and is therefore treated and used in an abstract way. This leads to lateral transformations which are essentially signs of movement from one idea to a slightly different idea. A vertical transformation is essentially a development and refinement of a single idea to a more complete version of the concept (ibid).

Goel’s conclusion is that tacit knowledge, what he describes as type 2 knowledge, is not knowledge in the conventional sense, as with explicit (type 1) knowledge, but has essentially at its core “a neuroanatomical basis” (p. 239). The patient he observed with a pre-frontal lesion did not possess at the preliminary stage of designing, a mental state that is “imprecise, ambiguous, fluid, amorphous, indeterminate, vague, etc” (p. 235). This selective impairment of the neural system did not allow him to develop initial ideas into transformations. The ideas remained fixed. Because the patient was unable to make lateral transformations he was unable to progress to later stages of design which involve refinement. Goel therefore thinks of tacit (type 2) knowledge as a mental mechanism, “as a mechanism, it is not something to be learned and remembered, like a formula... On this account it is not surprising that type 2 knowledge should seem inarticulate and elusive” (p. 239). Goel’s key point is that tacit knowledge cannot be accessed because it is essentially a neural mechanism.

Greenwood and Levin in *Reform Through Action Research* (2005) say that much of our knowledge is tacit and as with Schön suggest it expresses itself in our actions. They suggest though that Ryle’s (1949) concept of “knowing how” relates more closely to the idea that tacit knowledge is closely aligned to actions (p. 50). Litman and Reber (2005) interchange tacit-explicit with the terms implicit-explicit. In my next chapter I discuss different definitions of knowledge in relation to my epistemological perspective (see Figure 3.1) but wish, for the moment, to refer to

Litman and Reber's characterisation of "states of consciousness" (p. 432), a useful way to look at the differences between tacit and explicit knowledge. Litman and Reber ask how can we know when a mental state is unconscious? To frame the question they introduce the information processing terms *encoding* and *retrieval*. The key link or conduit between tacit and explicit understanding is memory. They suggest that knowledge is encoded implicitly "but over time becomes explicit and can then be retrieved explicitly". They continue by saying accessibility to tacit knowledge is a continuum as opposed to an "either/ or situation" (p. 434) and that it should not be seen as ontologically separate and distinct from explicit knowledge (p. 440). They do, accept that there is, as Goel (2001) suggests, strong evidence that tacit and explicit knowledge have distinct neuroanatomical structures. However, "it will still be virtually impossible to find functionally pure instantiations of them" (p. 440).

Polanyi (1958) thinks of tacit knowledge as a form of "illumination" (p.123), without which ideas might never emerge or develop. Tsoukas (2002) reminds us it is "ineffable" (p. 1) and cannot be accessed. This point is further amplified by Goel (2001) who explains this as a consequence of its "neuroanatomical basis" (p. 239) pointing out that without it we cannot design. Litman and Reber (2005) accept the neuroanatomical basis but suggest that tacit and explicit knowledge are part of a continuum linked by the power of memory to affect behaviour and that tacit knowledge can be accessed "over time" (p. 434). Schön (1983), Greenwood and Levin (2005) say that it is present in our actions. Schön (1983) further suggests that through reflection we can gain understanding of how we have used it. And while Goel (2001) tells us it cannot be learned like a "formula", it is something which can be developed and honed through practice in a learning environment (p. 239). Friedman (2000a p. 13) asks us to bring it (tacit knowledge) into "articulate focus" so that we might better understand the emerging field of design. I think that what we must conclude here is that tacit knowledge, however we define it, is crucial to the design process, and that helping students develop awareness of how it impacts on their creative process may be beneficial to learning. If much of our knowledge is tacit, as Greenwood and Levin suggest (2005) and without it we cannot design (Goel, 2001) then any attempts to bring it into focus within an educational setting is likely to be worthwhile.

A recurring theme which I have highlighted in this review is that design education, as a consequence of its long history and recent entry into the university as a subject of study, is preoccupied with the artefact and not so concerned with articulating and explicating the thinking processes behind designing. I identify this as one of the critical issues which called me to action. While history may be one of the factors that has led to this, so too has the fact that tacit knowledge is difficult to articulate.

It would seem that history and the elusive nature of creativity itself has created a legacy resulting in a number of conflicts in design, a neoteric field striving to define itself. In this next section I look at definitions of design and design process.

### *Defining design*

The first four entries in Merriam-Webster's *Third new international dictionary unabridged* (1986, p. 611) define design as a verb "1. a: to conceive and plan out in the mind, b: devote, consign, destine... c: to make up one's mind to set apart, d: to plan or have in mind as a purpose: intend, purpose, contemplate". Edelson (2002, p.108) describes design as "a sequence of decisions made to balance goals and constraints". He continues on the same page, "The process of design is complex. Its open-endedness and reliance on creativity have made it a challenge for researchers to characterise and explain".

Buchanan (2001a) says that because "design has become the new learning of our time" (p.6), it has left us in a deeply troubling situation because it is fragmented into such an array of specialisms that we struggle to find common references and connections. While this is a sign of a neoteric and emerging field, it is, for strategic and tactical purposes, necessary to seek common understanding of design. To that end he provides a formal definition: "Design is the human power of conceiving, planning, and making products that serve human beings in the accomplishment of their individual and collective purposes" (p.9).

Simon (1982, 1996), known for his reference to design as a science provides one of, if not *the* most quoted definitions of design. In *The Sciences of the Artificial* he defines

design as “courses of action aimed at changing existing situations into preferred ones” (1996, p. 111). However, despite the embracing of this oft quoted, de facto phrase used to encapsulate design, Schön, (1983, p. 77) cautions us, “It is questionable how far in this direction we ought to go”. He is referring to the idea that if taken to a logical conclusion, all activities, certainly all professions, are engaged with converting actual to preferred situations, “We risk ignoring or underestimating significant differences in media, contexts, goals and bodies of knowledge.” (p.77). Schön does however provide us with a definition of design. In his 1983 book *The Reflective Practitioner*, chapter three is titled *Design as a reflective conversation with the situation*. In this chapter, aimed at seeking the essence of the design process, he focuses on architecture as a prototype for all design, justifying it on the basis that it is the oldest of all design professions. As to there being an underlying, generic process of design that can be described, he identifies it as “a conversation with the materials of the situation”, (p. 78). He continues, “In a good process of design, this conversation with the situation is reflective” (p.79).

By comparing Schön to Simon, two often quoted writers, we can see differences of outlook on design and how this emerging field is coming to terms with how it articulates itself; Schön’s outlook is a constructivist one while Simon’s is positivist. Their viewpoints span the continuum of activity in design research. But as Cross says:

Following Schön and others, many researchers in the design world have realised that design practice does indeed have its own strong and appropriate intellectual culture, and that we must avoid swamping our design research with different cultures... We need to draw upon these histories and traditions where appropriate, while building our own intellectual culture, acceptable and defensible in the world on its own terms (2001a, p. 55).

Design as a new and emerging field is, therefore, developing its own unique epistemology which, in terms of the continuum, as identified through Schön and Simon, will most likely develop successfully within a constructivist framework which attains rigour through, where appropriate, the utilisation of what Friedman and Simon call the ‘tools of science’ and what Cross and Schön call ‘reflective practice.’

Remaining consistent with the aforementioned descriptions of design, I am able to claim that design is a reflective process concerned with making decisions that are intended to lead to a desired outcome. This is of course a very generic, all encompassing definition. As my study relates specifically to the discipline of visual communication design, I will add, in my own words, that visual communication design is a reflective, decision-making process that is concerned with the transfer of information from various sources into a visually dominant communicable form.

### *Design process*

Edelson (2002) groups the necessary decisions involved in designing into three categories: *design procedure*, *problem analysis* and *design solution*. Design procedure specifies the processes involved in the development of a design. These will be particular to the design problem or context. Problem analysis characterises the goals, need or opportunity for the design to address a situation. Design solution or “solution construction” is different, although complementary to problem analysis. It has at its disposal initial creative responses to the problem, potential identified solutions (p. 109). Edelson is quick to point out that this does not suggest design is a neat, rational process, but that, were a mental snapshot to be taken at any given time, one of the three, decision making categories would be most active. To the extent that these three design processes can be made explicit he points out that, “they are likely to be in constant flux” (p. 109). Additionally though, Edelson says that “These decisions represent opportunities for learning, because the more informed the designers are in making these decisions, the better the decisions will be” (ibid, p. 112).

For each of the categories of design identified by Edelson, there is, he claims, a corresponding theory that design research can develop. He calls these theories: *domain theories*, *design frameworks* and *design methodologies*. I will briefly describe all three as they have had some impact on how I have constructed my own study. A domain theory, says Edelson is a generalisation of some portion of a problem analysis, such as how learners learn or how teachers teach. *Deep* and *surface* approaches to learning, first coined by Marton and Saljo (1976) is an example of what Edelson (2002) describes as a domain theory. A domain theory therefore is not about

design *per se*. In my own study I have been conscious of how my understanding of design is itself insufficient to bring about positive change in the classroom. As Laurillard reminds us, “Teachers need to know more than their subject. They need to know the ways it can come to be understood, the ways it can be misunderstood, what counts as understanding” (1998, p 3).

Design frameworks gather around the theoretical principles which underlie what a design work requires to be successful (Edelson, 2002). Van den Akker (1999) refers to design frameworks as *substantive design principles*. A design framework is, says Edelson, “a collection of coherent design guidelines for a particular class of design challenge” (p.114). In relation to my study, when I analysed my students’ images to determine their communicative relevance, I was working within the theoretical area of design frameworks, looking to see if my students’ works embodied the design principles involved in illustrating text into an illustration.

A design methodology, says Edelson, “typically lays out a sequence of tasks, describing the objectives, processes and participants for each step” (p. 115). It is a general design procedure. Unlike theories around design frameworks which are product focussed, a design methodology is concerned with process. A design methodology therefore, describes processes required for achieving a successful design (Edelson, 2002). Van den Akker (1999) defines design methodology as *procedural design principles*. We can see the connection and relationship between Van Akker’s terms *substantive design principles* (design frameworks) and *procedural design principles* (design methodology) in the sense that the application or procedure of applying design principles requires a substantive understanding of what those principles consist of. Indeed we can also connect these two research areas to the first one, domain theories, which reminds us that the success of a design comes down to the capacities of the individual involved. I might add here that in relation to what Buchanan, Oxman, Friedman and Norman postulated earlier in this review, design education is currently most pre-occupied with design frameworks, less so with design methodology and even less with domain theories.

Swann (2002, p. 50) talks of “the willing contribution that design education has made to that culture of mystique”, but says it is now time to fully embrace Schön’s epistemology of practice based on reflection. He says “Reflection in action and reflection on action lead to action research” (ibid). As a methodology action research provides significant elements that can be assimilated into design practice (p. 50). Swann suggests that design is linked to a domain that feeds off ambiguity and intuitive understanding of phenomena. He puts forward the view that the design process is similar to the iterative process of action research. He describes the various stages of the design process, building on the earlier work of Jones (1992), emphasising that they are not linear:

Problem – Analysis – Synthesis – Execution – Production – Evaluation

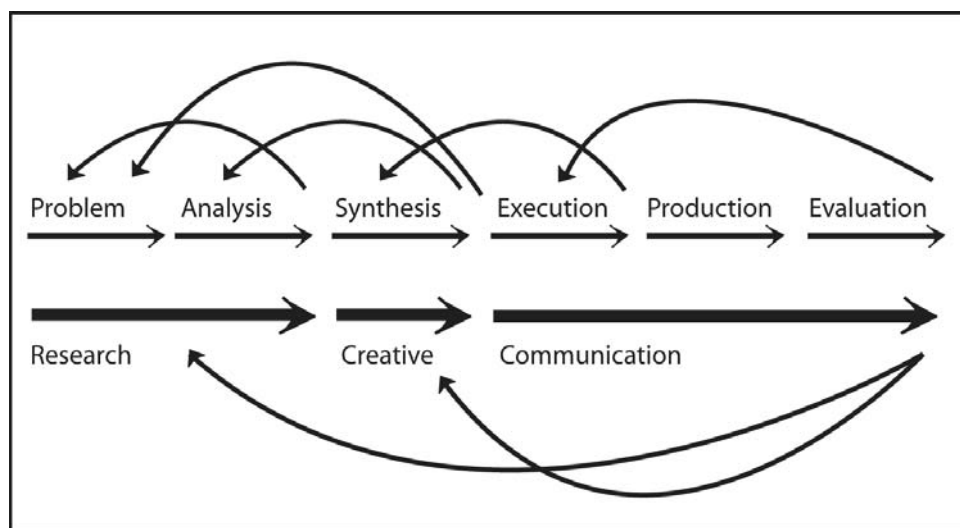


Figure 2.1. Design process model. From Swann (2002, p.53).

Swann (p. 53), referring to Cross, (1984) suggests that the key moment in the design process is “synthesis”. Unlike scientists who use *problem-focussed* strategies, designers use *solution-focussed* strategies. The process is characterised as bringing together a mass of fragmented pieces of information and then going through a period of incubation. Eventually a chosen proposition (the final idea) is devised. Swann suggests that what appears to be a “chaotic cascade of thoughts” (2002, p. 53) is what generally is considered to be a right-brain way of handling information. He says that it is generally acknowledged that the right and left hemispheres hold different cognitive

processing mechanisms with the left hemisphere accommodating deductive and sequential reasoning and the right hemisphere dealing with nonverbal/special holistic thinking. Swann calls for systematic case studies of situated design activity in order that the mystique of design process can be understood. To make the design and reflection process visible he suggests that action research may provide a means for achieving this. Design educators are well placed to do this because the cyclical, iterative similarities between design process and action research are, says Swann “very striking” (p. 56).

While Edelson (2002) talks of three design processes; *design procedure*, *problem analysis* and *design solution* and Swann (2002) lists six: *problem – analysis – synthesis – execution – production – evaluation*. Cross (2001b) identifies four stages of designing: *problem structuring*, *preliminary design*, *refinement and detailing*. Wilson, (2002) identifies nine phases of design: *problem identification and definition*, *task planning and management*, *research and evaluation*, *ideation*, *idea selection and decision making*, *action and implementation*, *reflection in action*, *evaluation of process and progress*, *refinement and completion*. To some extent this adds further to the notion that design is a neoteric field, borrowing as it does its terminology from other fields. These different terms do not necessarily suggest difference of opinion as to what designing involves. They are, in my opinion, simply different categorisations of the same thing. However, Swann’s list most successfully shows that the creative process is cyclical, not linear, “The design process is iterative. It can only be effective if it is a constant process of revisiting the problem” (2002, p. 53).

The dilemma I have been setting out to establish so far is that design education has historically been based on the arts and crafts tradition of making products while definitions of design seem, in contrast, to focus on design as a thinking process. Buchanan, Oxman, Friedman, Norman, Cross, Edelson and Swann have been chosen to represent a growing body of design theorists and researchers who are calling on design educators to adapt their teaching to suit a more complex world which seeks to make the thinking behind designing more explicit. I will conclude this section with Edelson’s challenge to design educators and researchers—his call to action:



Design research directly involves researchers in the improvement of education. Educational researchers, by virtue of their training and experience, are in a unique position to construct solutions to meet needs of the educational system... The large problems faced by our educational system call for true innovation (2002, p. 119).

### **What design educators are doing**

In response to Edelson and others, and their various but interconnected calls to action, I will now discuss the work of some design education researchers whose work demonstrates that thinking processes behind designing can be made explicit. Before I discuss studies which specifically looked at analogical reasoning, I will describe other studies which also set out to understand and improve design learning. Where relevant, I will refer to learning theories, what Edelson (2002) calls domain theories.

Drew, Bailey and Shreeve (2002) conducted a study on fashion students' approaches to a design project. The theoretical underpinnings relating to learning were the *deep* and *surface* model (Marton and Saljo, 1976) and *deep*, *surface*, *strategic* (Entwistle, 1987). Despite there being a large body of research carried out on student approaches to learning, they found that only one prior study relating to deep and surface learning had been carried out in design. Drew et al. comment on the fact that only recently in design education has there been awareness of the role that educational research can play in the development of design pedagogy, and they raised the point that [in design] "it is very likely that students are adopting deep and surface approaches. But if they are, how do we know, and what more can we say about these approaches in the context of art and design?" (2002, p. 181). As they were seeking understanding of variation in how students experienced a design task, and not setting out to change students' approaches to a design task, they found phenomenographic research the most appropriate methodology. Drew et al.'s study surveyed 21 students about a project that had recently been completed and assessed. The researchers identified four approaches to learning (Figure 2.2).

|  |  |
|--|--|
| <b>Approach A</b><br>Students adopt a product-focused strategy with the intention to demonstrate technical competence. | <b>Approach B</b><br>Students adopt a product-focused strategy with the intention to develop the design process. |
| <b>Approach C</b><br>Students adopt a process-focused strategy with the intention to develop the design process.       | <b>Approach D</b><br>Students adopt a concept-focused strategy with the intention to develop own conceptions.    |

Figure 2.2. Drew et al. Four approaches to learning (2002, pp.187-18).

Each student was interviewed and asked to recount their experience of the project. By looking for variation and determining patterns of responses, the researchers were able to create the four categories. The following is a summary of their findings. Drew et al. found that with approach A students, common traits were a desire to ‘get it right’, to produce a product or technique and to do it as they are instructed. These students also relied a lot on the tutor to show them and tell them how to do things. Approach A students tended to think of the design process as being one of applying techniques and procedures. Information is derived to identify what can be copied and reproduced. With approach B students, the focus was also on the production of the artefact and the acquiring of techniques, but these students also adopted strategies for experimentation with the design process. Approach C students were more interested in processes, trial and error experimentation. They used their design strategies to develop ideas and were less product focused. They also preferred to interact with other students as a way of further extending creative possibilities. They wanted to develop new ways of manipulating materials and techniques. Students who adopted approach D also used experimental approaches. Ideas and visual concepts were developed by using research to its full advantage. Research helped them make connections and develop a wider view of things. Students were engrossed in the development of concept, not the application of technique. Interaction with tutors was done mainly to develop critical and conceptual thinking (Drew et al., 2002, p. 186-194).

One thing which can be drawn out of Drew et al.’s study is how it in some way suggests that students whose approach was oriented towards surface learning (approach A and B) were pre-occupied with making product, while those oriented

towards deep learning (approach C and D) were more focused on process and concept. As I have noted a product oriented approach in many of my own students, this study suggests that design teaching has, perhaps as a consequence of tradition, been encouraging a surface approach to learning with many teacher and student conceptions of design revolving around making artefacts, rather than the process of design, i.e., the thinking process. Drew et al.'s study also demonstrated for me that seminal studies such as that carried out by Martin and Saljo (1976), while being based on students' approach to a text-based study, can be adapted to suit an image-based study. On that matter Drew et al. say:

At the extremes of deep and surface approaches to learning, this study illustrates a resonance between the intention to reproduce, memorise facts and procedures, and at the opposite extreme, the intention to relate ideas to previous knowledge and experience (2002, p. 194).

Another design education study based on theories of learning was Wilson's (2002) investigation into students' approach to designing. Wilson instigated an action research study as a consequence of a number of lecturing staff complaining that too many students didn't know how to think like designers. Preliminary work concentrated on looking at student records, surveys and student subject evaluations. Research into students' prior learning through looking at academic transcripts clearly showed that many students had gained entry having attained high marks in mathematics and science but performed less well in areas such as art, humanities and social sciences. The key finding at the early stage of the research was that students' conceptions of designing was inconsistent with what was being offered in the design studio, and at variance with their prior learning in mathematics and science "that was diametrically opposite to the student-centred, experiential learning strategy that we were attempting to implement" (Wilson, 2002, p. 398). These findings challenged Wilson to "find a way of beginning the change process by convincing students that learning by designing was different" (p. 399). The study continued with a questionnaire to determine students' preferred learning styles. This was based on Kolb's (1976) *Learning Style Inventory*. Kolb's model is derived from Dewey's emphasis on the requirement for learning to be grounded in experience. It consists of

four stages of learning: *concrete experience*, *active experimentation*, *abstract conceptualisation* and *reflective observation*. Allied to the four stages or steps of learning are four learning style preferences: *converger*, *diverger*, *assimilator*, and *accommodator*. What was found in Wilson's study was that most design students new to design education were identified as having a *converger* preference which, says Wilson, "can be interpreted to mean that they prefer the practical application of ideas as solutions to well-structured problems which have perfect-fit solutions" (Wilson, 2002, p. 408).

On the basis that learning styles can change and that the design process requires different learning strategies at different stages, Wilson developed a composite model derived from Kolb's learning activities and learning styles inventory. She claims that as designing and learning are heuristic, it is possible to create a composite model to demonstrate the parallel processes of designing and learning. As mentioned previously in this chapter Wilson identifies nine phases of design: *problem identification and definition*, *task planning and management*, *research and evaluation*, *ideation*, *idea selection and decision making*, *action and implementation*, *reflection in action*, *evaluation of process and progress*, *refinement and completion*. These nine phases were then aligned with Kolb's four learning styles: *converger*, *diverger*, *assimilator*, *accommodator*. Below is Wilson's model:

| Phase                                 | Learning mode              | Description  |
|---------------------------------------|----------------------------|--|
| Problem identification and definition | Accommodator/<br>converger | Requiring the motivation to start and be open without bias to new situations |
| Task planning and management          | Converger/<br>accommodator | Requiring active investigation and practical investigations                  |
| Research and evaluation               | Assimilator/<br>converger  | Requiring critical thinking and logical systematic analysis                  |
| Ideation                              | Diverger/<br>accommodator  | Requiring creative thinking and the ability to handle unresolved tensions    |
| Idea selection and decision making    | Accommodator/<br>converger | Requiring a view from various perspectives                                   |
| Action and implementation             | Diverger/<br>accommodator  | Requiring a commitment to take determined action with total commitment       |
| Reflection in action                  | All combined               | Requiring conscious awareness and self monitoring while acting               |
| Evaluation of process and progress    | Converger/<br>assimilator  | Requiring impartial reflection to examine aims and identify improvements     |
| Refinement and competition            | Accommodator/<br>diverger  | Requiring a willingness to change to achieve aims.                           |

Figure 2.3. Wilson's composite learning model (2002, p. 403)

The aim of the model is to help students see the implications of their preferred learning style and encourage them to extend themselves and take risks. It allows them to chart the stages they go through when designing, allowing them to consider if their thought processes in relation to designing are most suited to the stage they are at. It has also, says Wilson, "been extremely valuable to have students considering the correlation between thinking, learning and designing" (2002, p. 404).

The final stage of Wilson's project was to develop a new teaching and learning strategy and adapt it into the teaching studio. Wilson acknowledged that the old model of teaching which was highly product based may have encouraged surface learning and that assessment was based on the design product rather than learning. I can relate this to Norman (2000, p. 95) who earlier talked of the need in design education for

”making process rather than product”. Wilson and her colleagues now see the studio as a site for thinking about learning and how it can enhance design thinking. Less time is spent in the studio making designs. Analytical reflection is encouraged through workbooks (portfolios), which Wilson described as “reflective portfolios” (Wilson, 2002, p. 406). The goal of the change of emphasis in the curriculum is for students to become more aware of their thinking as they develop expertise as designers.

While I find Wilson’s study very interesting I consider her nine phases of design somewhat complex. Nevertheless the study demonstrated for me a number of things. Unlike Drew et al.’s (2002) phenomenographic study which sought understanding of students’ approach to designing, Wilson’s study, because of its action research methodology, sought to bring about actual change in the design studio. Students are challenged to change their learning styles which are more suited towards well-structured scenarios and adapt them to suit ill-structured design situations. The study also demonstrated that learning theories, in this instance Kolb’s (1976) theory of learning, can be harnessed and used in a design research context.

Newstetter and McCracken (2001) carried out a study which looked at misconceptions among first year design students as to what constitutes design activity. As learning is, according to these researchers, processed and construed through each individual’s life experience, they believe that students new to design bring well developed prior conceptions and theories about design which conflict with expert designers’ conceptions. Prior learning is a variable in all contexts, but, as this study suggests, these variables may have to be neutralised if they are affecting effective learning. Prior knowledge is important but if it is ‘incorrect’ it can lead to lower achievement and impaired learning. Such prior learning is formed into knowledge structures which act like theories, making it difficult for students to break away from their incorrect prior learning models as they perform “as a representational system”, meaning that their design process approach can be misconceived (p. 64). Newstetter and McCracken discuss three types of misconception: *incorrect*, *inconsistent* or *incompatible*. Incorrect misconceptions are easily changed because they tend to be incomplete and fragmentary. Inconsistent misconceptions are more resistant to change as they have structure. False beliefs have to be changed with correct ones. An inconsistent misconception would be seen in a

student who thought of design as the pursuit of well-structured problems. Incompatible misconceptions are the most resistant to change as they are fully developed.

Newstetter and McCracken (2001) suggest that incompatible misconceptions can never fully be eradicated and that at best they remain alongside changed conceptions. The more dissimilar student misconceptions are to expert conceptions, the more intervention will be required from design educators to lessen the effect. Newstetter and McCracken believe all beginning students have a naïve theory of design with most falling into the inconsistent category. Such students have developed the wrong model for design learning and while it can be changed through confrontation, it is robust and structured. Determining what level of misconception a student is at will lead to better strategies for working with individuals. “We need to develop means to probe learner misconceptions to better understand what we are up against” (2001, p. 66). To better understand student misconceptions, Newstetter and McCracken have carried out a number of tests using qualitative, observational and quantitative methods and have also applied intervention methods in class to determine how learning is affected by such means. Over a three-year period they have identified five features of novice design activity which differ from expert (design professional) approaches.

1. *Ideation without substance* - Students believe design is coming up with good ideas. Design does of course include ideation but designers also concern themselves with the practical realisation of ideas and evaluate them based on informed decision making and analysis
2. *Design arrogance* - Students do not place their designs in the context of the environment in which the design will reside. They arrogantly ignore the constraints of the user. They tend to design for themselves
3. *Design shutdown* - Students focus on single solutions to problems once beyond the ideation stage. Once they have an idea they stop considering alternatives and focus their energy on the one solution regardless of its feasibility

4. *Design jumps* - Students will often operate at only two levels of abstraction. The highest level of general idea (function) and the lowest level of the components of the product (structural). They do not move between these spaces in a formal manner, nor do they consider the implications of the giant leaps they are taking between the two levels
5. *Design routinisation* - Students act as though designing in a serial/linear process. They deal with design problems without revisiting previous decisions and evaluating alternatives. It is non iterative.

Figure 2.4. Five features of novice designer activity. Newstetter & McCracken (2001, p. 67-68).

Newstetter and McCracken (2001) conclude their study “With this work we have just begun to understand the misconceptions students may harbor... Our experience with novice designers leads us to believe that understanding naïve conceptions of design is critical in transitioning students to expert activity” (p. 74). While they accept that overcoming misconceptions is only one aspect of developing stronger design pedagogy, their study demonstrates that students are learning how to think like designers and that developing awareness of thought processes can assist students to develop design expertise.

Aside from prior learning and its attending variation among individuals, we should consider the theory that there are two systems of reasoning that are important to the processes of designing and learning. Goldschmidt (2001) carried out a study with design students on the topic of visual analogy and how it relates to parallel systems of reasoning. She applied Gentner and Medina’s (1998) theory that we are endowed with two cognitive systems, both independent but interacting. One system is associative and similarity based, the other is symbolic and rule based. While there are significant differences among individuals and their approaches to problem solving the theory is based on the premise that most ill-structured design problems are best addressed through the associative and similarity based cognitive system. Well-structured problems provide a better context for the symbolic rule based system. As mentioned earlier in Newstetter and McCracken’s research (2001) and



Wilson's (2002), students who do not think like designers will approach design problems from a well-structured perspective. Goldschmidt's focus is therefore on how the associative, similarity system can best be harnessed by designers when there may well be multiple solutions. I find this area worthy of pursuit as it suggests there are actual methods that educators can use to further extend student creativity and problem solving. Analogical reasoning is characterised as the creation and harnessing of analogies and applying them to unfamiliar situations.

Many known instances of beneficial use of analogy involve visual images, and we may therefore assume that the habit of "thinking in pictures" (in adulthood) may actually lead to a better chance of employing analogical reasoning in problem solving. It is therefore reasonable to hypothesize that problem-solvers will perform better if made to use visual images, and in particular, if made to use analogy when it is doubtful that they would do so spontaneously (Goldschmidt, 2001, p. 211).

As Goldschmidt points out, we may wish to pursue the application of analogy to specific design problems to determine what effect it can have on a learning situation. Visual analogy as a creative process is, says Goldschmidt, similar to sketching. Complex ill-structured problems require a variety of visual search strategies. "Since no rules are at hand to reason with, the immediate goal is to generate visual representations that are rich with clues that may potentially lead to a solution by way of similarity" (Goldschmidt, 2001, p. 210). This relates to the idea that 'priming', as demonstrated by Schunn and Dunbar (1996) can enable individuals to access knowledge previously acquired. To test the hypothesis empirically Goldschmidt carried out an experiment with three groups of subjects with varying levels of design expertise: beginning students, advanced students and expert professional designers (architects). Well-defined and ill-defined problems were presented. For the purpose of this study I will discuss the ill-defined experiment (Figure 2.5). The three groups themselves were split into three. The first group was presented with the problem without commentary or additional material. The second group was provided with a panel of approximately two dozen images but were not provided with any commentary. The third group was presented with the same images but was also specifically asked to use the images if possible to create analogies between the

images and the problem to be solved. All subjects were asked to sketch their solutions on paper. Judges were used to determine success levels. Agreement was high and Goldschmidt concluded that this supported the findings that visual displays had a discernible effect on the quality of design solutions. It was found that the group presented with the images but no encouragement to use the images to create analogies, did better than the first group. The third group given the images along with instructions to use them to create analogies did better still.

|  | Ill-defined problem            |                 |                                     |
|--|--------------------------------|-----------------|-------------------------------------|
|  | Novice designers<br>(Students) |                 | Expert designers<br>(Professionals) |
|  | <i>begin</i>                   | <i>advanced</i> | <i>expert</i>                       |
| No display provided                                    | 2.227                          | 2.58            | 2.809                               |
| Display provided.<br>No instructions to use analogy    | 2.621                          | 2.939           | 3.236                               |
| Display provided.<br>Instructions to use analogy given | 3.463                          | 3.731           | 3.984                               |

Table 2.1. Design quality scores, 5 as maximum.  
Modified from Goldschmidt (2001, p.213).

The implications of Goldschmidt's work is that students can possibly be shown how to maximise their problem solving capabilities by using pictures as triggers. As to how it may work, Goldschmidt discusses the idea that images undergo transformations through the process of transfer between what she calls *candidate-source* and *candidate target*. Pictures are inspected with the intention of recognising within them clues that might facilitate a connection with the problem to be solved. Visual analogy as a creative process is, says Goldschmidt, similar to sketching. Complex ill-structured problems require a variety of visual search strategies. "Since

no rules are at hand to reason with, the immediate goal is to generate visual representations that are rich with clues that may potentially lead to a solution by way of similarity” (p. 210). Analogies, like ideas, are not simply identified; they are created as a consequence of manipulation and transformation. Through looking at an image (display) one creates another image (display) that is analogous to the previous one. The original image could be a photograph and the transformation can be seen in a sketch. The similarity allows for “mapping and transfer” (ibid, p. 210).

Koestler (1975, p. 201) also points out that analogies used in creative acts are not “hidden” but “created” by the imagination by a process of “selective emphasis”. Bonnardel (2000) claims that selective emphasis results from being in a “constrained cognitive environment” (p. 505). The implication here is that creativity and ideas don’t come from nowhere but are selected as a consequence of the constraints of the situation. Bonnardel suggests that some constraints remain “unconscious processes,” which reveal themselves through intuitive acts. However, other constraints, says Bonnardel are the result of more “conscious treatment” (ibid).

In a study to identify the evocation process Bonnardel (2000) worked with a group of ten product design students. The students were given the same design problem, the design of a stool for a cyber café. They were split into two groups, a ‘free group’ and a ‘guided group’. The free group were given no assistance. The guided group were provided with names of objects from *interdomain* and *intradomain* sources. Intradomain sources were names of objects that belonged to the category of *seats*, such as couches and chairs. Interdomain sources were objects such as kayaks, objects which did not directly relate to seats but which involved sitting. The guided group produced design responses which evoked in high numbers both the interdomain and intradomain sources, while the free groups’ responses were largely intradomain, more closely associated with the original seat category. “Therefore, it seems that the presentation of names of objects, which refer to categories of these objects has a facilitating effect on the designers’ evocation process” (p. 508). Bonnardel suggests that, as design problems are open-ended, designers will refer to various sources for inspiration. Bonnardel also suggests that providing names of objects encourages selective emphasis and, “Such names reflect categories of objects and may lead the designer to think of *general principles or features* that could be transferred to the

object to design” (p. 508). The guided group were, says Bonnardel, as a consequence of the provided sources:

Less focussed on surface characteristics of the object they have to design and more focussed on deep principles (e.g. linked to the functioning of objects). Therefore, they have been able to take into consideration various domains and to look for functioning principles common they could transfer to the new object (Bonnardel, 2000, p. 508).

Bonnardel’s (2000) and Goldschmidt’s (2001) studies suggested to me that analogy as a creative method can have significant benefits for novice students learning how to become designers. These studies led me to ask whether analogy could be formally applied to my own teaching situation, that of illustration, mindful of Goldschmidt’s comments that students may not use analogy in a spontaneous way. This suggests that analogy, as a thinking method, while being a cognitive mechanism present in all humans, may have to be presented to students as a potential learning and creative strategy. As these studies relate directly to analogy, I will now focus more closely on the mechanisms of analogy itself.

## Section 2.

### Analogical reasoning

#### *Analogy*

Goswani (1991) says analogy is “a notoriously difficult term to define” (p.1). DeJong (1989) says it is a “fuzzy concept that means different things to different people”, but it would seem to be, “a fundamental component of intelligence” (p. 346). Duncker (1945) describes analogy as one of a number of problem solving methods. He defines a problem as something which cannot be addressed by known means, “As such there has to be a recourse to thinking” (p.1). What is largely agreed upon is that at the core of analogy lies “relational reasoning” (Goswani, 1991, p. 1).

Chapter 6, *Analogy*, in the *Cambridge Handbook of Thinking and Reasoning* (Holyoak & Morrison, 2005) is by cognitive psychologist Keith Holyoak. His descriptions of analogy, analogical reasoning and metaphor are worth describing in depth. Analogy is, says Holyoak, a “special kind of similarity”, (p.117). Two situations are analogous if there is a recognisable pattern of relationships among constituent elements despite the actual differences between both sets of elements. The two elements are referred to as *analogues*. One analogue is easier to understand or is more familiar than the other analogue. This first analogue is called the *source* and the other, less familiar analogue is the *target*. Asymmetry is the basis of analogical transfer, where the source, because of its ease of semantic access, is used to generate inferences to the target—that which requires further explanation or understanding. This is the basis of analogical reasoning. Analogical reasoning goes beyond the new information, using systematic connections between the source and target, with the outcome being the generation of plausible, but fallible, inferences about the target.

Analogy in relation to the creation of plausible predicates is therefore, a form of inductive reasoning (Holyoak, 2005, p. 117; Holyoak & Koh, 1987, p. 332; Sloman & Lagnado, 2005). The human mind is, says Sloman and Lagnado, (2005, p. 99) pre-wired to extract relations of similarity and causality and apply them to new situations. They talk of two inductive reasoning groups: *similarity-based induction* and *induction as scientific methodology*. While the second group relates to how scientists

spend time inducing general laws about categories from particular examples, similarity based induction is to do with individuals' ability to project properties from one situation to another. Crocodiles have large teeth and are dangerous. Alligators are similar to crocodiles; therefore they must be dangerous also (ibid, p. 102). Similarity-based inductive reasoning uses the mechanism of mapping to achieve its purpose, through the relationship between target and source.

### *Mapping*

The target situation, that which requires elaboration, provides a retrieval cue for the creation of a source analogue. When this happens, says Holyoak (2005), a *mapping* (the purpose of analogy) is established. This aligns the elements of the source and target. As a consequence of the mapping, one can make new inferences about the target “thereby elaborating its representation” (p. 118).

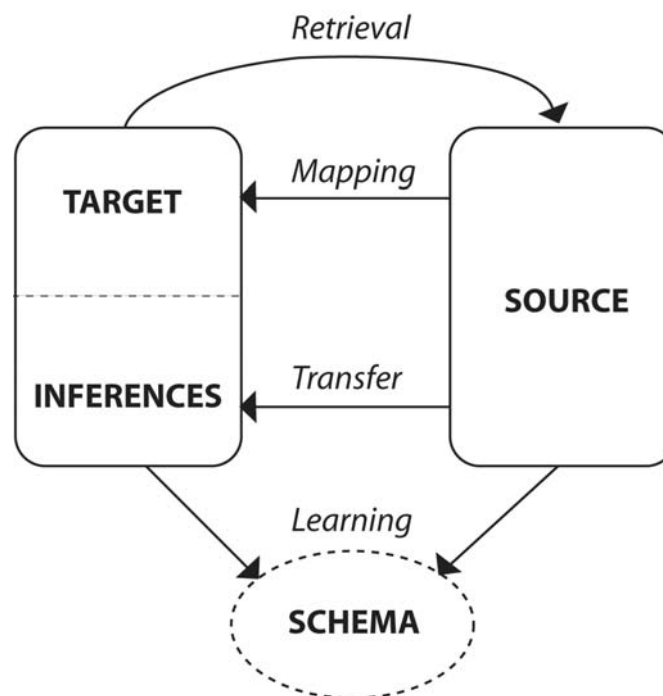


Figure 2.5 . Major components of analogical reasoning. From Holyoak (2005, p.118).

Figure 2.5 from Holyoak (2005) traces the major component processes in analogical transfer. The target acts as a retrieval cue for the creation of a potentially useful source analog. If successful, a mapping, or a set of systematic correspondences that align the components of the source and target, occurs. While the immediate purpose is to make a connection between the source and target and transfer understanding from one situation to the other, Holyoak suggests that, in the aftermath of analogical reasoning, “some form of relational generalisation may take place, yielding a more abstract schema for a class of situations, of which the source and target are both instances” (p. 118). In other words, new knowledge and connections, beyond that contained in the mapping from source to target can be attained.

Mapping, say Holyoak (2005), Holyoak and Thagard (1997), and Goel (1997) is guided by the goals of the individual looking for similarity, “People draw analogies not to find a pristine isomorphism for its own sake but to make plausible inferences that will achieve their goals” (Holyoak, 2005, p. 124). In some respects this relates to Koestler (1975) who talks of *selective emphasis* and Bonnardel (2000) who discusses *constrained cognitive environments*.

### *Metaphor*

Holyoak (2005) provides a clear description of the difference between analogy and metaphor. He claims the two are closely related. While similar in general, metaphors are characterised by blending and semantic asymmetry between target (conventionally termed *tenor*) and source (*vehicle*) domains. Holyoak provides an example. The target/tenor in the expression “the evening of life” is *life*. The target is contextualised and understood in terms of the source/vehicle which relates to time, *evening* being a time of day. The key domains, evening and life are connected, thus mapping occurs.

Metaphors are a special kind of analogy in that the source and target are always semantically distant... and the two domains are often blended rather than simply mapped (e.g., in “the idea blossomed,” the target [idea] is directly described in terms of an action directly derived from the source). In addition, metaphors are often combined with other symbolic “figures” – especially metonymy (substitution of an associated concept), (ibid p. 120).

Holyoak notes that there is contention as to whether metaphor should be seen as a type of analogy and offers a resolution that novel metaphors are interpreted by very similar mental processes as is the case with analogies, but also suggests that everyday, conventional metaphors are interpreted as general schemas. I will return to Holyoak's book shortly but wish to provide further discussion on this issue by discussing Lakoff and Johnson's *Metaphors We Live By* (1980, 2003, 3rd ed).

According to Lakoff and Johnson, most of us associate metaphor as a device of poets, a form of "rhetorical flourish." (2003, p. 1) They also point out that metaphor is largely associated with language rather than thought or action. They suggest metaphor is far more pervasive in everyday life, "Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature" (p.1). They provide examples to show that we use a variety of metaphorical schemata as frames of reference for understanding. They list a number of metaphorical schemas such as: *orientation*, *ontological* and *personification*, providing numerous examples:

(orientation) happy is up; sad is down (examples 'my spirits *rose*, 'I *fell* into a depression') (p. 15)

(ontological) the mind is a brittle object (example 'I'm going to *pieces*', 'his mind *snapped*') (p. 28)

(personification), inflation is a person (examples, 'inflation *has robbed* me of my savings', 'inflation has *outwitted* the best economic minds in the country') (p. 33-34).

Much of the book is taken up with examples of various metaphorical schemas.

Lakoff and Johnson's argument that metaphor is not simply a rhetorical device or a linguistic tool, but instead grounds our thinking processes is put forward very persuasively. The main argument is that metaphor schemas provide a source of cohesion for the various collations. They argue that all metaphors reside within an identifiable schema as opposed to being unique entities. The schemas provide unifying principles and serve well as categories of different types of metaphors.



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 they 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). What they mean by this is that they are not just creations; they are based on how we experience the world and are therefore linked to cognition. They also suggest that our conceptual structure is not simply a matter of intellect but is directly linked to all dimensions of our experience such as colour, shape texture and sound. Also, even though they are so integral to experience, they do not only relate to the mundane, every day experience, but our aesthetic experiences as well. Engaging with artworks leads us to “new experiential gestalts”, that is new ways of understanding reality, and indeed the artwork itself is “a means of creating new realities” (p. 236).

#### *Similarities between analogy and metaphor*

Holyoak (2005) talks of analogies as a special kind of similarity and Lakoff and Johnson (2003) talk of metaphor as understanding something in terms of something else. One could easily add that analogy is also understanding something in terms of something else. To meaningfully negotiate the subtleties and differences between metaphor and analogy I refer back to Holyoak (2005) who says metaphor uses semantically distant mechanisms and that the domains are blended (as in “the evening of life”) rather than transferred from one to the other as is the case with analogy (an atom is like a solar system). There is also a structural, genuine similarity, whether it be physical or conceptual when one deals in analogy. Both use inference and association, but the key difference is that at a recognisable level, the similarities between a source and target analog, whether they be in reference to a visual or conceptual similarity, must be based, at some level, on a perceived similarity to be seen as an analogy. Metaphoric similarity is therefore more symbolic than real. The word “evening” is not similar to “life”, it acts as a symbol of the different stages we

go through in life; morning would, for example relate to birth and early childhood (ibid, 2005).

Gangulyi (1995) also describes analogies and metaphors as close relatives. He frames their differences by saying “While metaphors compare implicitly, analogies compare explicitly the structure of two domains” (p. 244). His work relates directly to how analogy and metaphor can be used as thinking methods in science teaching. However, I note many parallels in design to what he says about science. He talks of how science deals with aspects that we in many cases cannot see literally. This is one reason why imagination is so vital to the enquiry process. On metaphors and analogies he says, they “anchor” thought processes by “generating a pattern that would thematically bridge the gap between the seen and the unseen” (p. 242). As a learning tool he says they are ways of getting closer to the problem by making parallel connections with something that can be seen or is already known (ibid). While Gangulyi describes the value of metaphor and analogy as learning and teaching tools in science, I am able to make the connection with the field of design where, design problems are also ‘unseen’. There would seem to be some resonance here for illustration, a visual method which often has to act as bridge between the seen and unseen. One only has to consider how an internal mental state can be conveyed pictorially to appreciate how illustrations aid understanding of non visual states. This is when associative thinking can be valuable as a communicative device. When a written text is to be explained visually the illustrator can make connections from the connotations that reside in the text and create visual scenarios which suggest these connotations. As Barthes (1977, p. 38) reminds us “a long text may only comprise a single global signified, thanks to connotation, and it is this signified which is put in relation to the image”. So analogy and metaphor may be a way of thinking about a text’s message when it has to be interpreted in visual form.

### **Expository text**

This section of my literature chapter relates to text comprehension. As with the previous areas I have discussed—design education, design and analogical reasoning—text comprehension is a wide field. My discussion therefore focuses on literature that I am able to relate directly to my own study.

Most of what we read is expository. It is to be found in essays, speeches, instructions, journals, documents, newspapers and magazine articles. According to Williams, (2000) expository text is more difficult to comprehend than narrative (fictional) text because narrative has a simple basic structure. Heller (1995) identifies seven distinct structures: *definition, description, process, classification, comparison, analysis* and *persuasion*, while Richgels, McGee, Lomax and Sheard (1987) describe four: *collection, comparison/contrast, causation* and *problem/solution*. Montelongo, Berber, Hernandez and Hosking (2006) use six terms: - *generalisation, cause and effect, classification, sequence, compare and contrast* and *enumeration*. Mayer (1996) also uses the term *explanative* to define an expository structure that explains how something works, but this can be related to Heller's terms definition and description.

Harvey and Goudvis (2000) provide a comprehensive outline of issues and strategies relating to comprehension of expository text. They take a constructivist approach to reading, saying that readers take the written word and construct meaning based on their own thoughts, knowledge and experience. Reading, say Harvey and Goudvis, is both the decoding and the making of meaning. Summarising the work of Pearson et al. (1992) they suggest that proficient readers use the following strategies (p. 6-7):

1. Search for connections between what they know and the new information they encounter in the texts as they read.
2. Ask questions of themselves, the authors they encounter, and the texts they read.
3. Draw inferences during and after reading.
4. Distinguish important from less important ideas in text.
5. Are adept at synthesising information within and across texts and reading experiences.
6. Repair faulty comprehension.
7. Monitor the adequacy of their understanding.

Harvey and Goudvis (2000) believe that the strategies good readers use can be made explicit. They refer to it as *strategic reading* and it focuses less on the process of decoding but is more to do with developing awareness of thinking and how it leads to understanding. This therefore requires meta-cognitive knowledge. They describe four levels of meta-cognitive knowledge that define different types of readers: *tacit*, *aware*, *strategic* and *reflective*.

1. Tacit readers lack awareness of how they think when they read.
2. Aware readers realise when meaning has broken down or confusion has set in but they may lack strategies.
3. Strategic readers use thinking and comprehension strategies to enhance understanding and monitor their understanding and adapt it if they become aware of gaps.
4. Reflective readers are strategic about their thinking and apply strategies flexibly depending on their goals when reading. They reflect on their thinking and ponder and revise their use of strategies.

The goal of using comprehension strategies, say Harvey and Goudvis, is to move readers from a tacit level to a greater awareness of how to think while reading with “an arsenal of tactics”, (Harvey & Goudvis, 2000, p. 17) that ensures meaning is constructed.

### *Macrostructures*

Harvey and Goudvis’s work can be related to theories of reading comprehension which suggest that skilled readers are able to abstract a higher order of text (Meyer, 1975; van Dijk & Kintsch, 1983). This *macrostructure* (van Dijk & Kintsch, 1983) enables encoding, recall and understanding of the key points of a text. Louwerse and Graesser (2006) describe macrostructures as global textual structures which make up the global, holistic meaning of a text. They are created by the use of *macrorules* (deletion, generalisation and construction) to propositions identified in a text. The result is the creation of *macropropositions* which represent for the individual the essence, or gist of the text (p. 429).

The formation of macropropositions is therefore essential for global comprehension and meaningful learning. An individual's creation of a macroproposition can be evidenced when students are asked to summarise a text (Armbruster, Anderson & Ostertag, 1987, p. 332).

Louwerse and Graesser (2006) and Armbruster et al. (1987) suggest that drawing student attention to typographical cues such as titles, headings, sub-headings and paragraphs as indices of text structure can assist macrostructure identification through the development and utilisation of *macropropositions*. "Some indicators of macropropositions can be identified. Titles of texts, summaries and topical sentences, often at the beginning or the end of a paragraph generally indicate macropropositions" (Louwerse & Graesser, 2006, p. 10). Taylor and Beach (1984) carried out a hierarchical summarisation study and found that the group of students who prepared a skeletal outline of a text based on its headings, sub-headings and paragraphs and then wrote a main idea statement for each stage of the text provided more accurate summaries than a control group not provided with any strategies.

Mayer (1996) talks of comprehension strategies as learning strategies but suggests they tend to be seen as part of the hidden curriculum, "Indeed, we expect students to use effective learning strategies but rarely do we provide instruction in how to use learning strategies in authentic academic tasks such as making sense out of expository text" (p. 360). Weinstein and Mayer (1986, p. 315) define learning strategies as "behaviours and thoughts that a learner engages in during learning and that are intended to influence the learner's encoding process". Mayer (1996) offers a model of three cognitive phases in expository text comprehension. Figure 2.6 describes his model *Selection-Organising-Integration* (SOI).

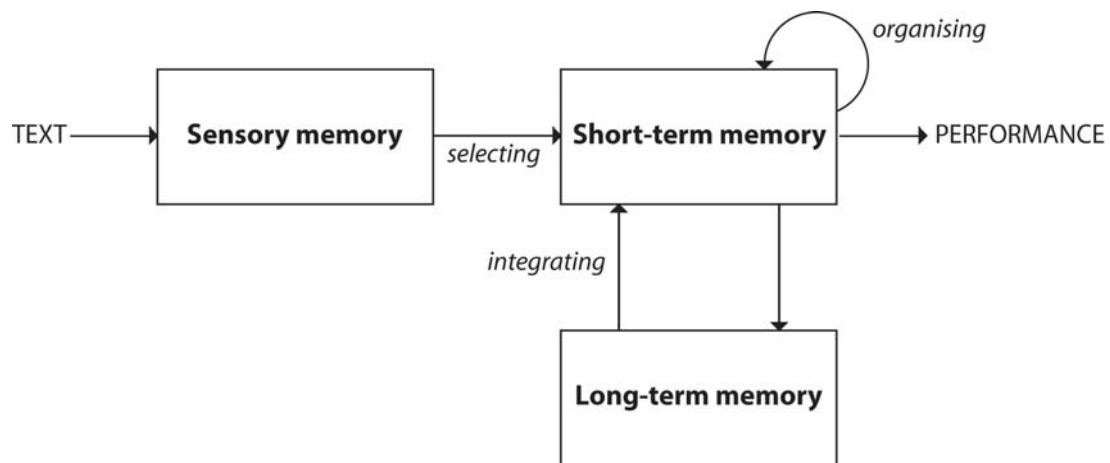


Figure 2.6. Mayer's model of three cognitive phases in knowledge construction (1996, p.365).

1. **Selecting.** This is the first stage in the process of making sense out of an expository passage. It involves distinguishing what is important from what is not, hence the term 'selecting'. The arrow from sensory memory to short-term memory represents this and involves "focussing conscious attention on relevant pieces of information". This leads to "selecting information from the text and adding that information to working memory". Finally the relevant information is sifted out from the irrelevant. This first phase is "intended to guide the reader's attention" (Mayer, 1996, p. 365).
2. **Organising.** This stage involves organising the relevant information that is selected in stage one into a coherent structure. This is represented in Figure 2.7 by the looped arrow from short-term memory back to short-term memory and consists of "building internal connections among the selected pieces of information" (p. 366). This leads to integration and creates a coherent structure that "accommodates the key pieces of information" (ibid).
3. **Integrating.** This is the final stage in the sense making process and it involves relating the knowledge being constructed in short-term memory with comparable or similar knowledge from long-term memory. In Figure 2.6 the arrow from long-term memory to short-term memory represents this and requires "building external connections between the organised new knowledge and organised existing knowledge" (ibid). By relating new

Mayer uses a constructivist approach to define learning. He describes other views of learning as *learners as response strengtheners*, or *learners as information processors* as opposed to what he defines as a need to think in terms of *learners as sense makers*.

If learners are sense makers, then learning strategies can be viewed as cognitive processing aimed at making sense out of presented material. Concerning the types of learning strategies required for meaningful learning, I have proposed that students need to learn to co-ordinate the basic cognitive processes of selecting, organising and integrating (Mayer, 1996, p. 368).

Kletzien (1991) found that when students were asked to describe their reading strategies good comprehenders used more types of strategies, using them more often than poor comprehenders. She suggests that students who know what strategies are available and are able to use them are strategic readers. Paris, Lipson and Wixson (1983) suggest, “strategic behaviour connotes intentionality and purpose on the part of the learner” (p. 294). Strategies should be used as deliberate means of constructing meaning from a text, particularly when comprehension is interrupted (Kletzien, 1991, p. 69).

This section in my literature review connects most strongly to stages in my three research cycles when students were asked questions about how they went about reading a text passage. As is the case with analogical reasoning, I have identified that students can identify their thinking processes. As such I have made a connection between analogical reasoning and three other cognitive processes, described by Mayer (1996) as selecting, organising and integrating. In relation to this I should now move on to the issue of communication as the final output of my students was an illustration aimed at communicating the main message of a piece of expository text. With this in mind, I will conclude this chapter by discussing issues that explore the communication of ideas.

## Communication

Chandler (2002, p. 14) says “Meaning is not ‘transmitted’ to us – we actively create it according to a complex interplay of codes or conventions of which we are normally unaware. Becoming aware of such codes is both inherently fascinating and intellectually empowering”. Clark (2004) adds that the basis for all communicative acts is meaning. He distinguishes meaning into either *natural signs* (or ‘symptoms’) or *signals*. Signals can be linguistic, for example speaking the words “I surrender”, or non linguistic, for example waving a white flag. Clark argues that *speaker’s meaning* requires from the addressee an understanding of the speaker’s intention. Meaning is therefore a participatory act, “The joint act of one person signalling another and the second recognising what the first meant I will call a *communicative act*” (Clark, 2004, p. 130). Building on the work of Austin (1962) and Searle (1969), Clark further describes this joint action as an illocutionary act (the speaker’s act of explanation) and an illocutionary effect (the addressee’s understanding) (2004, pp. 133, 134).

Barthes’ (1977, p. 40) notion of the text as providing “anchorage” to visual communication as provided in an illustration, highlights the issue of context in communicative design. Encoding and decoding is a useful description of the process of creating meaning and interpreting it. Jakobson (1960) describes encoding and decoding as a relationship between addresser and addressee where meaning comes from a shared context. Clear similarities can be seen between this definition and Clarke’s speaker’s meaning and what Grice (1975) calls *implacature*. While Jakobson is describing the interpersonal, verbal relationship between two individuals, Hall (1980) applies encoding/decoding to mass communication, specifically to television. Hall expresses the view that “decodings do not follow inevitably from encodings” and that the decoder may not necessarily share the same code as the encoder or addresser (Hall, 1980, p.136). Hall’s position refutes the idea of textual determinism, that a text only has one meaning. He suggests that there are three interpretive codes available to the reader; *dominant* or *hegemonic*, *negotiated*, and *oppositional*. The dominant reading is the ‘preferred’ interpretation, the one likely to be the one most compatible with the writer’s intention. The negotiated reading is one where the reader mostly accepts the writer’s codes but they may modify it to suit their own position. The oppositional reading is a rejection of the text even though it may be understood. Its



context is changed by the reader (ibid). It may be pertinent to point out at this stage that for an illustration to be effective, it must closely relate to the dominant reading, that most likely to relate to the writer's viewpoint.

In the context of design training for professional illustration purposes, there is a certain requirement that illustration will make sense to the majority of readers, hence the validity of an assessment based on consensus interpretation rather than completely radical or individual readings of the text. (McAuley, 2006). A common dictionary definition of denotation is that it refers to the literal meaning of a word while connotation suggests additional meaning. Barthes (1977) puts forward the case that in a photographic image, connotation can be analytically separated from denotation. In design oriented research the process of encoding/decoding requires a further procedure. The third party is the researcher. The writer encodes, the illustration student decodes. The student then interprets the decoding into a visual image. Their image is a new encode. The researcher then completes the process by decoding the image and the original text (McAuley, 2006). We therefore have the following: primary encoding/decoding, secondary encoding/decoding, a four-stage process. Kress and Van Leeuwen (2006) call this *transcoding*. The challenge for the researcher is to develop a system which can follow this process from the student's decoding procedure on to their encoding approach and ultimately conclude with the researcher's interpretation/decode/transcode. Kress and Van Leeuwen describe this another way as an interaction between "two kinds of participants, *represented participants* (the people, the places and things depicted in images), and *interactive participants* (the people who communicate with each other through images, the producers and viewers images)," (2006, p.119). The student and the researcher are *interactive participants* negotiating what the *represented participants* signify.

Visual images are a system of signification and representation. As with written text, visual images possess syntax and grammar, the building blocks of images. Understanding the structure of an image (its syntax), allows for the semantics (the codes of abstract meaning) to be understood. Kress and Van Leeuwen (2006) use the term *vector* to describe the narrative function of signs in an image - an important

element in visual syntax. The terms *actors* and *participants* describe the hierarchical relationships of signs within an image, with the actor as main message transference conduit and participants as supporting mechanisms. While there are clear comparisons between visual grammar and verbal grammar, it is important not to conflate them as exact equivalents: for instance, “what is expressed in language through the choice between different word classes and clause structures, may, in visual communication, be expressed through the choice between different uses of colour or different compositional structures” (Kress & Van Leeuwen, 2006, p. 2). However, a common link between verbal and visual can be made if we accept that grammar “goes beyond formal rules of correctness. It is a means of representing patterns of experience... It enables human beings to build a mental picture of reality, to make sense of their experience of what goes on around them and inside them” (Halliday, 1985, p. 101). The idea, therefore, that visual grammar is, like written grammar, fundamentally about conveying meaning, is central to this thesis.

#### *Visual communication, art, and illustration*

As will be seen in this section, changing contexts and usage make distinctions between visual communication, art and illustration difficult to make. Nevertheless, it is important that some attempt is made to locate key differences between them. As mentioned earlier in this chapter Edelson (2002) puts forward the view that “The process of design is complex”, a consequence of its “open-endedness and reliance on creativity” and subsequently this has “made it a challenge for researchers to characterise and explain” (p.8). Certainly it can be agreed that the visual arts disciplines of visual communication design, its sub-discipline illustration and also the fine arts are all reliant on creativity. One way to clarify differences is to look at function.

Meggs (1992, p.4) referring to the early pre-historic cave paintings of Lascaux and other early human markings says “This was not the beginning of *art* as we know it. Rather, it was the dawning of visual communications”. He refers to these various works’ “utilitarian” purposes as a criteria for determining the difference between visual communication design and fine art (ibid). Mareis, (2008, p.4) also referring to the utilitarian nature of visual communication design—illustration specifically—

claims, “for illustration to become art, it has to be as original and as remote from everyday life as possible, a stance known as “*L’art pour L’art*: purely aestheticized art devoid of intention or utility”. Mareis also points out that an illustration cannot be defined as art simply because it “was not motivated by commercial demand” and further points out that art also has commercial imperatives (ibid). What Mareis highlights is an ontological viewpoint that an image cannot define itself as either art or design, it is the purpose, usage and negotiated context in which people view the image which determines its status as art or design, high culture or popular culture. So context is a key factor in defining differences between visual communication, art and illustration. Jeffers (2004) illustrates how context determines how we can define a work as either art or design, high or popular culture, through describing how Leonardo’s Mona Lisa can affect us in different ways. Referring to how her reach extends beyond her high art status and placement in the Louvre in the form of T-shirts and coffee mugs, “she reaches right across time and space, right into the popular culture and people’s daily lives” (p. 14). Jeffers demonstrates that context and definition are subject to change and cannot be fixed.

Heller (2008) describes the illustration and art relationship as a continuum which can span the two areas of creative practice. At one end he says “The purpose of illustration is to illuminate, to add light but also depth to a manuscript” (p. 5). However, he also observes that at the other end of the spectrum, “There is more illustration that comes to pure art... than in the past thirty years” (ibid), describing some professional illustrators as “graphic commentators” (p.4). By this he is referring to illustrators whose ideas seem less obviously connected to the text than the work of mainstream illustrators. Heller’s stance is not that some illustration lacks utilitarian values, but that at the extreme outer edge of illustrative practice, some illustrators’ ideas are less confined by the text and act only as a starting off point for a more self expressive creative response to written text. However, in editorial illustration, written text is a constant feature. No “marriage”, as Holland (2008, p.182) describes the image text relationship is possible without both text and image. And, of course, furthering the constraint of context as important in making solid definitions, an illustration can be used in a commercial context as print and then the same original work can exhibited and described as art (Mareis, 2008, p. 4). However, often when

this does happen, the original text which may have initially inspired the illustration is not usually displayed with the image. The presence or absence of written text may be a useful, if simplistic way to see differences between illustration and art.

While Heller demonstrates that definitions of a discipline inevitably have to acknowledge a wide spectrum of difference, and both Mareis (2008) and Jeffers (2004) present us with the blurring effect of changing contexts and usage in making definitions, Frascara (1995) offers a simple way of looking at visual communication design by commenting on the role of the audience. Frascara says, “The emphasis on the receiver within the conventional scheme of transmitter-receiver opposition places visual communication design opposite to the romantic conception of art as self-expression, thus avoiding one of the distorting conceptions of the profession” (1995, p. 54, 55). Again, this helps develop the argument that visual communication design serves a utilitarian function, with mass understanding a prime identifying characteristic and concern.

It is perhaps pertinent to point out here that in this thesis the illustration students involved are novices. Therefore the fieldwork carried out relates most closely to the idea that illustration is about illumination of written text, not personal self-expression. The illustration curriculum at Massey begins by establishing solid principles that underlie mass communication. This can be related back to Hall’s (1980) category of dominant or hegemonic reading, the interpretation which most closely matches a writer’s intention.

Illustration, as a design subject within the umbrella of visual communication design, “involves a visual interpretation of information” (McAuley, 2006, <http://Praxis.Massey.ac.nz>. McAuley). Most commonly this refers to interpretation of the written word—the written word being the information which is to be interpreted creatively in visual form. One might ask the question why visual *communication* design and not visual *information* design? Wildbur (1989) provides a useful distinction. He talks of information design as being “concerned with conveying essential information to the user with the least distraction and ambiguity” (p. 7). In contrast he refers to the “persuasion” (p.7) and “rhetoric” (p.8) of visual communication design as its

attributing features. He further clarifies the difference between information design and visual communication design by saying “Visual rhetoric is not a term that many information designers use about their work and most would disclaim any use of it at all” (ibid). Schuller (2007, p.1), says information design is about “the transfer of complex data” to a communication situation as opposed to its interpretation. This is different to illustration which is more about the creative interpretation of the information, not its transfer. Schuller (2007) also suggests that information design is interdisciplinary in nature, combining “the skills of graphic design, 3-D design, digital media, cognitive science, information theory and cultural sciences” (p. 2). In contrast, according to Mareis (2008), one of the simplest ways to define illustration is that it is to do with objects and their representation through “drawing and sketching” (p. 2). Certainly, the key technical skills of an illustrator is an ability to draw. Schuller (2007) also says that information design “deals with making entire sets of facts and their interrelations comprehensible, with the objective of creating transparency and eliminating uncertainty”. (p.2). Frazier (2008) frames illustration around creative ideas, “Ideas are an essential ingredient in creating an illustrated voice. Without them, we have little foundation in telling a story that will arrest anyone’s attention for more than a second” (p. 110).

The information designer often has the task of integrating the text with the image. This is a particular characteristic of web design. In contrast, the illustrator’s job is to create an image based on the text, not combine it with the text. The illustrator’s job is usually done once he has created an image. The illustrator, once he has interpreted a written text into an illustration, has no special interest in how an image will be aesthetically displayed with the text in its published format.

In relation to meaning and communication, word and image can be seen as active partners. According to Sipe, (1998) “this relationship between the two kinds of text—the verbal and the visual texts—is complicated and subtle” (p. 97). He describes the relationship as a kind of “synergy”, the idea being that each is strengthened and changed by the presence of the other (p.98). Holland (2008) says of his objective when illustrating “I try to marry a picture to words and hope it is a successful marriage” (p.182). Czeh, (1983, p.118) refers to the relationship between word and

image as a “duet”. Nodelman (1990), frames the relationship by saying that the image and text “limit” each other, “By limiting each other, words and pictures take on a meaning that neither possesses without the other” (p. 223). This is a useful way to think of what illustration is as it demonstrates the inter-relatedness and chemistry between word and image and how they can enhance each other. A relationship between word and image is not necessary in a fine art work, but it is, arguably, fundamental to illustration.

As with all other design disciplines, illustration can be characterised as a visual means of finding solutions to an ill-defined problem. The problem to be overcome in written text is largely one of domain crossover, translating written text into visual text. Barthes (1977) usefully frames this as a balancing act and one where the relationship is not one of saying the same thing through a different medium, “It is impossible...that the words ‘duplicate’ the image” (p. 26). The problem is always one of connotation and finding a balance between the two domains (ibid). A single solution is impossible in illustration because the problem is not one of duplication. On the subject of ill-defined problems, Rowe (1987) says “both the ends and the means of solution are unknown at the outset”, (p. 40). This is considerably different to well-defined problems and is a defining feature of all design (ibid). Rowe further clarifies this through the example of the “crossword puzzle”, where only single solutions are possible (ibid). When written text is to be illustrated there can be no single solution. That is why a written text can be visually conceptualised in many different ways. This leads me to ideas and how they can be realised through sketching.

### *Idea generation through sketching*

In this, concluding section I will now look at the visual process of idea generation, focussing on sketching. This is relevant, as chapter four will include a discussion of my own students’ sketches and their developmental drawings.

Goldschmidt talks of sketching as “the simultaneous or almost simultaneous production of a display and the generation of an image that it triggers” (2001, p. 131). Cross (2001b, p. 90) talks of sketching as means of finding unintended consequences, surprises that ensure design exploration takes place. Cross also talks of Goel (1995)

who describes sketching as a means, not only of vertical transformations, but of lateral transformations as well. Ambiguity is also identified by Goel as being an important feature of sketching (in Cross, 2001b, p. 90). However, despite such testimonies to the value of sketching in the creative process, Purcell and Gero (1998) remind us that sketching is still in some quarters seen as a technical skill rather than an essential part of the process of thinking about a design problem.

Hare (2002) points out concern among many educators that there is a perception that drawing skills have dropped in undergraduate design students. Bradshaw (2002) notes that students “found it difficult to make the initial transition from observational studies giving an end result to the generation of sketches and notes which informed the design process” (Bradshaw, 2002 p. 103). Bradshaw also expresses concern that students often undervalue the role of drawing in idea creation, with many of them preferring to use computers, “Sadly the achievement of this form of visual outcome in the hands of the inexperienced often lacks any depth of the design process” (p.103). The main problem to overcome with many students is that students themselves see sketching as a technical skill as opposed to being a method of notating visual thinking. As Hare points out, many tutors assume that it is obvious sketching is important and further assume that students see the relevance as *a priori*. However, in a survey of 90 design students, Hare concluded that students do think drawing is important “Students appear to consider there are good reasons to be able to sketch well, whether they know what those reasons are or not” (Hare, 2002, p. 238).

Kossylyn (1994, p. 310) explains, “People can “mentally draw,” visualising patterns that they have never seen and that are not simply new combinations of familiar components”. However, according to Hare (2002), when mental tasks are too complex they have to be externalised and this is where sketching becomes invaluable. Goldschmidt believes “Sketching skills are therefore believed to have the power to amplify imagery” (2001, p. 209). Hare uses Biggs SOLO taxonomy as a means of measuring the potential of sketching in an educational environment. He highlights the danger of students seeing sketching simply as a means to an end “despite the inherent transformative nature of sketching” (Hare, 2002, p. 243). Students must be aware of the transformative action that is possible in sketching if deep learning is to take place.

Students have to be able to see that sketching helps transfer thinking between situations. Hare does not provide us with a model as to how relational or extended abstract reasoning will take place other than suggesting that students be made aware of it.

## **Summary and Conclusion**

I have set out to identify broad issues in design and design education that lead us to the present day. This sets the scene for action research, mentioned at the beginning of this chapter “as research which responds to a call to action, based on a perceived need for change” (chapter 1, p. 11). My own research fieldwork is placed within this framework as a personal response for the need for design students to become more aware of their thinking processes when designing. Zuber-Skerrit (1992) suggests that educators are more likely to make substantive changes to their practice when they actively engage in identifying issues around curriculum and student learning rather than having research done for them on their behalf (p. 110). I have argued that a new paradigm in design and design education is beginning to develop; one which values the processes of design over the products of design (Buchanan, 1998, 2001; Findeli, 2001; Friedman, 1997, 2002; Norman, 2000; Oxman, 2001; UCA, Irvine, 2002). I have attempted to identify design as a discipline, reflecting its emerging status as a new field of enquiry (Cross, 2001; Friedman, 1997; Rust, 2004; Schön, 1983; Simon, 1982). I then move on to highlight meta-cognitive processes relevant to designing (Cross, 2001; Polanyi 1958, 1967; Schön, 1983). I then define design itself (Merriam-Webster dictionary, 1986; Buchanan, 2001; Schön, 1983; Simon, 1982). This section is then concluded by a discussion of the design process, (Cross, 2001; Edlsson, 2002; Swann, 2002; Van den Akker, 1999).

Following the first section concerning the changing paradigm around design and design education, I then looked at some recent studies where design educators were, in their own work, seeking to address various design education issues. These sample studies (Bonnardel, 2000; Drew et al., 2002; Goldschmidt, 2001; Newstetter & McCracken, 2001; Wilson, 2002) were chosen because of what I determined were interconnected threads that related to my own issues of concern and interests in



design education, particularly those surrounding ‘thinking skills’. This led me to a central pre-occupation of my own fieldwork studies, analogical reasoning, discussed through the work of a range of cognitive scientists active in this area of research (Davies et al., 1987; DeJong; 1989; Gangulyi, 1995; Goswami, 1991; Holyoak, 2005; Holyoak & Koh 1987; Lakoff & Johnson, 1980).

Following on from analogy I then looked at expository text comprehension (Harvey & Goudvis, 2000; Heller, 1995; Kletzien 1991; Louwerse & Graesser, 2006; Mayer, 1996; Meyer, 1975; van Dijk & Kintsch, 1983). This relates, as with analogical reasoning, to the specifics of my fieldwork enquiry and, as with analogy, is related to meta-cognition. This area is then directly linked to communication (Barthes, 1977; Clark, 1996; Chandler, 2002; Hall, 1980, Kress & Van Leeuwen, 2006). My last section was idea generation through sketching (Bradshaw, 2002; Hare, 2002; Kosslyn, 1994).

### *Identifying a gap*

I have argued that analogy is a fundamental thinking process that can be used to effect in creative acts. Within the context of a changing paradigm which seeks to make designerly thinking methods more explicit, I have discussed that, while humans are “pre-wired” to think analogically, (Sloman & Lagnado, (2005, p. 99), novice design students will not necessarily respond to a design problem “spontaneously” by thinking analogically (Goldschmidt, 2001, p.211). The case studies I have discussed relating to analogy (Bonnardel 2000; Goldschmidt, 2001) however, have focussed on visual analogy and its use in areas such as engineering, architecture, industrial design and science. Little work has been carried out in visual communication in relation to what I call *visualised conceptual analogies*. Therefore, this study has identified a gap and an exciting opportunity to pursue analogical thinking as an explicit thinking method within the visual communication area of illustration. The next two chapters relate more specifically to the work I carried out with my students.

The various headings in this review reflect the breadth, scope and interdisciplinary nature of my enquiry, as do the different research areas covered. In my next chapter I

discuss the methodology chosen for my own call to action, describing action research in some depth, something only touched upon in this chapter. Chapter two can perhaps be seen as what inspired my study and why. My next chapter explains what I decided to do and how I went about doing it.

# 3

## CHAPTER 3: METHODOLOGY



This chapter is divided into two interconnected sections. Section one begins by describing my ontological and epistemological perspectives. This is followed by a discussion as to why I chose action research as my methodology and why I discounted other methodologies. I then continue the section by describing the cyclical, emergent and iterative nature of action research as a methodology and explain how this allowed me to modify my research question from a macro perspective on design learning in general to a micro perspective which enabled me to focus specifically on my own students' learning. In section two I then describe the actual work carried out with my students, explaining the chosen research design and each separate cycle of enquiry. I have presented ontology, epistemology and methodology in this chapter, albeit in two sections, to demonstrate their interconnectedness. Later in this chapter, from page 81 onwards, I describe how my research question developed. However, in relation to the literature chapter and its relevance to the work carried out by me, I wish to make a connection between the literature and the 'up front' question which provided its focus and impetus:

*How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of design?*

This was the initial start up question. In relation to Friedman's (2001) opening quote in chapter two about the need for a more articulate understanding of design, this question begins to focus on whether a more explicit understanding of the thought processes involved in designing can be harnessed and used to improve student learning. As such, it seeks to answer Friedman's call, supported by others such as Cross (2001); Goldschmidt (2001); Oxman (2001); Norman (2000) and Rust (2004) to develop our understanding of the design process and move forward from what has only been tacitly understood.

As the key significance of describing my ontological and epistemological perspectives is to highlight how I ultimately decided upon a research design, I now, in order to

provide some context, include my key objectives and describe the issues and problems that triggered this study. As action research is iterative and reflective, not all problems were identified at first.

1. I wanted to assist students to develop awareness of their thinking skills when undertaking a design task.

*(Students are learning to be design thinkers, not simply illustrators. I believe too much design teaching is heavily focussed on the development of tacit skills, with little emphasis on explicit thinking)*

2. I wanted to assist students to develop their text interpretation skills.

*(Text can contain many pieces of information. I wanted to know which words or phrases students chose as being of most use to their idea generation process)*

3. I was interested in exploring analogical thinking as an interpretive method. In this case, specifically focusing on how it could be used as a text interpretation method.

*(The potential of analogy as a creative method is, of course, much wider than the deliberate focus on text interpretation)*

4. I also set out to develop my own image interpretation skills.

*(Skills, normally used at a tacit level to determine, through the material outcomes of my students the appropriateness of concepts in relation to the design task, were to be developed into explicit skills. While this can be related to improving assessment of student learning via their designed artefacts, my interest was more scholarly)*

5. I set out to develop my scholarship of teaching.

*(By scholarship of teaching I mean making transparent, for public scrutiny how learning has been made possible).*

On conclusion of cycle one I decided that a new objective needed to be added. Objective number two focused on hierarchical significance of chosen keywords and how they were used in the concept development phase. I realised that a more fundamental objective which looked at student comprehension of text was required. This was because I noticed that some cycle one students did not appear to be able to locate the key theme of the text. This demonstrates the emerging nature of action research and how it can adapt to new insights.

6. I wanted to assist students develop strategies for determining the key theme of a text.

*(This is what van Dijk & Kintsch (1983) describe as the macrostructure, the gist of a text)*

## **SECTION 1.**

### **Ontological and epistemological assumptions**

I will now describe my ontological, epistemological and methodological premises that led me to action. Hitchcock and Hughes (1995, p. 21) suggest that all three are closely interrelated, and posit that our ontological assumptions lead to our epistemological assumptions, which in turn give rise to our methodological plans. I looked at this from the point of view that my methodology of choice was not pre-determined but that it would be influenced by my ontological and epistemological perspectives. I had to ask myself, what are my perspectives? One does not create an ontology. What one can do is become aware of what has been operating tacitly at a very deep, personal level and attempt to articulate it. I work in an environment where image making and meaning making are at the forefront of what I do. As a practising illustrator and lecturer in illustration I assist my students to develop expertise in the making of images, which can communicate effectively to large audiences. I find it very difficult to think of an image as having an external reality. By saying this I have committed myself to the belief that there is no separation of subject and object. A reality which cannot be separate from my knowledge of it places my ontological perspective in the constructivist-interpretivist paradigm. Truth becomes a negotiation carried out

through dialogue. This relativist ontological perspective assumes that reality is a construction, developed socially and experientially. Relativism is, according to Smith and Hodkinson (2005, p. 921-22) a problematic term because some researchers see it as “some illogical and irrational abyss where every claim to knowledge has equal validity and credibility with every other claim”. However, they refute this and argue that it is more helpful to think of relativism as an acknowledgment that nothing can be certain and we must learn to live within our limitations.

As a designer I am well aware of the subjectivity I bring when I look at an image. As an educator during assessment I make judgments about the value and appropriateness of my students’ visual communications. I determine to what extent a piece of work achieved its communication objectives or to what extent it did not. If I take a hard relativist stance then this might lead me to think of my judgments as no more valid than those of the student who produced an image. However, within a social framework—which is composed of educators and students, experts and novices—one can argue that an image’s meaning and value can attain consensual agreement. The idea of a negotiated reality is anti-positivist and supportive of the view that objectivity, most commonly associated with positivism, does not exist. Guba and Lincoln (2005, p. 208) express this view forcibly, “it is enough to say that we are persuaded that objectivity is a chimera: a mythical creature that never existed, save in the imaginations of those who believe that knowing can be separated from the knower”. Cohen, Manion and Morrison (2005, pp. 19-20), describing the anti-positivist position, say “anti-positivists would argue that individuals’ behaviour can only be understood by the researcher sharing their frame of reference: understanding of the world around them has to come from the inside, not the outside”. As a design educator I work closely with my students so my attempt to gain knowledge about their approach to text interpretation comes very much from the inside. Cohen et al. state, “The central endeavour in the context of the interpretive paradigm is to understand the subjective world of human experience” (2005, p. 22). My interests are in meanings within a social context, the hermeneutics of things, not phenomena. My ontological outlook therefore sits comfortably within the anti-positivist paradigm. In contrast, to use a broad description, the positivist paradigm at the other end of the research continuum takes as its tenet that there is an objective reality that exists external to

human experience but is a reality, which can be experienced and verified between independent observers (Guba & Lincoln, 2005, p. 203).

So what does a constructivist-interpretivist, anti-positivist ontological perspective imply for the educational researcher setting out to investigate what effect interventions incorporated into a classroom setting had on his students' learning experience, particularly when the material outcomes (the illustrations) were personal interpretations? Once again I return to the issue of relativism. Clark (1997) gives an overview of this issue. He suggests that neither Weber (1947) nor Dilthey (1989) managed to overcome the problem of relativism but that Schutz (1967) went some way towards resolving what Dilthey and Weber called *verstehen* (Clark, p. 34). Verstehen can be broadly described as understanding of intended meaning by others as a consequence of familiarity and empathy with another's situation. According to Clark, Schultz determined that verstehen should be seen less as an introspective activity and more of a public activity using shared language to interpret the actions of those we socially interact with. In this context we can think in terms of 'intrinsic' meaning. Clark says:

At the ontological level, unlike the positivist social researcher who holds society to be some sort of system constituted by the external relationship of its members, the interpretivist views social reality as consisting of the intrinsic meanings shared by members of a social group which are sustained by the actions and interactions of its members...This is the everyday world of commonsense life where ordinary people understand, interpret and give meaning to their actions and social practices (1997, p. 37).

Schultz' adaptation of verstehen to include intrinsic meaning shared by members of a social group relates to how I place myself in relation to my students and how I decided to go about analysing their work. I have sought to develop a negotiated meaning through cross-referencing what my students have said and done with my own interpretations. Our shared context, that which relates to verstehen, comes from my own experience as an illustrator and former design student. Therefore, while my role here is that of researcher, I am not detached from my students because I too have



experienced the process of interpreting text into a picture. In fact, I have experienced the text into image process many times as both a student and as an illustration practitioner. This provides me with valuable insight into the process of interpretation. While I have not consciously applied *verstehen* as a method, I refer to it because it helps establish the potential value of an ‘insider’s’ perspective which comes from a shared experience.

While ontology relates to our assumptions concerning the nature of reality, epistemology concerns how we can claim to know something. I am interested in the processes my students go through in their meaning making ventures. In relation to my epistemological perspective, I believe that *verstehen* embodies my belief that when, as a researcher, one has personally engaged in the process that is being studied, valid insights can emerge. This does give rise to significant problems within design-oriented research. Because of the prioritisation of language based propositional or explicit knowledge, other kinds of knowledge associated with practice are relegated. Knowledge often called practical, experiential or tacit sometimes evades articulation (Niedderer, 2007). The design educator often relies on his or her tacit knowledge of a student’s work to determine its communicative value. It is this dilemma which lies at the heart of what I have set out to investigate. The dilemma itself is that between tacit and explicit knowledge. The practitioner relies on tacit knowledge while the researcher requires the use of explicit knowledge. I believe I have come to terms with this, particularly when analysing my students’ design outputs, a significant component of my data. Polanyi (1958) makes a valid point as to how valuable tacit, practitioner knowledge is.

Rules of art can be useful, but they do not determine the practice of an art; they are maxims, which can serve as a guide to an art only if they can be integrated into the practical knowledge of the art. They cannot replace this knowledge (Polanyi, 1958, p. 50).

Polanyi is, according to Niedderer, categorising “Rules of art” (Polanyi, 1958, p. 50) as maxims or theories and is claiming that practical knowledge can complement theoretical knowledge but it cannot be supplanted by it. Within practice-based

research, it is therefore, in my opinion, important to use both forms of knowledge even though the ultimate goal within research is to articulate knowledge propositionally. Because tacit knowledge cannot be specified or disseminated through scholarship it has perhaps been undervalued in research. However, it seems essential for success in practice-based research in design learning as it provides intuitive insight into the creative process.

I have briefly talked of two different kinds of knowledge, tacit and explicit. It may be of value to compare them to other definitions of knowledge. Just as tacit knowledge tends to be seen as a kind of binary opposite to explicit knowledge, so too does propositional knowledge (associated with declarative, descriptive, 'knowing that') get contrasted to non-propositional knowledge (associated with procedural, practical, experiential, 'knowing how'). I refer in this study most commonly to tacit or explicit knowledge as their differences relate to issues around their communication while differences between propositional and non-propositional knowledge relate more to their different natures. The relationship between propositional and non-propositional knowledge is not so sharply defined as there are different types of knowledge clustered under the two (Niedderer, 2007). Figure 3.1 provides some clarity to how I have categorised different types of knowledge.

| <b>Tacit Knowledge</b><br><i>Terms associated with tacit knowledge for the purpose of this study</i> | <b>Explicit Knowledge</b><br><i>Terms associated with explicit knowledge for the purpose of this study</i> |
|--|--|
| non-propositional knowledge  | propositional knowledge  |
| procedural knowledge   | declarative knowledge  |
| skills knowledge   | descriptive knowledge  |
| implicit knowledge   | codified knowledge   |
| ineffable knowledge  | cognitive knowledge  |
| experiential knowledge   | conceptual knowledge   |
| personal knowledge   | theoretical knowledge  |
| embodied knowledge   |  |
| 'knowing how'  | 'knowing that'   |

Figure 3. 1. Knowledge associated with tacit and explicit knowledge.

Tacit knowledge, widely accepted as knowing how to do something, is gained from experience and is difficult to articulate. As a practising illustrator I know how to interpret text into an image that can communicate to a wide audience. 'Knowing how' is invaluable to this study as much of my focus is on analysing the processes my students went through when they were given the task of illustrating a piece of written text. The problem as I see it for this study is that my tacit knowledge cannot be followed or verified by others. I nevertheless think of my tacit knowledge as a resource. This resource has then been called upon, developed and codified into explicit understanding through the use of semiotic codes. By using semiotic coding, my interpretations of my students' images can be verified or discounted. Giddens, (1987, p.20) talks of a "double hermeneutic" to describe a two-way relationship between the researcher and the participant and how meaning and understanding is a negotiation between two parties. This is unlike a "single hermeneutic" approach, where understanding is essentially one-way (ibid), as in, for example, a scientist studying properties of a mineral. My own work uses a double hermeneutic approach. I am interpreting what are in themselves the interpretations of my students. We both share the same characteristic of being interpreters and sense seekers. My interpretations are open to scrutiny.

If one overarching skill can be identified as crucial for effective visual interpretation, then it is that of "visual literacy". According to Giorgis, Johnson, Bonomo, Colbert, Connor, Kauffman and Kulesza (1996, p. 146) visual literacy is the "ability to construct meaning from visual images". Miller, (1992) extends this to include the inter-relatedness of images and text, "what is needed is the ability to read not just pictures and words separately, but the meanings and forces generated by their advocacy" (p. 9). Visual literacy is certainly a skill that the design educator turned researcher can use to maximum effect in determining the connotations of his or her students' designs as well as the significance of the various components that make up a picture. Again, this can be related to *verstehen*, understanding that comes from shared experience. According to Chandler (2002, p. 142) "Connotations are not purely 'personal meanings'—they are determined by the codes to which the interpreter has access".

I have described in this section how I perceive reality as a negotiated construction. Within the context of the visual image I have discussed how images themselves have no external reality or fixed meaning, but are made sense of by the use of semiotic codes. In order for images to be discussed within a research framework, these codes have to be made explicit. Shared experience, *verstehen*, also allows the researcher to gain insight into how others' experience an event. Knowledge is created, not discovered (McNiff & Whitehead, 2006, p. 27). Action research, as a methodology values shared experience, because the researcher is central to the research.

### **My chosen methodology**

The preceding section has described my ontological and epistemological perspectives. In this section I will describe what methodology I chose and why I chose it. I will also relate it back to my ontology and epistemology where appropriate to establish their interconnection in this study. I begin by describing, but only in very broad terms, other methodologies which could have been adopted. It is out of the scope of this study to provide complete descriptions of other methodologies or issues of contention between their adherents and key theorists. I will focus on why other methodologies were discounted. Prior to commencing this study I considered four methodologies: *phenomenology*, *protocol analysis*, *grounded theory* and *action research* as possible methodologies which could answer the research question:

*How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of design?*

The common focus of phenomenology is an interest in how humans experience and make sense of a phenomenon (Patton, 2002, p. 104). While much of my interest was on gaining insight into my students' experiences of designing, I am unable to think of designing as a phenomenon, but think of it as a process. Simon (1996, p. 111), describing design as a verb says it is about "courses of action aimed at changing existing situations into preferred ones". Design is a process from one state to another, not a phenomenon. Phenomenology is more about variations and differences in how

people experience a phenomenon. It is the variations themselves which are of interest to the researcher. Therefore, the applied essence of the initial research question, relating to how knowledge can be applied to teaching, was not compatible to a methodology which does not seek change.

Protocol analysis is a methodology which seeks verbal accounts from individuals of their thought sequences carried out during an activity. Participants are asked to ‘think aloud’, verbalising as they do, and as best they can, what they are thinking while they are doing something. This approach has been carried out in numerous design education research studies (Atman & Turns, 2001; Cross, 2001b; Eckersley, 1988). Cross, (2007) points out that protocol studies are commonly suited to “artificial projects” because of the “stringent requirements of recording the protocols” (p. 50). Also, protocol analysis describes ‘what’ happens during an activity, not ‘why’. This methodology would not have enabled an iterative approach to an unfolding situation, and more importantly, it would not have been suitable for a normal classroom situation. Students do not normally think aloud in a classroom setting. Ethically, this approach would have been unsuitable as it would have imposed an approach which was driven by research interests and not on immediate curriculum requirements. The research question could only have been partially addressed by this methodology as it is not suitable in complex learning situations carried out over a period of weeks.

In grounded theory, the data is used to generate theory, not support an existing framework, theory or position (Patton, 2002, p. 11). As my intention was to bring about improved learning in my classroom I was already working within a theoretical position. From the beginning I stated that increased understanding of cognitive processes could lead to improved design processes in novice students. I had also embraced an established theoretical premise that analogical reasoning can enhance the design process. Grounded theory could, as was the case with protocol analysis, have suited some aspects of my study, particularly at the analysis phase, but it could not encapsulate everything I set out to achieve. The methodology I considered to be the approach best suited to the research problem was action research. I will now describe in some detail its characteristics and why I chose it in favour of other methodologies.

### *Definitions and characteristics*

Reason and Bradbury (2001, p. xxv) say they deliberately avoid thinking of action research as a methodology at all, preferring to see it more as a worldview which, depending on the context of enquiry, will draw on various practices and methodologies. They also define it as a verb rather than a noun, meaning that it is focussed on doing and acting rather than a form of classifying methods (ibid, 2001, p.2). Noffke (1997) and Dick (1999) describe it as a family of research methodologies concerned with the pursuit of action (or change) and research (or understanding) concurrently. Both these writers also describe it as an emergent process, iterative in nature taking its shape as understanding increases.

Certainly my approach does not fit any single action research description perfectly so I have selected from those that best suit the nature of my enquiry and the research problem, while staying aware of the fact that what I have done is contradictory to how some writers define action research. For example, Kemmis and McTaggart suggest that in classroom action research, university lecturers are, in many circumstances, advocates for “teachers’ knowledge” (2005, p. 561). I am, in contrast to how they see it, my own advocate for knowledge in my classroom.

McNiff and Whitehead (2006) describe action research as a form of enquiry that enables practitioners to investigate and evaluate their work. Carr and Kemmis (1986) make a similar suggestion. Many writers, including Somekh (1995), Noffke (1997) and Gustavsen (2001) consider action research a bridge between theory and practice. As a practitioner who has long relied on tacit knowledge, action research was my methodology of choice because it embraces the idea that practical knowledge could be used to help develop theoretical or explicit understanding and bring about meaningful change in a real life situation. According to Cohen, Manion and Morrison (2005, p. 226) “Action research may be used in almost any setting where a problem involving people, tasks and procedures cries out for solution, or where some change of feature results in a more desirable outcome”. Later in this chapter I will describe in some depth the problems, tasks and procedures involving people I sought to address and the interventions I incorporated to achieve desirable change. Suffice to say here that

Cohen et al.'s comments suggested to me that action research was the appropriate methodological framework to use in my study.

Zubber-Skerrit's (1992, p.2) CRASP model describes the characteristics of action research. Action research is, according to the model:

Critical (and self critical) collaborative inquiry by  
Reflective practitioners being  
Accountable and making the results of their inquiry made public  
Self-evaluating their practice and engaged in  
Participative problem solving and continuing professional development.

O'Brien (1998) identifies four separate 'streams' of action research: traditional, contextual (action learning), radical, and educational action research. He traces traditional action research to Lewin's work within organisations and the relationships between workers and employers. The key idea in contextual action learning, sometimes called learning-in-action, is that learning occurs in the company of others—a kind of collective learning—and from reflecting on and sharing personal experience. While it can be related to any group, it is most closely associated with collective goals, management and leadership and group decision-making. O'Brien uses the term *radical* to describe research associated with social transformation, emancipation and the disabling of power imbalances while other researchers (Kemmis & McTaggart, 1988; McTaggart, 1991) describe this as *participatory action research*. O'Brien's fourth action research stream is educational action research whose foundations are traced to John Dewey in the 1920s. Operating within educational environments the key focus is professional and curriculum development with teachers themselves being encouraged to be actively involved (O'Brien, 1998). Of O'Brien's four streams, the final one, educational action research, is the one most appropriately connected to my enquiry.

While O'Brien (1998) classifies four streams of action research, Kemmis and McTaggart (2005) continue Noffke's (1997) and Dick's (1999) definition of action research as a family of related activities. Within this family they identify seven

separate forms of action research: *participatory research*; *critical action research*; *classroom action research*; *action learning*; *action science*, *soft systems approach*; *industrial action research*. Rather than describing each of these separately, I wish to make a point about O'Brien's fourth stream, educational action research and Kemmis and McTaggart's third type of action research, classroom action research. As mentioned earlier in this chapter, Kemmis and McTaggart talk of classroom action research often involving university researchers as "advocates" (2005, p. 561) for teachers. O'Brien is saying much the same. Neither of these writers has provided a definition which fully suits what I did. However, Zeichner (2001, p. 276) categorises "self-study research" carried out by college and university lecturers as the fifth of five major traditions in educational action research. He cites the first four as starting in America in the 1940s with the work of Lewin and later Corey. This was followed by the British teacher-as-researcher movement begun by Stenhouse and Elliot in the UK during curricular reform in the 1960s. The third tradition according to Zeichner was the Australian participatory action research movement espoused by Kemmis and McTaggart, influenced by UK educational research but characterised through how it approached indigenous factors specific to Australia. The fourth tradition, starting in the US in the 1980s, was that of collaboration between teachers in schools working closely with university lecturers as theory advocates (Zeichner, 2001, pp. 273-74). My study fits Zeichner's fifth and latest tradition—self-study educational research. As to its developing acceptance he says, "In the 1990s there has been a growing acceptance of action research as a method for self-study within colleges and universities, especially among teacher educators" (ibid, 2001, p. 276).

Any discussion of definitions and characteristics of action research is not complete without specific mention of the pivotal contribution of Kurt Lewin (1890-1947). Festinger, talking to Marrow (1969) says Lewin's great contribution:

On the abstract level may have been the idea of studying things through changing them and seeing the effect. This theme — that in order to gain insight into a process one must create a change and then observe its variable effects and new dynamics — runs through all of Lewin's work (Marrow, 1969, cited in Sanford, 1981, p.174).



Festinger's comments on Lewin confirmed for me that my action research approach, despite its own particularities, was very much in keeping with Lewin's outlook. As will be discussed later in this chapter, my own approach was to incorporate change into a process to see what effect it would have, following the Lewin tradition. McNiff and Whitehead (2006) maintain that Lewin's original ideas remain influential and that they cemented the central feature of action research, that of a cycle of steps: namely *observe—reflect—act—modify*. These steps have also been described as *plan—act—observe—reflect* (Kemmis, 1991; Zuber-Skerritt, 1992). Dick (1993) says that at the very least the cycle involves three phases, *intend—act—review*. Gummesson (1991, p. 62) refers to these cyclical structures as a “hermeneutic spiral”, each turn building on knowledge gained from the preceding spiral. Carr and Kemmis (1986) call the process a spiral of cycles. In this study I refer to *plan—act—observe—reflect*.

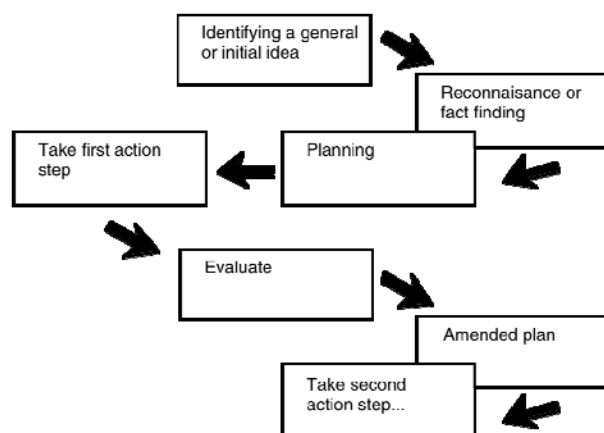


Fig 3.2. Lewin's cyclical approach to research. The first spiral.

Once in place this cycle or spiral of steps can lead to other cycles. In many ways this approach is similar to designing. When designing we start off with intuitive hunches and incomplete information. By trial and error we explore our options, moving from divergence to convergence. Through reflection we begin to get a clearer idea of what we seek and continue to modify until the adaptations and changes we implement converge towards a final design outcome. Throughout the design process the designer needs to be constantly responsive to the emerging situation. Dick (1993, p. 14) says

that this is the most important reason for choosing action research, “that the research situation demands responsiveness during the research project”. Dick also discusses how each cycle provides clarity to what may start off as a fuzzy set of propositions or questions. As a researcher and a professional designer I am struck by the similarities of the design process and the action research process in relation to their cyclical nature. While I have outlined some slight variations in definitions of the action research cycle, I do not see these as structural or semantic differences. The key element of the cyclical approach is responsiveness to an unfolding situation.

Carr and Kemmis (1986) see the action research cycle as one of three conditions necessary for research activity to be classified as action research.

It can be argued that three conditions are individually necessary and jointly sufficient for action research to be said to exist: firstly, a project takes as its subject matter a social practice, regarding it as a form of strategic action susceptible of improvement; secondly, the project proceeds through a spiral of cycles of planning, acting, observing and reflecting, with each of these activities being systematically and self-critically implemented and interrelated; thirdly, the project involves those responsible for the practice in each of the moments of the activity, widening participation in the project gradually to include others affected by the practice, and maintaining collaborative control of the process (ibid, pp. 165-66).

My approach satisfies Carr and Kemmis’s three conditions. In relation to the quote above I can say that the social practice I engaged in was that of working with students who are keen to develop expertise specifically in illustration and generally in visual communication. I will draw attention in this chapter to the similarity between the spiral of cycles which Carr and Kemmis refer to and my three research cycles. Widened participation was also a characteristic of my cycles. Each one benefited from what preceded, growing to include a larger community of participants.

Action research, of all the methodologies considered was regarded as the one most likely to answer the research question. The question itself asks how increasing

knowledge of cognitive processes in design can be applied to a learning situation. The question therefore requires an active methodology, one which seeks to apply knowledge to change a situation for the better.

### *Development of the research question*

In April 2004 I began what was to be the first of three separate research cycles. As mentioned previously the advantage of a cyclical approach is the ability to respond to an unfolding situation and work iteratively. Dick (1993) says this is partly because unlike traditional forms of research, which begin with well-defined research questions, an action research question is likely to start off fuzzy, “This is mainly because of the nature of social systems” (Dick, 1993, p. 16). Such fuzziness is anathema to empirical forms of research which begin with a fixed state question and because that which is being looked for is generally made explicitly clear. While this is one of the criticisms of action research, as long as a fuzzy answer leads to refinement in both questions and methods then the researcher can converge towards precision. For action and change to proceed one must be able to be responsive to a developing situation, something which a precise question prohibits or at least discourages (ibid). This was certainly my experience in April 2004. My second cycle which was carried out in August 2004 was partly an adaptation of cycle one but it included interventions and a modified design structure which enabled me to refine my enquiry as my understanding increased.

I began this study with an overview of some current thought on the need to develop design education curricula which could respond more effectively to the demands of an increasingly complex world. In an early stage of this study I discussed literature which addressed the following question: *How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of design?* That question remains pertinent. While it is quite specific and not ‘fuzzy’ it is essentially a ‘macro’ overview question pertinent to all areas of design education. Through it I am able to trace how I decided upon analogical thinking as a possible creative method for the interpretation of expository text. As my study moved towards a more ‘micro’ perspective the question became *How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of illustration?* On completion

of cycle one however, I realised that, prior to entering into the creative phase of text interpretation, students had to, in effect, comprehend the text itself. While this may seem rather obvious, it was something I had overlooked. As a consequence my research objectives developed to acknowledge the issue of text comprehension. This is why objective number six was added after data had been gathered from cycle one. I have found that one of the most satisfying aspects of action research as a methodology is the flexibility to respond and modify the research question; not arbitrary change but change which can clearly be justified on the basis of accrued insight gained from data in successive cycles of enquiry.

In April 2005 cycle three commenced with the research question: *Can the application of formal comprehension strategies and analogical reasoning improve illustration students' visual interpretation skills?* This question is much more action oriented than the first question, fully suiting the remit of action research as being about changing and improving an existing situation. Data from the previous two cycles had been provisionally analysed allowing me to refine my approach as my developing understanding increased. As a consequence, my third cycle involved more participants and was carried out over a four-week period. This could not have happened without the two previous cycles. For me this demonstrates that the action research cycle is an evolutionary process, whose structure cannot be pre-determined. Such an approach suits someone such as myself, who when designing an illustration is used to an unfolding process. Action research therefore, was determined to be the most appropriate to answer the research question.

### *Motivational factors*

While Carr and Kemmis (1986) identify three related conditions necessary for work to be carried out and identified as action research, Noffke (1997) outlines three different motivational factors which determine why educational researchers choose action research over other methodologies. The first motivation is to understand and improve one's own teaching. The research is carried out for the betterment of the individual. The second motivation is to produce knowledge that will be useful to others, shared through scholarly dialogue in conferences, presentations and publication. The third motivation is that of contributing to social justice and equity within schools and

society in general. Placing myself as I did in Zeichner's fifth educational action research tradition—that of self-study educational research, I would, within the above terms of reference to motivational factors, think of myself as being most strongly drawn by the second motivational characteristic identified by Noffke (1997)—producing knowledge that will be useful to others. Next in sequence is a desire to understand my own practice and improve my teaching. The third motivational influence, the desire for equity and social justice, seems to rest outside my own personal requirements at this time. This is not to say that I am not interested in equity and social justice. In choosing action research one does so with the awareness that definitions and motivational factors between researchers will differ. For example, Elliot (1991, p. 49) says, “The fundamental aim of action research is to improve practice rather than to produce knowledge. The production and utilisation of knowledge is subordinate to, and conditioned by, this fundamental aim”. Improving my practice is something I strive for every day I teach. I can improve my practice through action, gain practical, tacit knowledge and not understand why my interventions succeeded. I can also make improvements and find no need to share with others what occurred. In this project, however, my focus is to share what I have learned as an agent of change and present it in a scholarly manner. That is when my actions, through research become action research.

*Summary of ontological, epistemological and methodological assumptions*

1. I have placed my study in the constructivist-interpretivist paradigm
2. Practical knowledge can be used to help develop theoretical knowledge
3. I categorise my work as self-study educational research
4. Other qualitative methodologies were looked at and rejected as unsuitable to the nature of this study and its research question
5. Action research was chosen as the most appropriate methodology to carry out the study
6. My main motivation was to produce knowledge useful to others, closely followed by self-knowledge.

## What I set out to achieve

In this section I will describe the nature of my enquiry and what I set out to do. This will then be followed by a section where I describe the particular methods used to gather data. In chapter two I gave an overview of illustration in general. I will now refine this and target what I mean by illustration in relation to this study. My focus here is on visual interpretations of expository text as opposed to narrative text, editorial as opposed to publishing. Illustration based on narrative text is that which we would expect to see accompanying a story, such as in a picture book. This type of illustration is generally defined as ‘publishing’. Such texts incorporate characters, a plot line and a resolution. Expository text illustration, that which accompanies a perspective or point of view is, (and this is my definition) imagery which encapsulates, supports and enhances a hegemonic reading of a written text. Most of what we read is expository. It is to be found in non-fiction books, essays, speeches, instructions, journals, documents, newspapers and magazine articles. According to Williams (2000) it is more difficult to comprehend than narrative (fictional) text as the structures of expository text are varied. Heller (1995) lists seven distinct expository structures: *definition*, *description*, *process*, *classification*, *comparison*, *analysis* and *persuasion*. The type of illustration that my students were involved in is that which one would normally expect to see in a magazine. This type of illustration is commonly known as ‘editorial’.

### *The chosen text*

One of the first things I required was a piece of text which my students could illustrate. My criteria for selection were (1.) the language of the text had to be rich, providing potential for an illustrative response, (2.) the text should not be well known. This factor was important so that students were all accessing the text for the first time and had no previous engagement with it, (3.) The text had to be short but conclusive. (4.) The text had to be copyright free. While decisions around criteria three and four were pragmatic, they are typical of considerations made regularly in the normal teaching of illustration at Massey and in no way affected the type of data that the research would gather. After a considerable search I found a book by Sir Arthur Conan Doyle. Titled ‘*Through the Magic Door*’, it was written in 1907 and, using

Heller's definition, is an example of *persuasive* text. Persuasive text is characterised as being about compelling the reader to accept and view a topic from the same viewpoint as the author (Heller, 1995). The whole book is about Conan Doyle's thoughts on literature and the books that he cherishes. However, the first two paragraphs in chapter one are self-contained, providing more than enough written text for illustration students to work with (Figure 3.4).

I have identified three transitional stages when written text is required to be interpreted into an illustration. These are: *comprehend—interpret—illustrate*. To comprehend a text is to understand and grasp the meaning of it. This will vary from individual to individual but it should be related to the author's intended meaning. To interpret a text means to explain one's understanding of a text. Again this will vary. In this context an explanation takes the form of a verbal or written description. To illustrate a text is to clarify one's explanation through an example. Again, in this context, I am referring to visual examples. One can, of course, illustrate a text's meaning by a verbal example. Within the context of this study I will be referring to illustrations as visual structures. One's interpretation of a text is a mental and abstract construction. The illustration is the adaptation of an abstract construction into a physical structure. The three stages are inextricably linked and I argue that a flaw in comprehension leads to a flaw in interpretation which in turn is echoed in the concept embodied in the illustration.

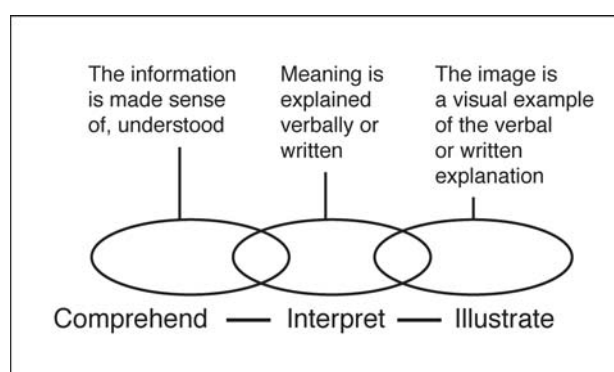


Figure 3.3. The three transitional stages from text to image.

*The chosen text and the main design task*

Conan Doyle's text was given to all students who participated in each of the three cycles. The main design task for all students was to illustrate the text into an image which conveyed the writer's main message. The text and the design task were common features of all three research cycles. Below is the text in its entirety, exactly as given to the students. I would invite you to become familiar with it. A copy has also been provided at the back of the thesis (appendix e). Familiarity will hopefully give you some insight into the student experience of text interpretation.

**Arthur Conan Doyle. THROUGH THE MAGIC DOOR.**

I care not how humble your bookshelf may be, nor how lowly the room which it adorns. Close the door of that room behind you, shut off with it all the cares of the outer world, plunge back into the soothing company of the great dead, and then you are through the magic portal into that fair land whither worry and vexation can follow you no more. You have left all that is vulgar and all that is sordid behind you. There stand your noble, silent comrades, waiting in their ranks. Pass your eye down their files. Choose your writer. And then you have but to hold up your hand to them and away you go together into dreamland. Surely there would be something eerie about a line of books were it not that familiarity has deadened our sense of it. Each is a mummified soul embalmed in cere-cloth and natron of leather and printer's ink.

Each cover of a true book enfolds the concentrated essence of a person. The personalities of the writers have faded into the thinnest shadows, as their bodies into impalpable dust, yet here are their very spirits at your command.

It is our familiarity also which has lessened our perception of the miraculous good fortune which we enjoy. Let us suppose that we were suddenly to learn that Shakespeare had returned to earth, and that he would favour any of us with an hour of his wit and his fancy. How eagerly we would seek him out! And yet we have him—the very best of him—at our elbows from week to week, and hardly trouble ourselves to put out our hands to beckon him down. No matter what mood you may be in, when once you have passed through the magic door you can summon the world's greatest to sympathize with you. If you be thoughtful, here are the kings of thought. If you be



dreamy, here are the masters of fancy. Or is it amusement that you lack? You can signal to any one of the world's great story-tellers, and out comes the dead writer and they hold you enthralled by the hour. The dead are such good company that one may come to think too little of the living. It is a real and a pressing danger with many of us, that we should never find our own thoughts and our own souls, but be ever obsessed by the dead. Yet second-hand romance and second-hand emotion are surely better than the dull, soul-killing monotony which life brings to most of the human race.

Figure 3.4. The Conan Doyle text extract from *Through the Magic Door* (1907, p.1).

### *The target audience*

In professional design, the target audience is a prime consideration. As a design has to suit a particular purpose, its value, potential useability and success is to a large extent determined by the user. Such considerations are also important in an education context. However, in many design education situations, the user is essentially hypothetical. Massey university's illustration curriculum addresses user needs through a variety of strategies. Some projects are commissioned by actual clients and the client is able to choose a winning design from a class project. Success will largely be determined by how a design meets the needs of a clearly stipulated audience. Students who major in illustration complete their study by enrolling in 'Studio practice', a paper with a strong vocational component with projects which are themselves *live jobs*, i.e. a chosen design will be printed and published and read by a real audience. Illustration 1, the first paper in the illustration curriculum, begins with a very generic target audience, the general adult public. As students develop expertise they are more able, in future projects, to empathise and understand the specific needs of different target audiences, whether they be gender, age or niche market based. In this study, the target audience for student illustrations is the general adult public. This is the audience students are more readily able to identify with. When projects conclude in illustration 1, peer feedback at this introductory level, is more effective as peers are themselves within the target audience. Criteria in all assignments are clearly stated and these partly relate to the hypothetical user.

Everyone who participated in the study was a second year student studying for a Bachelor of Design degree at Massey University. The second year is regarded as the

first of three professional years of study as it is the first time students determine their broad area of specialism. Prior to the specialist years is the 'actual' first year where students study a wide range of subjects in both design and fine arts. This entry year has no specific vocational focus. The three years of specialist study are expected to enable students to make the transition from 'novice' to 'expert'. As my students were studying illustration at degree level for the first time, they are referred to as novice designers.

On average nearly 100 students, 50 per semester, will enrol in Massey University's introductory illustration paper, 222:220, Illustration one. Illustration is one of five specialist streams within the Bachelor of Design in Visual Communications degree. The others are: graphic design, advertising, digital media and animation. Of the 100 who enrol in the first illustration paper, an average of 35 will take it to the next level. By the final year in the degree, on average, 12 to 18 students will regard themselves as illustration 'majors'. This paper, illustration one, therefore caters to a large number of students, many of whom will not pursue study in illustration beyond this introductory paper. I provide this back-drop as it is significant to some of the issues I have sought to address.

With a large number of students studying illustration for the first time, and with many of them not intending to pursue it further, I have sought to develop a meaningful programme which enables learning to transfer between subject areas. Transferable thinking skills, (most specifically analogical thinking) are therefore one of my considerations in this. I am nevertheless also teaching subject specific skills and one of the most important illustrative skills is the ability to interpret a piece of text into a image. These two elements, transferable thinking and interpretation skills, are therefore at the forefront of my methodological plans. I set out to develop a strategy which would enable students to become more conscious of their thinking skills and strategies and to develop their interpretation expertise. Interpretation is not an exclusively illustrative skill. All visual communicators to some extent interpret text. An advertising student, for example, may have to develop a campaign based on a textual slogan—a one-liner which requires a visual concept to accompany it. So the

overall illustration programme seeks to develop visual communication design expertise. The issue of expertise is a large one currently being debated in the design research community. As Cross (2001b) points out “We still need a much better understanding of what constitutes expertise in design, and how we might assist novice students to gain that expertise” (2001b, p. 98). The debate over expertise itself is a backdrop to my study, not a specific focus. This study nevertheless cannot avoid being caught up in the issue.

My personal premise from over a decade of teaching design at tertiary level is based on a belief that a significant proportion of visual communication design students tend to value technical expertise over problem solving expertise, the making of designed artefacts over the thinking skills behind good communication design. As tacit knowledge in design, both in practice and in education, has been elevated above explicit knowledge, the field of design is itself struggling to articulate itself (Friedman, 2003). I therefore set out to do something about that. The purpose of my study was therefore guided by my five objectives described in page 67 of this chapter.

### *Data gathering*

I will now describe how I set out to achieve my stated objectives above. I will begin by describing my data gathering approaches. Patton (2002) lists three kinds of qualitative data: *interviews*; *observations*; *documents*. Interviews include open-ended questions with the intention of gaining in-depth responses about people’s experiences, perceptions, feelings and knowledge. Data comes from comments that are transcribed verbatim and have sufficient context to be interpretable. Observations concern fieldwork descriptions of activities, conduct, dialogue, interactions, organisational or community processes and other observable human behaviours and experiences. Documents relate to written materials in various formats such as reports, diaries, letters, photographs, memorabilia, and correspondence. Patton (2002) also includes artistic works in this list of documented data. I believe the term creative works would be more appropriate as it more accurately encompasses both design *and* art outputs. I will nevertheless assume that Patton would accept illustrations as being artistic outputs and that he has used the term artistic to encompass creative works which have been designed for a specific purpose. He suggests that excerpts from documents

should be used in such a way that they capture and preserve context (Patton, 2002, p. 4). My own research focuses on interviews and documents with particular emphasis on artistic outputs.

### *Ethical issues*

Massey university identifies eight ethical principles which must be adhered to when research involving human participants is being proposed. These are:

1. respect for persons
2. minimisation of harm to participants, researchers, institutions and groups
3. informed and voluntary consent
4. respect for privacy and confidentiality
5. the avoidance of unnecessary deception
6. avoidance of conflict of interest
7. social and cultural sensitivity to the age, gender, culture, religion, social class of the participants
8. justice.

Acceptance is based on the understanding that an ethics proposal has satisfied the university's eight ethics principles and that implementation of an approved application is unlikely to lead to ethical issues. As regards this study, two separate ethics applications were necessary. This was mainly because of different issues concerning gaining access to students and the separation of my role as teacher and researcher. The first application was covered by the approval document *WGTN application 03/153*. My supervisor, Dr Linda Leach approached my students at the end of a class and gave out information sheets and consent forms (appendix a). I was not present in class during this exchange. The eight students who volunteered became cycle one participants. Geoff Hargreaves, in the role of co-supervisor, later followed the same procedures as Dr Leach (appendix b). As with cycle one, I was not present when students were approached. The twelve students who volunteered became cycle two participants.

The second ethics application to be approved by the ethics committee was designated *WGTN application 05/28*. To satisfy the ethics committee's ruling that a clear division between my role as a teacher and a researcher was established, I had to ask students, once their class work had been assessed, moderated and returned to them, if they would agree for their work to be used as data for my PhD. The main ethical issue surrounding this is conflict of interest (ethics principle number six). To ensure there was no conflict of interest, teaching and research had to be seen as separate activities. Information sheets and consent forms were handed out by me when the class project had concluded and all work had been returned to students (appendix c). The data I was allowed to gather in cycle three could only be done with student permission after the teaching had ceased and all work had been assessed and independently moderated. This was to ensure that students had full rights to participate or not participate in the research without any sense of obligation or duress. Voluntary and informed participation in research is an identified major principle in Massey university's code of ethics (ethics principle three). It was therefore part of my ethical agreement with Massey university's Human Ethics Committee that the data could only be gathered after teaching and assessment had been completed. As it turned out, all students gave formal consent for their design work and comments to be used as data. While questionnaires were used during the normal class teaching time, this did not compromise my ethical obligations. This is because I have, in the past used questionnaires as a normal part of my teaching so there was nothing unusual about the inclusion of questionnaires, which, in this instance, could also be used as research data. All data in cycle three was nevertheless generated during fieldwork. Essentially though, while I was involved with cycle three students in class over the four week project, I had to detach myself from the role of researcher. I did ensure that my activities were totally consistent with how I would proceed with a class project. Nevertheless, I was able to observe students directly during their class activity. As this is normally regarded as fieldwork, I did not take notes during my teaching to abide by the ethics committee's ruling that teaching and research were to be kept separate.

During fieldwork, the researcher spends time in the setting under study—a program, an organisation, a community, or wherever situations of importance

to a study can be observed, people interviewed, and documents analysed. The researcher makes firsthand observations of activities and interactions, sometimes engaging personally in those activities as a *participant observer* (Patton, 2002, p.4).

Because of ethical issues relating to cycle three I would say that I did not think of myself in terms of what Patton describes as a *participant observer* during my teaching activity but I was certainly personally engaged in my students' activities. However, many of the outcomes of participant observation and teaching are the same. On the aim of participant observation in qualitative study Foster (2006, p.63) says, "The aim is that subjects come to trust the researcher and become accustomed to his or her presence. Consequently, the data produced may be less influenced by reactivity—by the researcher and the research process". I would argue that Patton and Foster are largely referring to researchers whose subject of enquiry is unfamiliar and new, say for example a researcher who wants to gain insight into the experience of factory workers.

As a teacher researching my practice, I had considerable familiarity with my subjects of study and so formal fieldwork reporting, within Patton and Foster's terms of reference as participant observation was less of an issue for me. I have nevertheless attempted to resolve the ethical issues around my study by not using on-site fieldwork observations during cycle three.

### *My design strategy*

I have outlined previously that my data was gathered during fieldwork in cycle one and two and after student work had been assessed in cycle three. It consisted of interviews, observations and documents. I will now discuss my overall design strategy mindful of Patton's call for credibility. I believe I achieved credibility through the design strategies of *naturalistic inquiry*, *emergent design flexibility* and *purposeful sampling*. According to Patton (2002, p.51) "Any design strategy ultimately needs credibility to be useful. No credible research strategy advocates biased distortion of data to serve the researcher's vested interests and prejudices".

The central tenet of action research is a call for responsiveness to an emergent situation set in a social context. Responsiveness is achieved through a cyclical approach. The cycle should not be seen merely as a technique but as a set of principles based around responsiveness (Dick, 1993). My design strategy is based around three cycles of activity. The three cycles themselves are situated within a broad continuum that can be described as naturalistic inquiry. They are also guided by the principles of emergent design flexibility and purposeful sampling. Patton (2002) lists them as three separate, but connected, research gathering strategies. I see a more hierarchical relationship with emergent design flexibility and purposeful sampling as sub-sets of naturalistic inquiry.

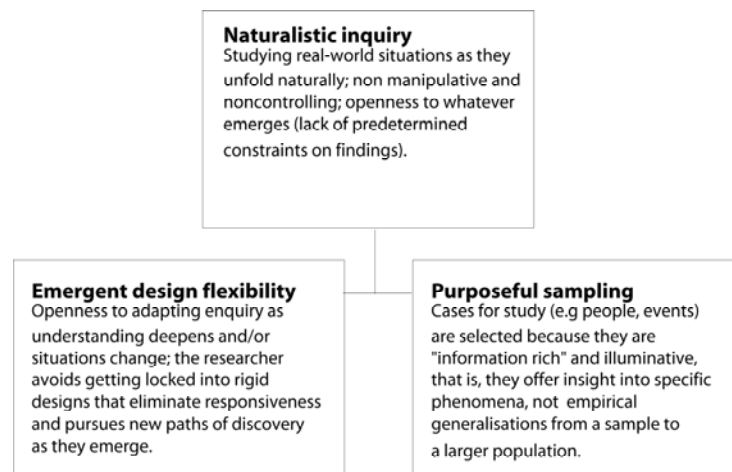


Figure 3.5. Hierarchical relationship of qualitative design strategies.  
Adapted from Patton (2002, p 39-46).

At one end of the naturalistic inquiry spectrum is completely open fieldwork where the researcher has no control over the conditions, and at the other end where conditions are completely controlled by the researcher. Significant control should not be seen as more befitting quantitative, laboratory, experimental research because, as Patton (2002) says:

Natural experiments can involve comparing two groups, one of which experiences some change while the other doesn't. What makes this

naturalistic inquiry is that real-world participants direct the change, not the researcher, as in the laboratory (ibid, p. 42).

The unifying feature of naturalistic inquiry is that it must take place within a real world setting, a setting with which participants are familiar. Throughout my three cycles of activity I have sought to provide this even though my naturalistic inquiry itself spans the continuum with varying levels of control and intervention. Cycles one and two were very focussed controlled situated learning studies of short duration with volunteer students. Cycle two had a control group and an experimental group with variations. Cycle three was also a situated learning study of four weeks duration but it was at the other end of the naturalistic inquiry spectrum carried out as a normal part of classroom teaching. According to Clancey, “Situated learning is the study of how human knowledge develops in the course of activity, and especially how people create and interpret descriptions (representations) of what they are doing” (Clancey, 1995, p. 49).

#### *Commonalities between cycles*

While each action research cycle will have unique characteristics, commonalities and continuity from cycle to cycle is also a feature of the methodology. Before I discuss each cycle separately and in-depth, I wish, first of all, to highlight and justify the common features of my three cycles.

1. The most apparent of all the commonalities between cycles is the written text ‘Through the Magic Door’ (Figure 3.4, p. 86, 87). All 54 students involved were given that text and asked to illustrate it. As part of their design challenge each student was given the clear instruction that their objective was to convey the writer’s key theme. This did not vary from cycle to cycle.
2. All 54 students involved in the study had similar levels of design expertise. All students were in their second year of study. The participants were all enrolled in the first illustration paper 222:220, Illustration 1. The pre-requisite for this paper is a core design studio paper. All students enrolled had to pass that core paper.



3. All students produced thumbnails. Thumbnails represent an early stage in the design process where ideas are being explored and initially communicated. Illustration thumbnails contain the essence of an idea without the details or consideration of aesthetic. Ideas developed at the synthesis stage of the design process, certainly within the context of illustration, can usually be communicated at the thumbnail stage. They do not usually require aesthetic refinement to communicate their intent.
4. All participants involved throughout the three cycles worked in the illustration studio at their own desks. While cycles one and two were of short duration, each student involved carried out their design task in a familiar, comfortable environment, the same environment as for cycle three students. To make links between cycles, it was important to retain, wherever relevant, some level of commonality and continuity.

#### *Specific methods cycle by cycle*

As described in the previous section my data was gathered during fieldwork with the three main data sources being interviews, observations and documents. I sought depth of enquiry not breadth, through purposeful sampling. Purposeful sampling is sometimes called *purposive* or *judgment* sampling. Bernard, (2000) says, “In judgment sampling, you decide the purpose you want informants, (or communities) to serve, and you go out to find some” (cited in Patton, 2002, p. 230). I categorise my purposeful sampling under a sub-group, that of *homogenous sampling*. Homogenous sampling is characterised through its focus on a specific group. In my instance, my focus is on 54 design students with comparable design expertise, studying illustration for the first time at university.

Data gathering began in April 2004 and finished in May 2005. In section two I will describe how I gathered data from each cycle separately. Figure 3.6 describes the cyclical nature of my investigation and the relationships between cycles.

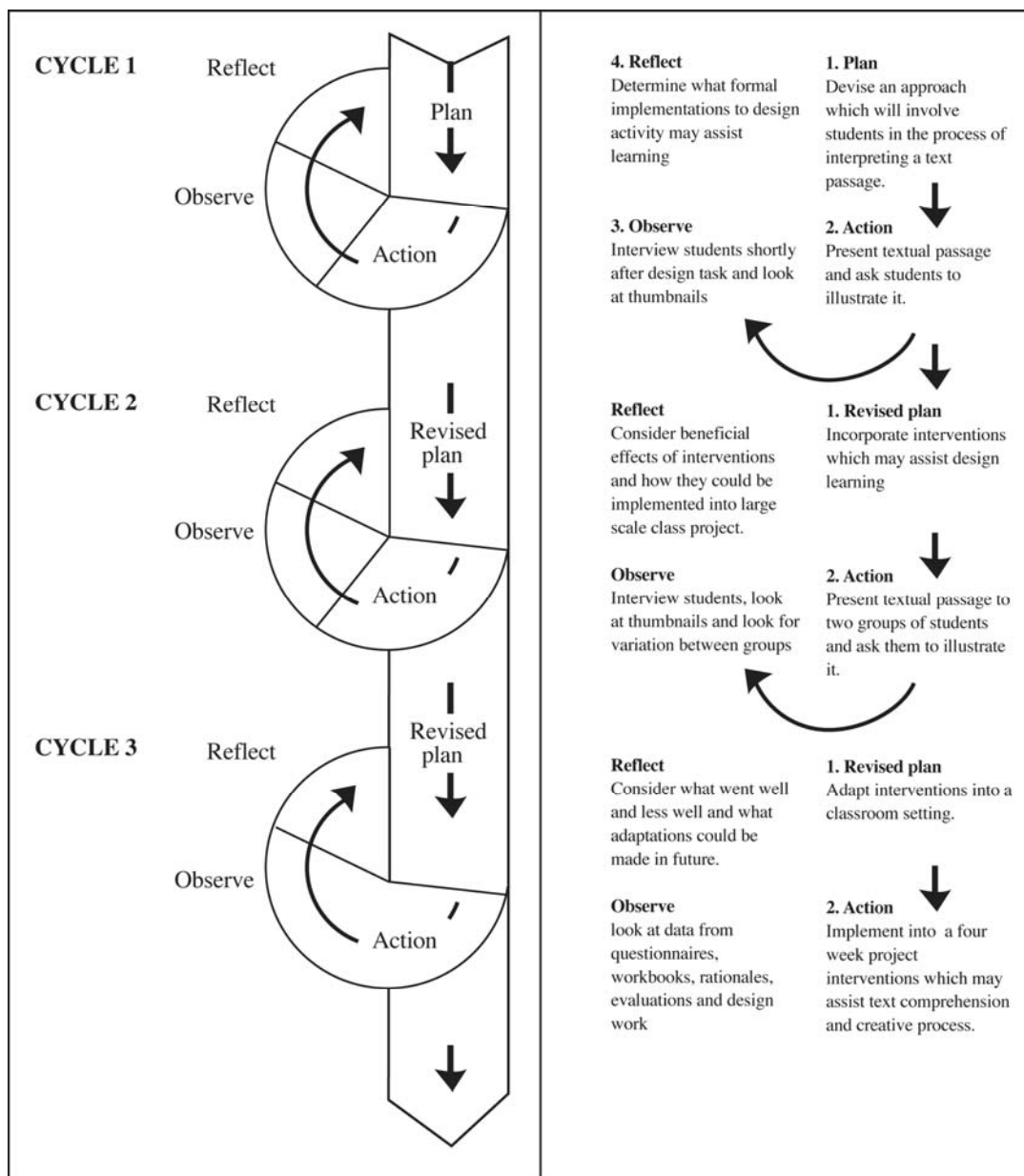


Figure 3.6. My action research cycle. Developed from O'Brien (2001).

In section two I will describe in-depth each of the three cycles separately.

## SECTION TWO

### Cycle one

Cycle one's participants consisted of eight students studying illustration for the first time (second year of degree) who volunteered to take part in my first investigation in April 2004. Of the eight who volunteered, the ratio was seven female to one male. This ratio is only slightly unusual. Currently female design students at Massey university outnumber male students approximately two to one. An information sheet was handed out to all students. The information sheet included the following criteria and limitations:

1. All students had to be second year students who had previously studied specified 'core' design papers. Core papers are obligatory papers which all students must enrol in and pass. Students had to provide their grades for core papers. *This was to ensure comparative levels of design expertise and academic attainment.*
2. All students who agreed to participate had to agree to an audio interview which would be transcribed. *The interview was to take place individually as soon as practicable after the design task.*
3. All students who agreed to participate had to grant permission for their design ideas to be used as data. *It was stressed that draftsmanship (technical rendering expertise) was not an issue, that what was of interest was the initial ideas in rough, quickly rendered sketches (thumbnails).*

The investigation took place in the illustration studio, a room which the students were familiar with as a consequence of their ongoing study. This was important as the enquiry sought to engage students with a design activity in a real-world setting, in a familiar environment where they normally carried out design activity. It was split into two sessions with four students per session so that interviews could take place as soon after the design task as possible with the fourth student of each session being interviewed approximately 45 minutes after the first interview began. The time difference between the design task activity and interview was therefore no longer than

one hour. Students in the first session agreed not to discuss their activity with those of the second session. As conditions were exactly the same during each session no comparisons were made between the students in relation to which session they attended and their data was grouped together as a single unit of analysis. Information sheets and consent forms were handed out and the consent forms were returned prior to commencement of the investigation. Purpose and structure of the investigation were clearly explained.

*The purpose of the study is to gain insight into the human experience of how ideas are created. The study will specifically enquire into the process of how written text is interpreted into a visual form. The focus is on idea creation and not on producing a final complete design (Excerpt from the information sheet, April 2004).*

#### *The design task*

A design brief was provided to students (appendix d). A brief is a written set of instructions and information about what is required of students. It is the formal, written component of a design project. The structure of the brief was typical of what students would normally expect in a project with the exception that it did not contain assessment criteria. Students were not being formally assessed in relation to learning outcomes. The brief did however contain, as is the norm in all design projects delivered in teaching situations, the ‘aim’ of the project. The aim of the project was:

*‘To interpret text extract into a visual image which conveys the writer’s message.’*

The brief asked students to read the Conan Doyle text ‘Through the Magic Door’ and render some illustrative concepts which conveyed what Conan Doyle was expressing in his writing. Students were asked to determine the main message and underline words or phrases from the text which they felt were of key significance and could be adapted into their concepts. Each student had 30 minutes to carry out the design task. It was expected that within that time each participant would be able to read and comprehend the text and interpret it into a variety of thumbnailed concepts.

Thumbnails are small sketches quickly rendered to explore the key conceptual elements and visual features of an idea.



Figure 3.7. Example of a thumbnail sketch, approximate to actual scale.

There are no rules which determine a sample size in qualitative inquiry. It all comes down to determining, as the researcher, what one wants to know. Eight participants might, compared to quantitative sampling, seem a very small group from which one can gain useful data. It is important however to recognise that throughout the three cycles there was one constant: all participants were given the main task of illustrating the main message of 'Through The Magic Door'. Therefore knowledge gained from the three cycles was in-depth and cumulative.

I regard the activity-focused nature of cycle one (and two and three) as being information rich. It was purposeful because it sought to research a specific activity: text interpretation, described previously as a linked three stage process: comprehension—interpretation—illustration. It was homogenous as the participants had comparable levels of design expertise. The key constant of the design task and the same textual passage ensured that depth of analysis was achievable.

The main aim of cycle one was to highlight issues pertinent to design education based on student activity involving the interpretation of written text into an illustration. At this time the underlying research question was: *How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of design?* As a starting point such a question allowed me to look at research which preceded me in

different areas of design where cognitive processes and design thinking were being explored. Ultimately I had to develop a project which enabled me to continue this area of research interest within my own specialist teaching area of illustration. The question remains pertinent throughout my study but it can be seen as a ‘macro’ question which ultimately led to a more specific ‘micro’ question around my own design education specialism.

The intended research outcomes of cycle one were answers to the following:

1. What variations were there among students as to their understanding of the key textual theme?
2. What level of explicit awareness can be identified as to students’ procedures for comprehending text?
3. Can I identify a relationship between chosen keywords and phrases and how (or if) they are adapted into visual concepts?

### *Procedures*

All 20 students studying illustration one were formally invited to participate in my first investigation. In the illustration class where all students were present, an information sheet and consent form were given out. Total confidentiality was guaranteed throughout. It was also made explicit that students were under no obligation whatsoever to participate. Eight students volunteered. The other students said they would have liked to volunteer but had other commitments. While those who did volunteer were not specifically asked why they had done so, they did say that they thought the research sounded really interesting.

Times were allocated. Two sessions were timetabled with four students in each session. At the allocated time in the illustration studio, students were given a design brief outlining what was expected of them and a copy of the Conan Doyle text. Sheets of A3 paper were provided, as were pencils and pens. Students were invited to use as many sheets as they required with no minimum or maximum number specified. They were given 30 minutes to carry out the design task.

On completion students handed in the sheets they had used to render their concepts, the design brief and the Conan Doyle text. Interviews started immediately afterwards. Students waiting to be interviewed were asked to remain outside the illustration room. They were asked not to discuss the exercise with each other. A colleague remained outside with the students and confirmed that students did not discuss the task. The interviews lasted approximately 15 minutes, varying from 12 to 17 minutes. Each interview was recorded digitally directly to computer and saved under a coded common name. Many of them are regularly referred to in the next chapter. During the interview the design brief, Conan Doyle's text and students' sketches were made available for reference. Without carrying out an interview with each student my analysis would have been based on the material outcomes of their design activity. Having the benefit of students' perspectives on what they did provided me with direct insight into their experience of the task.

The purpose of interviewing then is to allow us to enter into the other person's perspective. Qualitative interviewing begins with the assumption that the perspective of others is meaningful, knowable, and able to be made explicit. We interview to know what is in and on someone else's mind, to gather their stories (Patton, 2002, p. 341).

### *The interview*

The intended research outcomes of cycle one stated in the preceding page relate to a series of questions I asked the students. The interview was set up with a semi-structured format with the following main questions.

1. Can you describe how you went about understanding the text?
2. What would you say the writer was trying to convey in his writing?
3. What was the key theme?
4. Which keywords or phrases did you highlight and why did you choose them?
5. Can you describe your concepts for me?

The five main questions were *standardised open-ended*, questions which I had determined before the interview. The weakness of this approach is that it does not

allow for unanticipated issues or topics which may arise in the course of questioning. To compensate for this, I made room for a semi-structured element by asking what Patton (2002, p. 352) calls “probe” (follow-up) questions in response to what students said. For example, if a student responded to question five by pointing out a concept as his or her favourite, I would ask “what is it about this concept that particularly appeals to you?” However, I found that following the main structure of the five key questions was of great use as it enabled me to make direct comparisons between students based on their responses. Probe questions did not allow for this as they varied between students. The standardised open-ended approach worked well for me as it allowed me to keep the data focussed. It also made analysis easier because I could quickly compare answers to the same question. I therefore make no specific reference in the next chapter to students’ responses to probe questions.

### *The design outputs*

Each student had the design task of illustrating the text. The design challenge was for them to convey the writer’s main message. As the message in a text is a conceptual abstraction the visual image has to be composed of recognisable physical forms which ‘represent’ the abstraction. I use the terms *concrete* and *abstract* to describe this relationship. In cycle one (and cycle two) initial, rudimentary sketches (thumbnails) that embodied various concepts were what students produced as their material outcomes. As discussed in chapter one, I am experienced both as an illustrator and as an illustration lecturer. I was able to take full advantage, as the researcher, of this experience and expertise to interpret the ideas behind these sketches. What was also of value were the notes that students made during the exercise. I make reference to thumbnails and student notes in the next chapter. In cycle one the concepts are basic sketches devoid of detail and aesthetic enhancement. I use the method of denotation and connotation to describe the content and purpose of students’ images. Denotation, as discussed in chapter two, is essentially the physical elements found in a picture, connotation is what they represent. Essentially, for an illustration to communicate, its visual elements must be recognisable (concrete-denotation). These recognisable elements are then interpreted by the reader in the context to which they are being used to represent an idea. The image can then be understood symbolically (abstract-



connotation). Figure 3.8 describes this. The context for meaning is the well known biblical Adam and Eve story.

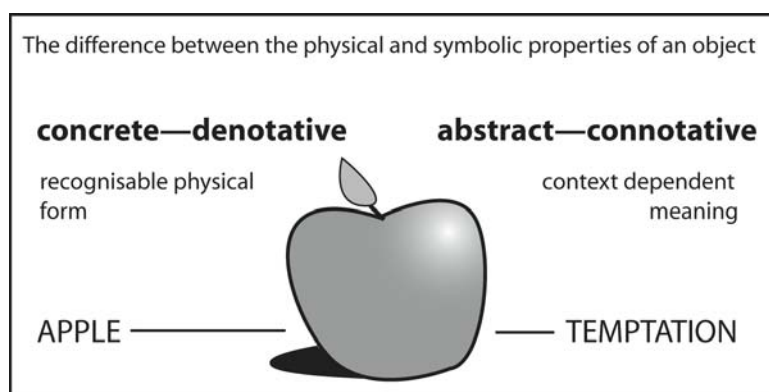


Figure 3.8. The relationship between concrete-denotative and abstract-connotative.

Wherever possible I use student comments made during the interviews to cross-reference my interpretations. This enables my readings of the images to be accurately verified by others. Figures 4.2 - 4.11 in chapter four describe cycle one design outputs.

Before I describe my second cycle I will locate it within the context of the action research cycle. The final stage of any cycle is to reflect on its successes and failures. Initial, rudimentary analysis of cycle one led me to the conclusion that probing questions were of little value when researching a small group of students. Standardised open-ended questions enabled focussed analysis and verifiable comparisons to be made between students. This approach also suited the limited time available for the interview. While I was able to determine that there was significant variation between students as to their understanding of the text and the conceptual approaches they took towards illustrating the text, I was not able to come to any definitive conclusions as to what caused variation, only that it was clearly present. I determined to resolve this through action in cycle two.

### *The reflective stage*

A second research cycle begins as a revised plan. It is a response to what was learned in a previous cycle. Variation in student understanding of the main text and

conceptual approaches suggested two key things: (1.) variation in student comprehension of text may be to do with their comprehension strategies. If so, the incorporation of a formal comprehension strategy may assist more students to identify key themes within a text. (2.) Variation in conceptual approaches in cycle one students suggested that the formal introduction of a conceptual strategy which uses analogy may assist novice students to develop novel concepts. In his seminal book on intelligence and creativity—*The Sciences of the Artificial*, Herbert Simon (1996, p.162) defines novelty as “interestingness”. In the context of teaching illustration my interest is in helping students develop ‘interesting’ ideas.

The challenge for cycle two was to incorporate some interventions into the design task and structure of cycle two and investigate what effect they had on student process from comprehension to illustration. This can be seen as the second phase of the cycle—the action. It was important to be able to carry out a comparative study with two groups. Ethically I could not create separate groups in a normal classroom situation involving formal assessment as it could hypothetically disadvantage some students’ learning. So cycle two necessitated, as with cycle one, a controlled, situated learning study with volunteer students.

Plan—act—observe—reflect

## **Cycle 2**

It is important to stress that cycle two was set up, as with cycle one, to be a naturalistic enquiry. Patton (2002, p. 42) reminds us that naturalistic inquiry “falls along a continuum”. Students who volunteered worked at their own desks in the illustration studio, an environment with which they were very familiar and comfortable with. Interventions are a key component of action research where change and its effect can be observed first hand. I would argue that having two groups in a single cycle allowed for comparisons to be made in a naturalistic environment. Reason and Bradbury (2001, p. xxv) suggest that action research, depending on the

context of enquiry, is able to draw on a multitude of different practices and methodologies. Creating comparative groups is therefore not inconsistent with the intentions of action research.

Cycle two's participants were 12 volunteer students enrolled in the illustration one paper. As with the previous cycle these students were studying illustration for the first time. This investigation took place in August 2004. Protocols and procedures for enlisting participants were the same as the April 2004 investigation and the information sheet had the same content. To ensure parity between group one and group two, students were put into groups based on their grades in previously studied 'core' design papers. This was to ensure that each group was academically balanced with an even spread throughout the grades from A to C. Of the 12 students who volunteered, six were female and six were male. As with cycle one students, this group of volunteers said that the research sounded really interesting. It was only by coincidence that each group ended up with an even gender match—three male, three female in each group; an even spread of academic attainment between groups was the guiding criteria, not gender distribution.

Once students had been allocated to a group we met in the course of two consecutive sessions in the illustration studio. Both groups had 30 minutes to engage with the design task. As with cycle one, interviews took place immediately afterwards with the final student of each group interviewed approximately 90 minutes after the first. Interviews lasted between 10 and 18 minutes. Students were asked not to discuss their activity either with their own group or the other group. A colleague waited with students while the interviews were taking place.

The research question of cycle two developed slightly to enable a more convergent focus on illustration. *How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of illustration?* The previous question was more generic, emerging, as it did, from the wider perspective of the field of design in general. The main aim of cycle two was to further highlight issues pertinent to design education based on student activity involving the interpretation of written text into an illustration. However, cycle two involved the incorporation of two specific

interventions and the separation of students into two separate groups. It was hoped that the interventions would ultimately assist student learning in a normal classroom situation, but this was in no way guaranteed.

As some students in cycle one were unable to highlight the key textual theme and some devised concepts which were rather literal, my interventions were designed to help students overcome these tendencies. To determine if my interventions would have an effect I had to separate participants into groups. This led me to develop the following intended outcomes.

The intended research outcomes of cycle two were answers to the following:

1. Can I identify different outcomes between groups?
2. What effect did formal instruction on text comprehension strategies have on group two?
3. What effect did the incorporation of analogy have on group two's creative response to the text in the form of their illustrations?

*The design task and interventions given to group two*

Group one were given exactly the same information as cycle one students and the purpose of the exercise was exactly the same as the previous investigation. Group two's brief had an additional requirement. Below are the briefs as given to each group. While the main design task is the same, the additional requirements in group two's brief relate to my achievement of my intended outcomes as stated above.

|  |
|--|
| <p><b>GROUP ONE BRIEF</b></p> <p><b>Aim</b></p> <p>To interpret text extract into a visual image which conveys the writer's message.</p> <p><b>Brief</b></p> <p>Produce some ideas in sketched form which express what, in your opinion, the writer's viewpoint/message is.</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"> <li>1. Read the text 'Through The Magic Door'.</li> <li>2. Underline words or phrases which you find to be of most significance.</li> <li>3. Illustrate the text. Initial sketches are all that are required. Remember your main objective 'produce some ideas in sketched form which express what, in your opinion, the writer's message is.'</li> </ol> <p><b>GROUP TWO BRIEF</b></p> <p><b>Aim</b></p> <p>To create an analogy and interpret text extract into a visual image which conveys the writer's message.</p> <p><b>Brief</b></p> <ol style="list-style-type: none"> <li>1. Produce some ideas in sketched form which express what, in your opinion, the writer's viewpoint/message is. You are to do this through the creation of an analogy (or more) to the provided text. For example, if the text you were illustrating was about humans and how they are destroying life in the oceans and will ultimately be destroyed because of their actions, an analogy could be 'War of the Worlds', the book by H.G Wells. This analogy would show how humans, like the martians from the book are like aliens invading another world.</li> </ol> <p>So, define something similar to what the author is telling us.</p> |
|--|

Figure 3.9. Project brief given out to group one and group two students.

There are two key differences between what was required of each group: (1.) Group two had to read the sheet titled '*Reading text: The development of understanding*' before they read the Conan Doyle text and then illustrated it (appendix e). I will describe the content of this sheet shortly. (2.) Group one had to illustrate the text through the use of analogy. I cannot stress strongly enough however, that both groups

still had the main design task of ‘**conveying the writer’s message/viewpoint**’ in their illustrations.

I developed a sheet titled ‘*Reading text: The development of understanding*’. The sheet contained 11 procedures, nine of which were specific to the enhancing of text comprehension; the other two related particularly to the design task itself. While the procedures were my own, they were inspired by the literature on reading comprehension. Writers such as Harvey and Goudvis (2000) provided me with a number of options as to how I should devise my own comprehension strategies for my students. The sheet was handed out to group two and they were asked to read it before they read the Conan Doyle text. The brief and the Conan Doyle text was handed out a few minutes after the comprehension sheet.

The second key difference between groups was the request for group two to explain the text through a conceptual analogy. This was to be done once they had summarised the text’s message down to one or two sentences. The textual summary was to be explained (illustrated in the verbal sense) through an analogical situation. The visual outcome—the illustration, is defined as a *visualised conceptual analogy*.

#### *The interview and design outputs*

The interview was carried out under the same conditions with the same structure as cycle one. Probe (follow up) questions were also asked but, as with the previous cycle, found not to be of great value. Design outputs were gathered and analysed according to the structure determined in cycle one. As with cycle one, the questions relate to my research aims and as a consequence of there being two groups, the second group were given additional questions to assist the achievement of intended outcomes.

1. How did you go about reading the text?
2. Which key words or phrases did you highlight?
3. What would you say the writer was trying to convey in his writing?
4. You were asked to summarise the text into one or two sentences. Can you tell me about what you wrote? (Group two only)

5. From your summary you were asked to create an analogy. What did you come up with? (Group two only)
6. Can you describe for me your concepts?

### *Reflections*

Initial, rudimentary analysis of cycle two suggested that my interventions had a beneficial effect on how group two approached the task of interpreting the Conan Doyle text. I decided that my interventions could be adapted into a normal classroom situation with a full group of students (my plan). The interventions would be incorporated directly into an illustration project lasting four weeks (the action). Data would be gathered after the project was completed to fulfil ethical commitments. And finally I would collate all data from the three cycles, look for patterns and themes (observe) From this I would develop a cohesive argument and present it in this thesis (reflect).

Plan—act—observe—reflect

### **Cycle three**

This cycle's participants are 34 students who enrolled in the illustration one paper. As this cycle was carried out during normal teaching its structure and procedures vary considerably from the previous two cycles. However, the prime design task—that of illustrating the main message of the Conan Doyle text 'Through the Magic Door' continues to a final designed output conclusion—a fully rendered, full colour illustration. This contrasts to the outputs of the first two cycles where the design outputs were thumbnail sketches.

### *Thumbnail to full colour illustration*

All three cycles were situated within the broad spectrum of naturalistic enquiry. They were all carried out in the illustration studio at desks students normally used in their illustration study. All three cycles required the generation of thumbnails. This is a normal part of the design process, whether they represent lateral (different) or vertical (variations of an idea) transformations. However, in all illustration studio classes that

form part of Massey's illustration curriculum, ideas have to be developed and realised through the production of a final design. In this instance, the final design was a full-colour illustration. Technically the image had to be rendered in an illustration technique known as dry-brush on a base colour. This is a common technique and one which allows novice students to develop technical expertise in traditional painting. Thinking skills form the backbone of this research study and it could be argued that only thumbnails would have been required to demonstrate effective comprehension and analogical reasoning. However, it should be stressed that one of my key objectives was to improve student learning in a normal classroom setting and this required the inclusion of cycle three as a full duration class project. To argue and demonstrate that improved learning took place in a normal teaching/learning situation it was necessary to complete the cycles with a full duration class project. The reflective comments of cycle three students, as a consequence of a four week time span were far more in-depth than those of cycle one and two students who were interviewed immediately after the design task. Completion, culminating in a full-colour illustration therefore enabled more reflection and awareness of thinking approaches to a design task. The final design artefact, as a completed material outcome brought conclusion to the project, not only as a classroom activity, but as a research study.



Figure 3.10. Examples of design outputs from, left to right, cycle one, cycle two and cycle three.

The gender ratio was 27 female to seven male. All students were studying in their second year, for a Bachelor of Design degree. The information sheet for cycle three



was different from the previous two. Below are some excerpts from the sheet. As per previous cycles, data could only be gathered from students who volunteered to participate. I was extremely pleased that all 34 students gave consent for their work to be used as data:

*The project you have completed has been designed as part of the illustration curriculum. However, the outcome of the project is also of relevance to my PhD research into design learning and Massey University's Ethics Committee has given me approval to collect data from the project under the understanding that it is with your full approval.*

*My role during the teaching of this project was as your lecturer. Now that the project has been completed, your work can be analysed as research data for my PhD. My role in this data gathering exercise is entirely as a doctoral research student.*

*No extra work is required of you. The questionnaire is a normal part of this design brief. What is required is your permission to use your comments and design work as part of my doctoral research. (Excerpt from cycle three information sheet, appendix c).*

The research aim of cycle three was to gather data to find out if the formal incorporation of comprehension strategies for reading text and the inclusion of analogical thinking as a creative strategy could enhance novice student learning of illustration. As mentioned earlier in this chapter, action research starts off with fuzzy set of propositions and leads to a formulated question. On conclusion of the first two cycles I was confident that I could implement positive change into the classroom which would result in effective learning outcomes. As mentioned previously my research question was: *Can the application of formal comprehension strategies and analogical reasoning improve illustration students' visual interpretation skills?*

As with cycles one and two my main aim was to further highlight issues pertinent to design education based on student activity involving the interpretation of written text

into an illustration. To achieve this aim I developed a number of specific research activities in cycle three.

The intended research outcomes of cycle three were answers to the following:

1. What effect would cycle two interventions have when implemented into cycle three's four week class project?
2. What was each student's experience of the project?
3. Did the formal incorporation of reading strategies enhance comprehension?
4. Did applying analogy lead to novel concepts?
5. Were students' able to describe in explicit terms their thinking approaches?
6. What analysis structures can be used to determine the conceptual basis of students' illustrations?

### *Procedures*

Action research seeks to bring about meaningful change in real-life situations. My first two cycles prepared me to implement, as a teacher, a number of changes to my normal delivery of an illustration project. My insights from previous delivery of text interpretation projects suggested to me that many first time novice students failed to grasp the significant features of a text, often picking up on issues of lesser importance. Also, a common output by some students are concepts which are really quite literal and lack novelty. This is perhaps to do with playing safe and not risking a more symbolic, conceptual approach. Further to these concerns, I have also noted that students are often unable to describe, on reflection, how they went about a task or what approaches they took in creating concepts. As design is as much to do with thinking as it is to do with making, I also set out to assist students to become more aware of their thinking approaches.

The design brief was similar to that given to group two in cycle two, the key difference being the addition of learning outcomes and assessment criteria (appendix f). Students worked on this project over a period of four weeks. There was therefore a large amount of potential data to be gathered from their activities.

The data was a combination of visual work and written commentary. Figure 3.11 lists the various data types in relation to the number of students who participated. The developmental workbooks and final designs were the only sections of data which were formally assessed during the project. Questionnaires, evaluations and rationales are often given out to students during a project but they are never formally assessed. Evaluations are written by students to describe what they learned in a project. Rationales are the written version of an assessed verbal presentation which students give at the end of a project. The verbal rationales are assessed as presentation is regarded as a crucial design skill. This is where the student describes his/her work, the concept behind the final illustration and the various pictorial elements which make up the image. All these various forms of data are referred to in the next chapter.

|   |                         |    |
|---|-------------------------|----|
| Questionnaire 1.Comprehension of text part 1. | Written data            | 32 |
| Questionnaire 2.Comprehension of text part 2. | Written data            | 19 |
| Analogy exercise                              | Written and visual data | 22 |
| Evaluation                                    | Written data            | 29 |
| Rationale                                     | Written data            | 28 |
| Developmental workbook                        | Written and visual data | 34 |
| Final design                                  | Visual data             | 34 |

Table 3.1. Types of data and participant numbers.

As the activities in the illustration studio cover a period four weeks I will now provide a timeline of events during the teaching of the project.

|  |   |
|--|---|
| <p><b>Week 1. Day 1.</b><br/>Project begins with tutorial. Reading sheet handed out with design brief.</p> <p><b>Day 2.</b><br/>Painting exercise. Conan Doyle text given out. Analogy exercise.</p> | <p><b>Week 3. Day 1.</b><br/>Concept development. Questionnaire 2.</p> <p><b>Week 3. Day 2.</b><br/>Concept development.</p>  |
| <p><b>Week 2. Day 1.</b><br/>Painting exercise. Analogy exercise critique. Concept development.</p> <p><b>Week 2. Day 2.</b><br/>Concept development. Questionnaire 1</p>                            | <p><b>Week 4. Day 1.</b><br/>Concept development.</p> <p><b>Week 4. Day 2.</b><br/>Concept development. Last day in class. Work handed in the following week with written rationale and evaluation.</p> |

Figure 3.11. Timeline of classroom activity.

The analogy exercise contained four short written propositions. These are discussed in chapter four. Students were given the task of providing a visual illustration of each proposition by developing a conceptualised visual analogy in thumbnail form. They also had to write a short description of the concept. There was no instruction given as to how students should proceed with developing an analogy. I wanted to find out what kind of instruction might be required later when the Conan Doyle text was to be conceptualised analogically. The successful outputs were used to great effect as exemplars during the follow on critique session in the next day's class. A selection of images from the analogy exercise is discussed in the next chapter.



Figure 3.12. Analogy exercise example.

### *Workbooks and final illustrations*

Unlike the previous cycles where students only had time to produce basic sketches of ideas, cycle three students were able to spend considerable time developing their concepts into finished illustrations. The various stages of concept development are captured in student workbooks. Figure 3.13 provides a snapshot of the various stages that precede the final illustration.



Developmental process. Initial ideas consolidate towards a final concept. Source images from photographs are used to provide detailed features for final image. Composition options are then explored. Colour roughs are done prior to final art which is carefully rendered in full colour.

Figure 3.13. Sample from student workbook concluding with final illustration.

### *Written data*

As table 3.1 shows, there was a considerable volume of written data to complement the visual data. The focus of the questionnaires was on comprehension of the text. Student notes in workbooks provided insight into the interpretation stage from comprehension towards visual conceptualisation. The written rationales described in the students' own words the ideas behind each image. The evaluations written by students focussed on what they felt they had gained from the project overall. I have tried to meaningfully bring the written and visual data together to create a holistic picture of the student experience of interpreting text into an image.

### *Reflections*

The third cycle was very much concerned with action, a desire to change existing practices which often seemed to lead to poor quality illustrations. These practices revolved around (1.) not locating key themes in text, leading to, in many instances concepts which focused on lesser themes and (2.) the development of concepts which lacked novelty, tending to be focused on literal themes within a text. To assist more students develop good illustrative practice which involves communicating purposefully to a large audience, I wanted to see what I could do to improve my students' learning. As verification would come from analysis of images in relation to the text which they interpreted, I would also have to develop my own expertise in image analysis.

Plan—act—observe—reflect

## **Conclusion**

I have described my ontological and epistemological perspectives and explained why action research was chosen as the most appropriate methodology for this project. Action research seeks to bring change to an identified situation requiring improvement. Within an educational context, this was an opportunity to apply rigorous methodological practice with a view to improving design student learning and add to the growing body of knowledge on design process. This chapter has also described the content of each of the three cycles, the ethical issues involved, the research aims and objectives as well as the methods used to gather data. I have described how I determined to make the most of both written and visual data, by preparing for analysis, discussed in the next chapter, by cross-referencing the two types of data to produce a structured, cohesive and, hopefully, persuasive argument. I have tried throughout to provide you with some background information which will allow you the means, during the next chapter to follow my image analysis in relation to the original text, through structured semiotic analysis and cross-referencing with student comments and notes. In the next chapter I present my analysis of the written and visual data carried out during three cycles of enquiry from April 2004 till May 2005.

# 4

## CHAPTER 4: ANALYSIS





## INTRODUCTION

The results from three identifiable research cycles will be presented here. Each cycle is discussed separately with occasional references to other cycles made when a particular point can be best emphasised by comparison. The unfolding and cyclical nature of action research is such that I have decided to present the data in the order that it was gathered, cycle-by-cycle. Each section includes an outline of the main issues which will be discussed and concludes with a summary of the main points. I have incorporated a brief summary of cycles one and two just prior to discussing results from cycle three. On conclusion of cycle three I discuss links and patterns, which flow through each cycle and connect them. To begin I provide you with a summary of each cycle's structure and data sources (Figure 4.1).

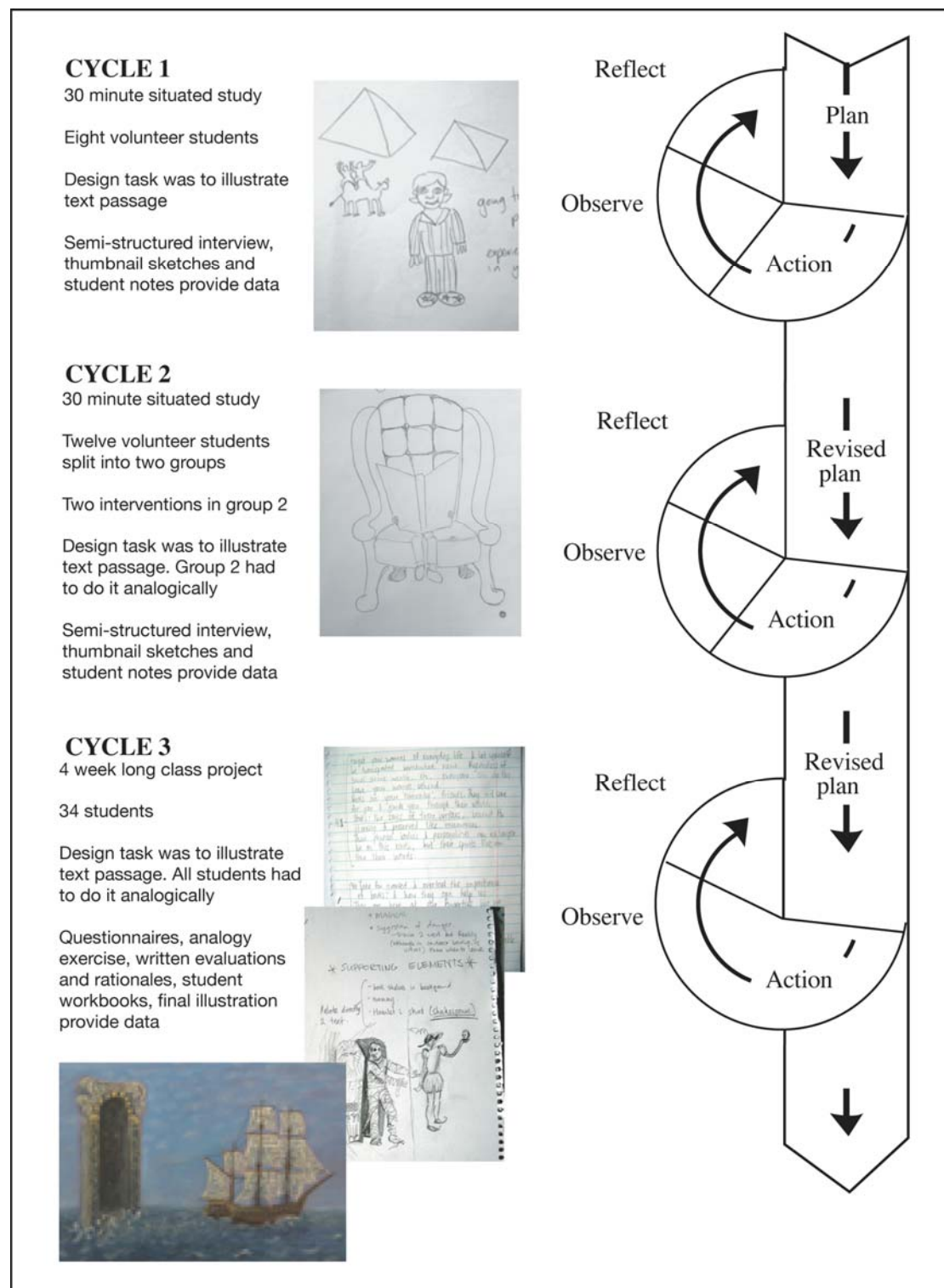


Figure 4.1. Cycle sequence.

Figure 4.1 demonstrates the different types of data gathered in each cycle and the common links between them. It also shows that the action research process is incremental, what Gummesson (1991, p. 62) calls an “hermeneutic spiral”.

## Cycle One

### *Introduction*

As mentioned in the previous chapter the time span of this cycle was 30 minutes. In that time students were given the task of illustrating the supplied text extract. Illustration based on expository text interpretation is defined in chapter three as “imagery which encapsulates, supports and enhances a hegemonic reading of a written text” (p.84). The design challenge was to produce sketches/visualised concepts, which illustrated the writer’s main message. Students were asked during a semi-structured interview to describe what they believed the main message contained in the text was. They were also asked to describe which particular keywords or phrases they chose as being of value to their concept development. The plan I devised for cycle one was to investigate student ideas of the main message, see if keywords and phrases chosen would be adapted and incorporated into visual concepts, investigate what understanding students had of their approach to reading text and also investigate what relationship there was between student understanding of the text and the concepts produced.

The following will be discussed:

1. Variation in student conceptions of the main message
2. Links between conceptions of main message and the concepts produced
3. Approaches to reading text
4. Different concepts and conceptual approaches
5. Student descriptions of their approach to reading text.

### *Variation in student conceptions of the main message*

During the semi-structured interview each student was asked to describe the key theme in the provided text passage. Three students said that escapism in books was the key concept. This was either explicitly stated (see Dana’s comments, p. 122, 123) or implied (see Frances’s comments, p. 121). The other five students focused on

describing lesser themes from the text (see Harry, p.123 and Brenda's comments, p.124, 125). As their design task was to illustrate the key theme from the text it was noticeable that six of the eight verbal descriptions of the text did not coincide with visual concepts rendered. This was also largely the case with chosen keywords and phrases which can be usefully adapted into an illustration as secondary, supporting concepts. On the whole, student descriptions of the text's main theme were quite vague with emphasis often placed on aspects which were of lesser significance than the key theme of escapism (see Harry and Brenda's examples, Figures 4.6-4.9). Two students' works showed an implicit but clear connection between the key theme, student's comments and the design work produced (Frances and Dana, Figures 4.2-4.5). I will describe these works and compare them to two examples where student descriptions of the textual message and chosen keywords and phrases did not tally with the visual concepts (Harry and Brenda). This was determined through semiotic analysis.

Frances described the text as being about how reading takes you to another world, *'it's like, how would you put it, a holiday, like getting away'*. She also referred to how the text talked about writers who were long dead, *'he also went into the way how these dead people left their experiences for us to read and how they're more exciting than live people sometimes'*. Keywords and phrases mentioned in the interview have also been, either implicitly or explicitly interpreted into her images (see below). She underlined 'mummified soul' and 'company of the great dead' from the text and said in the interview *'Maybe just things that I could relate to with imagery, things like 'mummifying' and stuff like that. It's just stuff that made it more clear like 'company of the great dead' and things like that, which actually described the whole kind of thing'*. A clear connection between what Frances said and did can be made by comparing her comments to her design sketches.



Figure 4.2 (Frances) analogical concept.

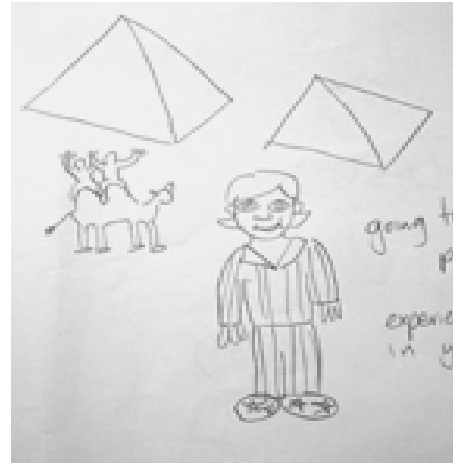


Figure 4.3. (Frances) concept variation.

In Figure 4.2 we see that Frances has compared the experience of reading a book to going on holiday – the implication being that both books and holidays help you get away from your normal existence. The outer figures in Figure 4.2 are secondary elements added to represent dead writers, mentioned numerous times in the text. The central figure represents the reader, the individual whose experience has been changed. The image represents a photograph placed in an album, again something we would do to remember a holiday (the outer edges represent album flaps). In Figure 4.3 Frances continues with the holiday concept, making an oblique reference to a section in the text which talks about ‘mummified souls’ through the inference of the Egyptian pyramids. The figure is wearing pyjamas and this is because we see a new concept emerging, comparing books to dreams. Pyjamas provide context for dreams through an immediate association with sleep. At this stage two concepts, being on holiday and dreaming, are blending in the one image, a common creative approach. The dream concept did not develop further despite its potential as a way of connecting the experience of dreaming to that of reading. Both books and dreams contain fantastic worlds which we can become part of.

Dana also provided an accurate summary of the text’s main theme, summing it up by saying ‘*Just the fact that you can escape in books I think*’. She chose ‘you can summon the world’s greatest to sympathise with you’ in her keywords and phrases and refers to the text by saying ‘*you know, you just open a book and the great masters will come out and teach you stuff and when I saw that I thought, oh it’s kind of like*

*Aladdin's lamp.*' Figure 4.4 shows a girl opening a book. From the book emerges a gaseous, genie-like form in the guise of William Shakespeare, the only dead writer specifically mentioned in the text. What Dana has been able to do is incorporate notions of 'escaping' and 'summoning' from her understanding of the text and adapt them directly into her concept. Figure 4.5 is a variation of the same concept. To guarantee the Aladdin connection the girl wears an exotic costume.

*No matter what mood you may be in, when once you have passed through the magic door you can summon the world's greatest to sympathize with you. (Conan Doyle, 1907)*



Figure 4.4 (Dana) analogical concept.



Figure 4.5 (Dana) concept variation.

I will now describe the work of Harry and Brenda, two students whose approach to the task of describing the text and illustrating its main theme were more typical of the group of eight overall.

Harry makes very little connection between his description of the text and the images that he sketched. *'Overall, I thought that it was quite a sort of piece of text that was talking about the sort of positive sides of reading and experiencing well written text and what not.'* Keywords and phrases of significance chosen by Harry are 'plunge', 'great dead', 'you have left all that is vulgar and sordid behind you' and 'noble silent comrades'. When asked about his choice of keywords he said *'Okay well the first one I said was 'plunge', I just thought it was a really emotive word, it was quite sort of*

*getting definite ideas with plunge...*’ Plunge is indeed an active verb and could have usefully been incorporated into a concept (see Kris, Figure 4.15, cycle two for an example where ‘plunge’ was effectively used to support the key theme in the text). However, none of Harry’s concepts can, using semiotic analysis, be traced back to this word. The only clear connection between a keyword or phrase chosen by Harry and its physical manifestation is in one concept, Figure 4.6 and its variation in Figure 4.7. Here we see a line of books slightly metamorphosed to resemble comrades or soldiers. This can be traced directly to a section in the text which says ‘noble, silent comrades, waiting silently in their ranks’. Conceptually Figures 4.6 and 4.7 tell us very little about what Conan Doyle is telling us about books. The metamorphosing books are to all intents and purposes literal translations from the text. At best they symbolise what books ‘are’ but not what books ‘do’. The other element, that of the figure reading a book again fails to provide us with a conceptual narrative that would enhance our understanding of the text.



Figure 4.6 (Harry)



Figure 4.7. (Harry) concept variation.

Brenda said the main textual message was ‘*Probably about how books are an access to a person’s well, the author’s ideas and so, he’s saying that you don’t really need, you don’t need to worry about the fact that he’s dead*’. Her rationale for her keywords was to separate them into two categories, ‘concrete’ and ‘descriptive’. *Well I had different sort of categories of things I highlight. There’s the concrete things like*

*'bookshelf', 'door' um and the kind of descriptive things... like 'out comes the dead writer and they hold you enthralled by the hour'. Her concepts were very narrowly located around books, bookshelves and gravestones. Semiotically it is simple to connect gravestones to dead writers in the context of Conan Doyle's text. This is confirmed by one concept which shows a book with the words 'RIP. W. Shakespeare' as on a gravestone. Brenda's conceptual approach is similar to Harry's and it has led to images which only manage to capture small fragments of the text's content and are not particularly illustrative of the key idea in the text. Figure 4.8 focuses on connecting books to dead writers. In Figure 4.9 an individual is looking up at a large bookshelf. These images fail to provide any useful insight into the writer's main theme, that of escapism.*



Figure 4.8 (Brenda)



Figure 4.9 (Brenda)

### *Different types of concept*

During the exercise students rendered basic pencil or pen sketches. Most included some written comments next to their ideas. What I noticed as being of possible significance was that some of the concepts whose pictorial elements had more illustrative and communicative potential (by Frances and Dana), not only linked back to verbal or written comments but they were based on making comparisons between different things; they had analogical content. Each student handed in their sketches which varied from between four to nine identifiable concepts. As mentioned



previously there was an overall tendency for students' verbal descriptions of the text's main themes and keywords not to be matched by their concepts. Concepts which had more illustrative potential were based on comparisons between situations. These concepts, through comparison enable us to identify with the nature of books or the effect they can have on us. The majority of concepts were either set in literal situations, often based on secondary themes and details from the text, with many concepts incorporating rooms with books on bookshelves. Dana and Frances created concepts, which can be described, as analogical. Below are comments they made when describing the text's theme,

*It's like, how would you put it, a holiday, like getting away*

(Frances, Figure 4.2, 4.3)

*I thought oh it's kind of like Aladdin's lamp*

(Dana, Figure 4.4, 4.5)

Both students described the effect reading books can have on us by describing other experiences. This approach is very useful in the context of expository text illustration where there is no point in just literally illustrating something described in the text. A good conceptual illustration provides new insight into a text by bring out something which is not obvious, yet, when an audience sees the image and reads the text, a connection which might not otherwise be made is produced. This is when a good illustration truly enhances a written text.

The six other students in the group did not develop analogical concepts but developed what I would describe as *fragmentary* or *situational* concepts. Brenda's illustration (Figure 4. 8) is a good example of what I mean by fragmentary. In the Conan Doyle text dead writers are mentioned. Brenda's concept focuses on dead writers to the exclusion of the key theme, that of escapism. Figure 4.9 is situational, based on providing a location for where we would find books. Another example of fragmentary conceptualising is Carrie's concept (Figure 4.10). In the text Conan Doyle talks of books as the 'mummified souls' of dead writers. Carrie uses this as the basis for her concept of a book wrapped in bandages.

*A mummified book that was just a bit cheesy laughter, but I kind of thought the whole mummified book thing was kind of a juxtaposition to the rest of it. (Carrie)*

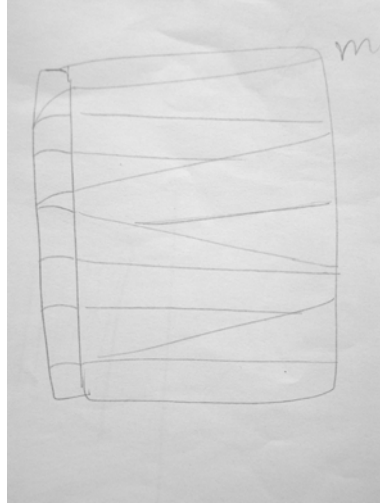


Figure 4.10. (Carrie)

Harry's illustrations (Figure 4.6 and 4.7) are examples of what I mean by situational. This refers to concepts, which are situated in rooms with bookshelves. The opening sentence of the Conan Doyle text does talk about a room with bookshelves but a conceptual illustration does not require such a literal approach. Another example of this is Amy's image (below). Amy's image, fails to capture anything of the emotional experience of reading a book.

*'I just wanted this room and the size, the cosiness of the room was to do with the 'humble bookshelf' (Amy)*



Figure 4.11. (Amy)

Harry and Amy's approach to illustrating the text was to create situational environments where we might expect to read books. Carrie's approach was to pick up on secondary, or fragmentary aspects of the text. Brenda created both fragmentary and situational concepts. Frances and Dana, in contrast to the group as a whole, took a different approach and conceptualised through analogy. As good conceptual illustration is generally regarded as image making which bring something new to a text as opposed to exploring the obvious, their work shows the value of an analogical approach to text interpretation. This does not mean that fragmentary and situational aspects cannot be part of a concept. For example, there is no reason why Carrie's mummified book could not be incorporated into an image in the background. As a secondary element it could quite easily enhance an analogical concept. More will be said of secondary elements later when I discuss the 34 images produced in cycle three.

#### *Approach to reading text*

Students were asked to describe how they went about understanding the text's message. Descriptions of comprehension strategies were rather general, lacking articulation of a clear strategy. I have included comments from four of the eight students. Three of the others wrote similar comments and one failed to answer the question talking more about her concepts than approach to the text.

Q. Can you describe how you went about understanding the text?

*Um I just read through it and read through it fully the first time and then the second time I went through and underlined all the bits I thought that I could get images from and also things I could bring into the illustration. (Amy)*

*Literally at first because it had a lot of, it was quite descriptive and it was exaggerated but also real descriptive and just pictures started coming into my head when I first read it, rather than words. (Carol)*

*I just read it through once and read it through twice. (Dana)*

*I read it the first time but I still felt I didn't understand enough so I read it again and underlined some bits. (Frances)*

Based on student comments, awareness of an applied reading strategy was essentially limited to talking about reading the text through a couple of times and underlining words. I found no noticeable exceptions. In the second cycle I will discuss how a formal approach to reading text can assist students to develop an identifiable and systematic approach to text comprehension. Students in one of the groups in cycle two were able to recall how they went about reading text in a more structured way than those of cycle one.

During analysis, something which I had not previously considered significant began to emerge. When looking at the data from all three cycles I was able to notice patterns in student note writing activity. This will be discussed more fully later in both cycle two and three. With respect to cycle one it came to my attention that student notes focussed on describing concepts and not on analysis of the text. This pattern continued with some students in cycle two and three. Of great interest however, is the fact that another note taking pattern emerged in cycle two and three: that of text analysis.

### *Main findings of Cycle One:*

1. Verbal descriptions of textual message and the concepts produced rarely matched
2. The key concept of escapism was not mentioned by five out of eight students
3. Keywords and phrases from the text were rarely adapted into the visual concepts
4. Some concepts based on making comparisons between different situations complemented the text by providing something new and novel
5. The majority of students developed concepts which were fragmentary or situational
6. Descriptions of reading strategies were limited and generic
7. Student notes focused on describing concepts, not on text analysis.

## **Cycle Two**

### *Introduction*

As with cycle one, semiotic analysis of design work and written notes have been linked with student comments made during a semi-structured interview. I have, wherever possible, used students' own words as explanation for actions. As with cycle one, the design task lasted 30 minutes. Twelve second-year design students volunteered from a class of 20. I would say that the volunteers were typical representatives of the class. Of the eight who did not volunteer, some said that they had too many class projects awaiting completion and did not have time to participate. Students were separated into two groups of six.

Gender was evenly matched. Separation was based on academic transcripts with each group evenly matched in previous academic attainment. There were three males and three females in each group. As with cycle one the main task of illustrating the text extract remained the same. Two interventions were added to this cycle. The first intervention involved providing group two with a written sheet containing 11 formal procedures for reading text and interpreting it into pictures (see appendix e). The second intervention had three linked propositions. (1.) Group two students were asked to sum up the Conan Doyle text in one or two sentences. (2.) From this summary they were asked to describe it in terms of an analogous situation. (3.) Their described analogy was then to be developed into a visual concept, which embodied the meaning behind their one or two sentence summary. The purpose of the interventions was to investigate what variations there would be between groups.

The following will be discussed:

1. Differences between individuals and groups in relation to their understanding of main textual message.
2. Differences between groups' note taking approach
3. Different conceptual approaches taken
4. Student descriptions of their approach to reading text.

#### *Understanding of key concept in text*

All students were interviewed shortly after completion of the design task. Students were asked to describe the writer's main message. During their interview, everyone in group two mentioned escapism while only Ben from group one mentioned it. I referred to the sheets containing notes and design sketches that students handed in and also discovered that the words escape or escapism appear in five of group two's notes. The only exception in group two, Kris, mentioned escapism during his interview. In contrast to this, in group one, references to escapism only appear in Ben and Chris's notes. The following four excerpts illustrate variations in responses between the

groups. As mentioned previously, group two were supplied with procedures on how to structure an approach to reading comprehension.

Q. What would you say the writer was trying to convey in his writing?

*I didn't fully understand the message as a whole, I sort of so, the only stage I got up to was capturing little parts and I sort of understood. Well this is what I got from it. Yeah, there was some sort of, he was bringing importance in to, say like books or writers or capturing the past and like people feeling safe that it's already written down, so that sense of it yeah. So that's why it's better than life or something. (Graham, Group one.)*

*Em, basically I thought that he was trying to say that we've got the power to listen to what writer's are trying to say by reading their books, by picking a book off the shelf, em, and beginning to read you can sort of hold a conversation with the writers who are dead or understand what they're thinking. (Fiona, Group one.)*

*He was, it was about escapism, how books are a way to escape everyday life and he was describing how amazingly powerful these books actually are but we don't realise it because we're so familiar with them in a way that blinds us to the full extent, but they've got enough power to other world's and see inside other people's minds. Familiarity has blinded us to the full and magical power that is within books. They hold within them worlds of all types to escape to, far better than our own. Each book is a door into the minds of great people long gone that they are so powerful that we could lose ourselves in them. But it is a risk we should take for it is far better than the world we live in. (Mark, Group two.)*

*I originally thought that he was trying, how that time that familiarity had lessened our value of what books are and sort of take it for granted. But in the end I've narrowed it down to saying that we take for granted the escape that books provide from the real world. (Noline, Group two.)*

As mentioned earlier, all of group two talked about escapism during the interview. Kris was the only student in the group who didn't specifically mention it when asked what the main theme was, but he made clear references to it later. The following are short extracts from each of the six:

*This text was about how humans as a race avoid problems in life by creating forms of escapism...* (Lianne)

*The writer was conveying how books can be seen as an escape from reality...* (Iain)

*He was, it was about escapism, how books are a way to escape everyday life...* (Mark)

*Books are a container holding someone else's world which we can jump into.* (Kris) (Please note, Kris mentioned escapism later in the interview)

*We take for granted the escape that books provide us from the real world.* (Noline)

*I think he was trying to express the way that becoming in writing can be an escape from reality.* (James)

Only Ben from group one said the main message was about escapism. Group one was given the same question as group two, 'what is the writer's main message?' The following are extracts from group one's replies:

*Yeah I guess just, um, maybe books are like the key to the porthole of escaping reality...* (Ben)

*I guess that reading is such a valuable thing like, but we don't, a lot of us probably don't realise how valuable it is.* (Helen)



*Um basically I thought that he was trying to say that we've got the power to listen to what writers are trying to say by reading their books... (Fiona)*

*There was some sort of, he was bringing importance in to, say like books or writers or capturing the past and like people feeling safe that it's already written down... (Graham)*

*I try to define it as, he wanted to say the richness in books sort of thing, in terms of knowledge and stuff... (Dawn)*

*His point of view, I got the idea he was, um trying to say that books are great... (Chris)*

Escapism is a key element in the text. While group one may have had an implicit awareness of this, they don't mention it in their interviews. Group two seemed to show an explicit understanding in their replies. I believe a more explicit understanding is essential as it can ensure that when a concept is being developed an explicit understanding of a key theme can act as an anchor. Such anchoring can act as a point of reference to ensure that concepts don't stray too far from what is significant in the original source, in this instance the Conan Doyle text extract.

#### *Approach to reading text*

As with cycle one all students were asked about their process for understanding the text. There was a difference between the groups. Group one's responses were similar to students in cycle one. Group two however offered a more detailed description of procedures they were aware of when they read the text. I have included three representative replies from each group as some responses were quite long.

Q. How did you go about understanding the text?

#### GROUP ONE

*I read through it heaps of times. (Ben, Group one)*

*Oh, um, I went through it and picked out key words, or words that just struck me, um, like I think it was a word 'dream world' I highlighted just thought, um, just quite strong, yeah, and maybe the quite strong adjectives that he used to describe it, just seemed to stick out to me, just highlighted those, and then read on more with that in mind. (Chris, Group one)*

Um I read it through all the way just once and then just to get a general idea and then I usually read through things about three, four times just cos' you know in case I miss anything yeah but any other time I read through it just go through and like pick out bits that seem to be more important or things that spark off ideas or whatever. (Helen, Group one)

## GROUP TWO

*At the beginning the title is often the key to the context of the text, so 'Through the Magic Door' was the title of the piece and already that sort of conjures up, this is gonna be something, you know, an escape of some kind and as I read through the text I created links back to the title, you know, how does this title relate to what I'm reading? (Iain, Group two)*

*Um, I read the title and kind of considered what that made me think of before I actually read the body copy and read it quickly, or not in a rushed manner, but not pausing over little things that I didn't understand or whatever, just trying to get a feel for what he was trying to say and then went back through and read each paragraph a couple of times, read each one a couple of times, to try and just get a feel for it and an understanding for differences in mood or ideas that he was trying to portray or the way that he was writing or speaking I suppose. (James, Group two)*

*I skim read it first and then went over it again sentence by sentence, cause I had to pause on a couple, re-read, just so I made, understood everything. I re-read a section of the text to try and figure out what the hell it was saying and, and then looked at it overall. Em I broke it down into paragraphs after that*

*and just tried to work out the different concepts that was coming across and how it linked back and forth. For instance the bit where it was taking about familiarity how it carried on, but in the second paragraph but from a different angle saying that was also bad. (Mark, Group two)*

#### *Students' notes*

During the design task students from both groups wrote notes. They were not specifically asked to do this but note taking is a common activity during a design task. I found it significant that while five students in group two (Kris was the exception) had written something about escapism, only Ben and Chris from group one referred to it in their notes (Ben was the only student in group to mention it in his interview).

Looking more closely at students' notes I noticed that group one tended to write about their ideas with only occasional reference to words from the text. I was not able to locate any written notes, which concerned actual text analysis. This was the same pattern as that carried out by all students in cycle one. The pattern of note taking in group two was considerably different. Iain, Lianne, Noline, Mark and James went to considerable lengths to dissect the text into sections such as first paragraph, second paragraph, and main message. This is perhaps significant, as they were not asked to do this. The information sheet they were given did provide a structure for reading text and it would seem that, as a consequence of this they took notes as they worked their way through the text determining its structure, message and themes. The following are two excerpts from group two's notes.

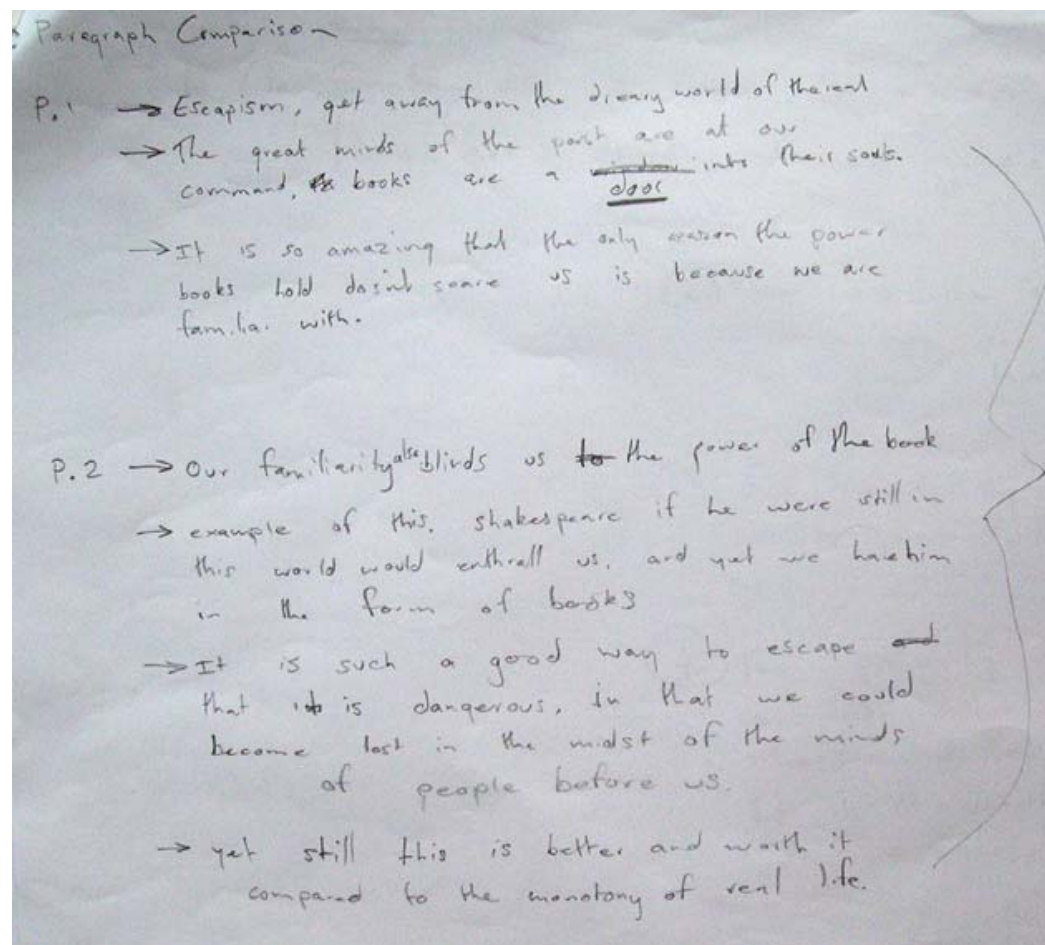


Figure 4.12. Extract from Mark's written notes.

In the interest of clarity I have typed out this section from Mark's notes:

#### Paragraph Comparison

P1. Escapism, get away from the dreary world of the real

The great minds of the past are at our command, books are a door into their souls.

It is so amazing that the only reason the power books hold doesn't scare us is because we are familiar with.

P2. Our familiarity also blinds us to the power of the book

Example of this, Shakespeare if he were still in this world would enthrall us, and yet we have him in the form of books

It is such a good way to escape that it is dangerous, in that we could become lost in the minds of people before us. Yet still this is better and worth it compared to the monotony of real life.

→ author describing ~~diff~~ process of reading  
positive tone. Fact that reading is a ho  
That most people become lost in.

2nd paragraph ;

→ more negative, cynical. Commenting  
on the human condition of ignorance  
and taking things for granted. Lack of  
appreciation.

→ really morbid, dark ending.

→ lack of human communication → social  
disabl  
impair  
cann  
in  
o

Main message; human nature avoids  
problems & situations in  
life through means of  
fantasy or escapism,  
whatever form this may take.  
Do not want to face own

Figure 4.13. Extract from Lianne's notes.

Mark and Lianne's notes are typical of group two's output where the common feature was analysis of the text. Mark's extract shows how he has described each paragraph separately, outlining many of the important themes within the text. Lianne has also done that connecting the paragraphs to what she regards as the main message. Group one in contrast wrote very little; no analysis and what writing there was mainly described the visual concepts.

### *Concepts*

Both groups were asked to illustrate the text. I was interested to see if group two would produce more novel concepts than group one as a consequence of my request that they think about the text analogically. What I did find was that group one concepts were on the whole, ‘situational’ or ‘fragmentary’ (described in glossary, methodology chapter and in cycle one). They tended to be located in rooms with bookshelves or focused on supporting themes from within the text as opposed to the main message. Group two’s concepts were largely ‘experiential’, (also described in glossary, methodology chapter and cycle one) focusing more on the effect books can have on us. The following images have been grouped to show typical differences between groups.

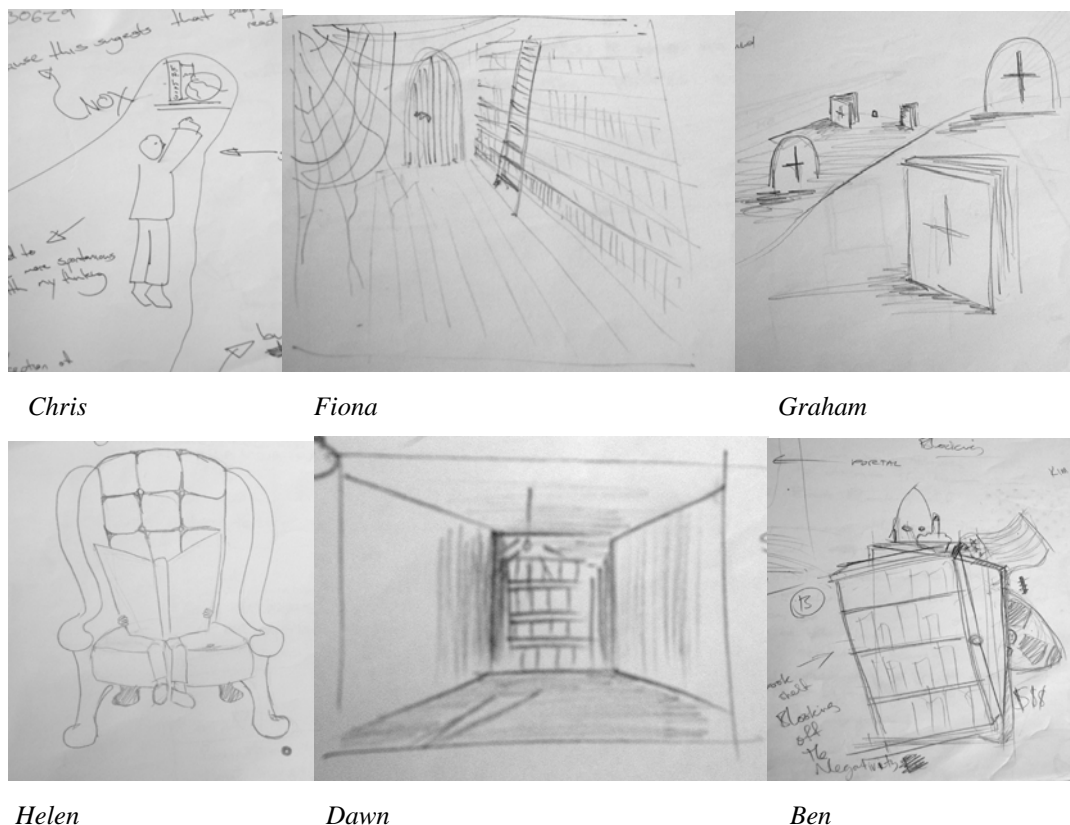


Figure 4.14. Examples from each student in group one.

The examples in Figure 4.14 show that group one’s approach was largely to create situations where we might expect to read books. The opening sentence of the Conan Doyle text does say ‘I care not how humble your bookshelf may be, nor how lowly



the room which it adorns'. It is perhaps understandable that novice students, unfamiliar with conceptual approaches common in professional illustration, would go for this, somewhat literal approach. Graham's example is what I have described as 'fragmentary'. Dead writers are mentioned a few times in Conan Doyle's text. His metaphor for dead writers as visual communication is very clear. However, it fails to encapsulate Conan Doyle's positive key message about how books can, to use Conan Doyle's own word, transport us to 'dreamland'.

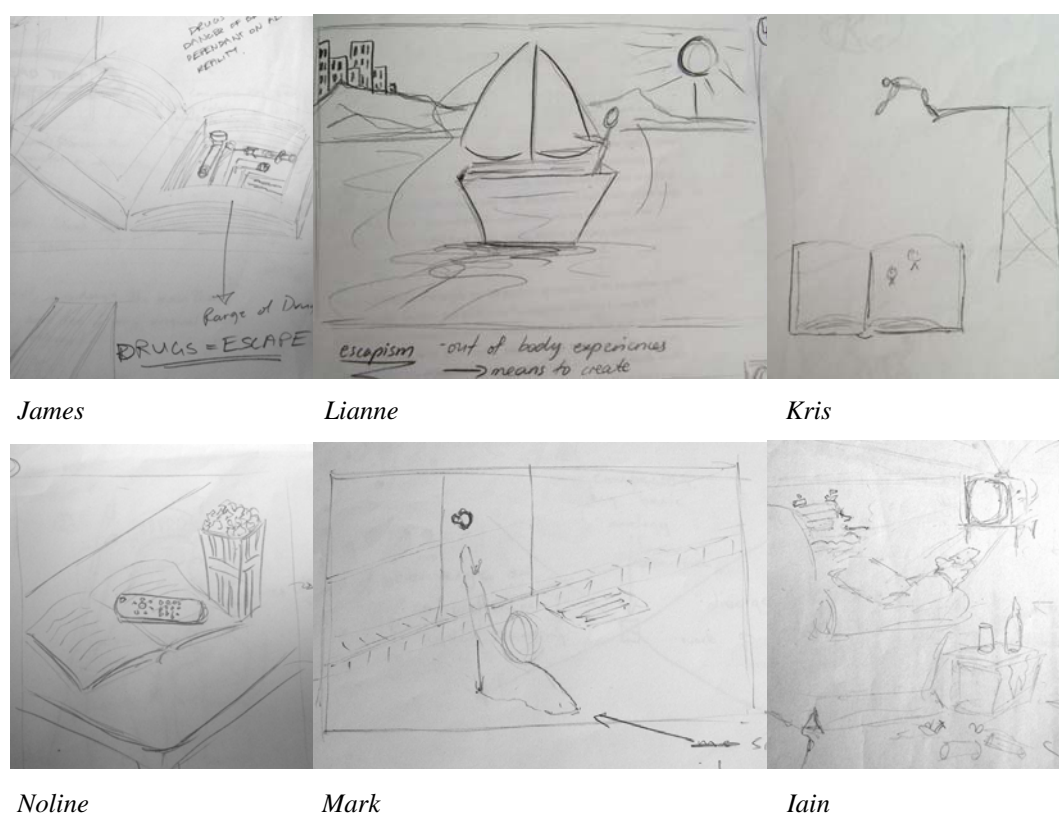


Figure 4.15. Examples from each student in group two.

While group one's images are, according to my definitions, either situational or fragmentary, group two's images are more abstract, focusing on communicating the effect or experience of reading, what I have termed experiential. One must keep in mind that the outputs above were produced within a short span of thirty minutes. I will nevertheless argue that the concepts in group two are more novel and interesting than those of group one. If we look at Chris, Fiona, Helen and Dawn's images in Figure 4.14 we can see that these are interior locations with recognisable, commonplace happenings. Chris's figure is reaching up to a bookshelf. Fiona and Dawn have sketched rooms with bookcases and Helen's image is that of a person

reading a book. I would not regard regular commonplace illustrations in the context of Conan Doyle's text to be novel or particularly interesting. They provide a context that says 'this is about books', but tell us illustratively very little about what the writer is trying to convey. Ben also includes a large bookcase with a figure behind it and other objects. Graham's image is less commonplace, more conceptual than the others, picking up, as did Brenda in cycle one (Figure 4. 8), a fragmentary aspect of the text dealing with dead writers.

Group two students' concepts, as a consequence of being driven by an analogical approach are varied, unusual and tend to try to capture something of the effect books can have on us. Group one were not excluded from doing this; they were given the same task of illustrating the writer's message. What I find exciting here is that students were not asked to capture the effect books have on us or produce an experiential concept; they did this, I believe, as a consequence of using a reading strategy to determine the important elements of a text and then interpret this understanding through an analogical approach.

While I would say that group two's images are more novel and interesting than group one's, I temper it by pointing out that not all of the examples are of value in an illustrative context. James tried to get the angle of escape across by comparing books to drugs. Drugs are used to provide escapism from the real world. So too are books used. However, the strong connotation of drugs as harmful, illegal and dangerous transfers across from source to target. And while analogies only need some elements of similarity to provide new insight; negative connotations destroy the connection and purposeful transference of a positive idea. At its most basic level the device for generating inferences is called "copying with substitution," (Holyoak & Thagard, 1999, p. 30) or CWS. Lianne's analogy is much more positive. The image conjures up two main propositions -journey and escape. The connotations map positively to the target and remind us that books are also a means of journeying and escaping. Kris has created an analogy by making use of the writer's words 'plunge back into the soothing company of the great dead, and then you are through the magic portal', 'plunge' being the key verb. Kris reminds us that the experience of diving into a pool of water is exhilarating. We travel through the domain of air to a new domain, that of water and we are immersed in it. And, from an illustrative perspective, this eloquently tells us



that this is similar to being immersed in a book. Noline explores the idea of choice in her image. Her concept develops the phrase from the text, 'choose your writer'. In her notes she writes '*Analogies??? Taking things for granted... TV also takes you into another reality*'. Noline avoids connecting books too strongly to television, a potential negative analogy and cleverly develops the idea by using a remote control. This also connects with the idea of 'choose your writer' and 'at your elbows from week to week'. While the idea has come from an analogical source, televisions are like books - the remote acts as a metaphor for choice and ease of access. Noline cements the context by placing the remote on top of a book. The addition of a bag of popcorn ensures that we think of her idea as enjoyable escapism. What Noline has done is avoid the negative connotation 'books are like television', and instead tells us it is easy to pick up a book, there is so much choice out there and books are fun. At another level is the fact that, just like television, we take books for granted. This is a simple yet very effective illustrative concept, which came about by thinking about the text analogically. Iain also explored the television analogy, but by including a figure watching television his image remains too close to source and doesn't travel effectively to target. Mark's analogy is intriguing, comparing real life to being in quicksand. It essentially is about how in real life we are stuck. The Conan Doyle text talks about how real life is 'dull' and 'soul-killing'. Books release us from this state. As his figure reaches for a door, we remember that the text talks about a 'magic door', so this is no ordinary door that the figure reaches out to from the quicksand. This analogy is problematic. Firstly, the purpose of the analogy is, not to tell us about books, but about real life. Secondly there is no clear word or phrase that we can connect to quicksand, in the way that we can with ease understand, say Kris's idea of 'plunging' into a book. Quicksand as a concept is too far removed from 'dull' and 'soul-killing', words from the text passage which Mark has understandably interpreted as representing real life as being stuck. However, Mark's idea if developed with secondary visual elements could work illustratively.

*Main findings in cycle two:*

1. Group two's description of the text, on the whole, captured more of the main points
2. All six students in group two talked about escapism during their interview and five referred to it in their notes. Two students in group one wrote about escapism in their notes and one of them mentioned it during interview
3. Group two's notes were considerably more extensive, characterised by in-depth analysis of the text's structure
4. Group one's visual concepts were largely 'situational', rooms and bookcases being very common, or 'fragmentary', focused on secondary elements within the text
5. Group two's analogical visual concepts were largely 'experiential', scenes which attempted to demonstrate the experience of reading or the effect books can have on us. This abstract approach may indicate a deep approach to learning.

*Brief summary of cycle one and two*

In cycle one, two students, Frances and Dana, autonomously developed analogical concepts to illustrate the text passage. These concepts encompassed something of the effect reading books can have on us and captured the key concept that when we read a great book, to use the writer's own words from the text, 'away you go together into dreamland'. The other six students in cycle one developed concepts, which were either fragmentary, such as Brenda's concept of a book in the shape of a gravestone, or situational, such as Harry's concept of a figure reading a book with books metamorphosing into figures. Books and bookshelves commonly recurred in cycle one students' sketches. Explicit understanding of approaches to text reading was minimal and note taking focused on concepts rather than on text analysis. The pattern of fragmentary and situational concepts was also common in cycle two's group one,

as was the tendency for notes to be about ideas rather than text analysis. The pattern was different in group two who, in their notes, broke down the text into sections and spent considerable time writing about the ideas contained in the text. Group two also demonstrated an explicit awareness that the key idea in the text is that books provide escapism. Group one failed to demonstrate this even though it is possible they had an implicit awareness that escapism was the key theme. Group two's ideas were also different as a consequence of them being asked to interpret the text analogically. Not all analogical concepts worked effectively but each student was able to explicitly use an analogical thinking method. These two cycles encouraged me to reflect and plan the third cycle.

### **Cycle Three**

#### *Introduction*

As in cycles one and two, semiotic analysis of student design work forms the basis of much that will be discussed here. Unlike the previous cycles, there were no face-to-face interviews. However questions about what students thought about their design task were answered in two questionnaires given out during the four-week project. Students also made notes during the project in their workbooks. The project concluded with a written rationale by each student about their final design and an evaluation, which discussed what they felt they had learned from their involvement in the project. I have therefore continued my approach to negotiate between my understanding of student activity and design output with their own written comments via the questionnaires and what was written in their workbooks, rationales and evaluations. I will discuss the results of the analogy exercise, students' approaches towards understanding the text extract, their awareness of what strategies they used to understand the text, their conceptions about the text's main message and secondary concepts, their processes from comprehension to conceptualisation and the final illustrations in relation to their analogical content.

*The following will be discussed:*

1. The analogy exercise and the issues which arose from it
2. Student descriptions of reading strategies and the impact of a formal approach to reading expository text
3. Student conceptions of the key concept in the text
4. Student conceptions of the secondary concepts in the text
5. Different approaches students took in developing their illustration
6. The final illustrations.

*Results of analogy exercise*

Students had to essentially work out how they could create an analogy for each text's key proposition by themselves. There was no instruction on how to do this. They were asked to take each text and describe its theme through a conceptualised visual analogy. I was interested in testing Goldschmidt's (2001) claim that the use of analogy in ill-structured problem settings requires training. This approach would help determine how challenging students found the task. The results were varied. Of the 22 students who handed in the exercise, six did not develop any analogies, nine developed one, six developed two and one student developed three. No students developed four analogies. A one hundred percent success rate would have resulted in 88 analogies. The total number of successful analogies was 24. The outcome of the exercise supports Goldschmidt's position that design students may need assistance in developing expertise with analogical thinking. I gave no assistance to students during the exercise. We did however discuss the issues surrounding the task after completion. I believe that the class critique was an important learning experience for the students. They had to, in a sense, experience at first hand the process of thinking about a textual proposition analogically before they could, on reflection see what is required in developing an analogy.

| <b>Text based propositions requiring a conceptualised visual analogy</b>   |              |
|--|--------------|
| 1. Education is the answer to many of society's ills but not all of us are aware of its powers.  | 2 analogies  |
| 2. The meaning in the article is that war happens because we have failed to master our primitive instincts and we are no different in many respects to all other species which inhabit the planet. | 4 analogies  |
| 3. The writer tells us we love fast food because we have been conned by advertisers to buy it.   | 4 analogies  |
| 4. J.R.R. Tolkein's book 'Lord of The Rings' reminds us that obstacles in life can be overcome if we work together.  | 14 analogies |

Figure 4.16. Exercise given out during class project.

The exercise required from the students visual scenarios which, through similarity, described the key ideas embedded in the texts. The exercise itself only lasted 30 minutes. As part of the research cycle, it was hoped that it would provide some insight into students' processes and also highlight issues which would need to be addressed when students took on the challenge of illustrating the Conan Doyle text. As part of the learning process in class, the exercise confronted students with the issue of interpreting a textual proposition through an analogical approach.

Students responded to number four with, by far, the largest number of analogies. Its key theme is that of co-operation. By co-operating we can overcome obstacles. Of the four it is the simplest proposition. By contrast, number one has two main propositions: (1.) education is important for the betterment of society, (2.) some of us are not aware of what education can provide. Number three also has a simple proposition—advertising is deceitful. Fast food provides a particular context for the statement. Number two has two propositions: (1.) war happens because we still retain our most basic instincts (2.) our basic instincts are no different to other species.

I will describe two examples of each scenario where analogical situations have been devised by students to illustrate the text. The text-based propositions are in italics, numbered from one to four.

1. *Education is the answer to many of society's ills but not all of us are aware of its powers*



Figure 4.17. (Ricky)

The denotative elements in this image are those of a door with a notice pinned on to it. The notice says 'closing down'. Ricky writes '*A company goes down caused by poorly skilled staff*'. Based on cross-referencing the image and Ricky's comments, my connotative reading is that the image illustrates the idea that if companies fail to train their workers, their products will not compete and they will ultimately go out of business. Management, in this instance, were not aware of the need to up-skill their staff. The scenario created does provide us with insight into how important education is and the consequences of not fully appreciating what it can provide.



Figure 4.18. (Anna)

The sketch shows a road with a figure running and another figure standing. The standing figure is overweight. Anna writes *'Exercise is good for us—healthy – physically and mentally – if people don't exercise they will feel down/fat etc – mainly also mental side – makes you feel good – people may not realise this'*. Again, as with image 1, by cross-referencing the student comments with the thumbnail, it is possible to make an accurate connotative reading. The idea being explored is that exercise is similar to education. It is good for us both mentally and physically. The overweight standing figure represents those of us who are unaware of the benefits of exercise.

Only Ricky and Anna were able to devise an analogy to scenario one. So from 22 respondents, 20 were unsuccessful. Criteria were based on determining a source to target mapping relationship. The relationship between source and target is discussed in section two of chapter two under the heading *analogical reasoning*. The image below is an example of what happens when that relationship is not determined.

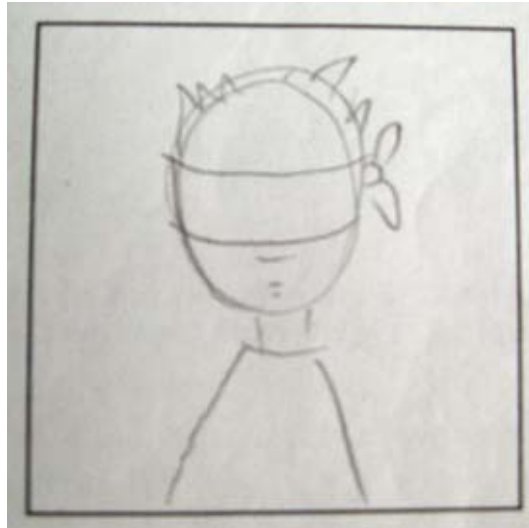


Figure 4.19. (Jen)

Jen's image provides an example of what I determined as unsuccessful. The only word she writes is '*Blindfold*'. We see a blindfolded figure. The figure is certainly unaware of something. That is the source which Jen has used. There is nothing to inform us as to why he cannot see and therefore the mapping between source and target is unrealised.

2. *The meaning in the article is that war happens because we have failed to master our primitive instincts and we are no different in many respects to all other species which inhabit the planet.*

As with scenario one, there are two propositions: our inability to control our primitive instincts and our similarity to other species in this respect. To connect the two is not easy but four students were able to conceptualise the scenario with visual images which provide some insight into aspects of the text's message.





Figure 4.20. (Eric)

*'A cat stalking (about to pounce) on a mouse. A cat will almost always attack a mouse when given an easy chance. Instinct'*, writes Eric. Also contained in this thumbnail are some further comments. An arrow pointing to the cat says *'a powerful country'*, and another arrow pointing to the mouse says *'a weaker country or something the powerful country wants'*. Contained in the foreground of the image is a mouse. In the background there is a cat looking forward. We are all familiar with the fact that domesticated cats are often to be seen chasing birds and mice. This scenario does illustrate the concept of primitive instincts. The cat does not need to chase mice or birds for food. It does it because its instincts to do so are so strong. The student, as an attempt to connect this example of primitive instinct to war, has incorporated a metaphor. The cat represents a large country, the mouse a small country. Source and target mapping takes place, describing through similarity the consequences of not controlling our instincts. The addition of metaphor, cat = large, country, mouse = small country has been used to represent war.

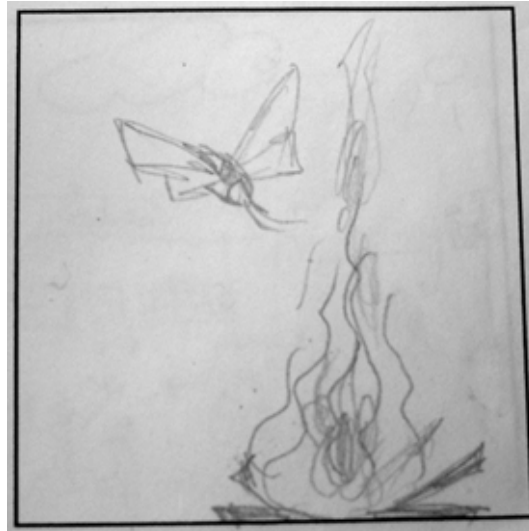


Figure 4.21. (Carol)

There are two physical elements in this picture, a moth and a fire. Wood is burning and there is smoke rising. The moth is flying around the fire. As with Figure 4. 20, Carol has provided an example of primitive instincts through a naturally occurring event. Most of us at some time will have seen this type of thing whether it is a fire or a light. As an illustration it fails to address the issue of war, the first proposition, but it does address the second proposition reminding us that our primitive instincts are the same as other species' primitive instincts. She writes, '*Moth to the flame – primitive instincts kills this moth – like people are drawn to power – war*'. Carol has used CWS, copying with substitution. The image suggests that when there are two propositions, a second element may be required, as in Eric's image (arrow-large country, arrow-small country).

Four student images were deemed to be analogical, leaving 18 that did not satisfy the criteria. Figure 4.22 is an example.

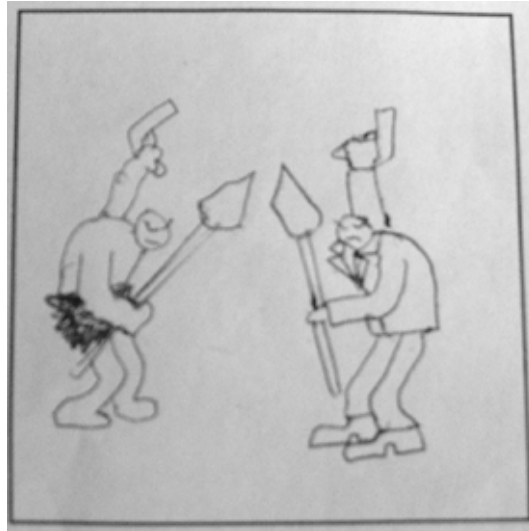


Figure 4.22. (Martin)

Martin writes, *'Neanderthal man and business man both holding bombs? Or weapons?'* There is no effective source to target mapping. What Martin has done is to represent war by two people fighting, a literal representation. The Neanderthal represents 'primitive'. By implication Martin is perhaps suggesting that we are still primitive, like our ancestors. The scenario is not one we are familiar with, unlike the previous successful examples. What Martin tells us is that that we still have many of the instincts of our ancestors and we still fight. There is no reference to the second proposition, that we are no different to other species. Also, we see a literal example of fighting or war, not a symbolic example.

3. *The writer tells us we love fast food because we have been conned by advertisers to buy it.*

A simple proposition. Fast food advertising is deceitful. To illustrate this proposition all that is required is an example of deceit, not deceit in advertising but a comparable scenario where deceit takes place. Four students were able to devise analogies for this scenario.

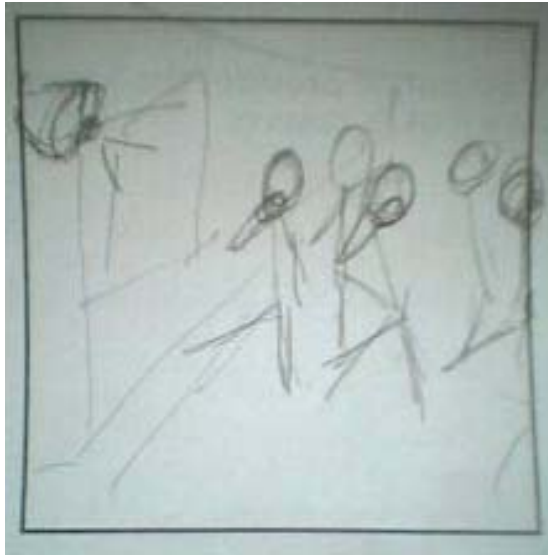


Figure 4.23 (Mary)

*'Propaganda – like Nazis with the loudspeaker, posters and people in marching ordered troops all eating burgers'*, writes Mary. In the image we see a group of marching figures. In the foreground is a loudspeaker. A rectangular image immediately to the right is probably the poster Mary refers to. The figures are holding burgers. The connotative meaning is that the dialogue coming out of the loudspeaker is manipulating the figures. The conceptual connection to advertising is Nazi propaganda. Just as the Nazis marched in blind, unquestioning obedience, so too do we blindly accept the rhetoric, propaganda of advertising. This example demonstrates that some analogies, while successfully describing something through similarity, also bring other connotations. The Nazi analogy also brings associations of cruelty, genocide, racism and destruction; unnecessary connections. As an initial concept though, this could be developed if the Nazi connection is removed, retaining the propaganda aspect. James in cycle two had a similar issue with his association between books and drugs.



Figure 4.24. (Jen)

*‘Hypnosis: under influence of a master’*. This is another example from Jen. In Figure 4.19 she was unsuccessful in developing an analogy. In this instance she has used analogy effectively. A central figure holds a hypnotic wheel. A group of figures are looking at it. The connotation here is that the hypnotist has control over the crowd. The level of similarity between the image and the original text comes from our mapping of hypnotism onto advertising; the link being control. By implication, the idea is that the figures are unaware they are being controlled, therefore they are being tricked. We can then connect this to advertising. This is a simple, yet very effective analogy. To connect the concept more closely to food, the hypnotist wheel could have been metamorphosed into a large pizza. Ideas such as that are normally developed as part of the problem solving process. The exercise was too short to allow for iterations and developments of initial concepts. There were four identifiable analogies from 22 participants. The following image from Helen is an example of an unsuccessful attempt at analogy.

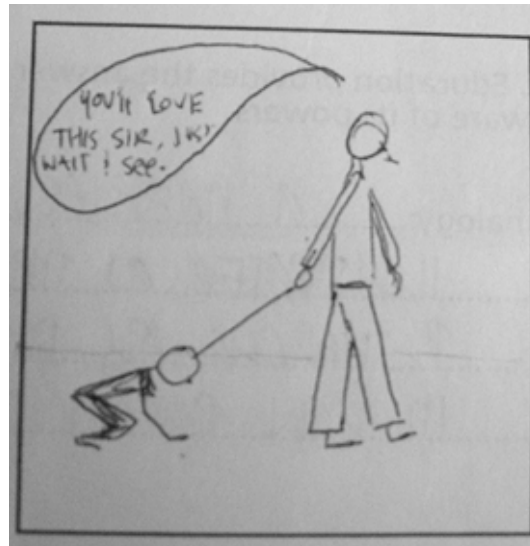


Figure 4.25. (Helen)

Helen did not write anything in her notes. What I can make out of the image is that we see an image of a man with a leash connected to another figure, possibly another man. The word ‘sir’ from the caption, ‘You’ll love this sir, just wait and see’, suggests that it is a man who is on the leash. I think Helen has tried to get across an idea of control, one figure controlling the other. Presumably the walking figure represents advertising and the leashed figure represents individual citizens. There is no clear source to target relationship. Nor is there an issue of genuine similarity. Control is not the same as deceit, the key proposition in the provided text.

4. *J.R.R. Tolkein’s book Lord of The Rings reminds us that obstacles in life can be overcome if we work together.*

The proposition here is very simple. *Lord of The Rings* gives us an example of co-operation. All that is required is for students to think of this in another context and devise an image which shows co-operation. Fourteen students were able to create analogical concepts.

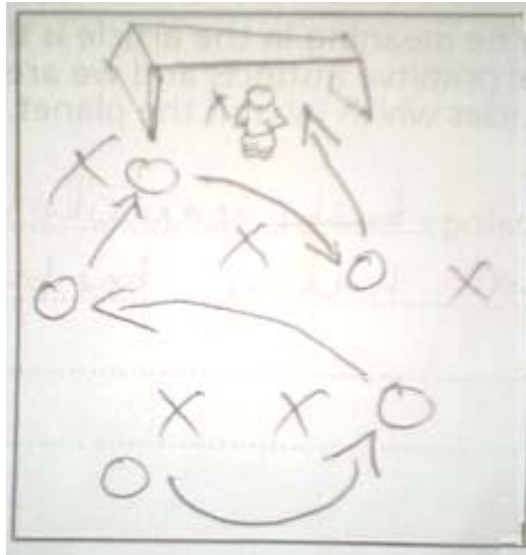


Figure 4.26. (Martin)

A soccer pitch with a goal and a goalkeeper in the distance. A number of Os and Xs can be seen as well as some curved arrows. The Os represent one soccer team and the Xs another. Goalkeeper is next to one of the Xs to give the X an immediate figurative representation. By passing the ball from one figure to the other, the image shows the value of team effort. The image is from Martin, who was unsuccessful in developing an analogy for proposition two about man's primitive instincts (Figure. 4.22) '*A football play showing the ball going to the whole team to score the goal*'. The idea is very simple but as a signifier for co-operation and overcoming obstacles it clearly communicates the proposition.



Figure 4.27. (Jared)

In this thumbnail we see a row of ants carrying a piece of fruit. The proposition of co-operation is clearly communicated. The weight of the fruit is the obstacle. No single ant can carry it. Together as a group the ants overcome the problem. Co-operation is mapped through the creation of a scenario in nature, which we clearly understand as an act of co-operation. *'Ants work together to carry things they couldn't carry individually'* wrote Jared in his notes.

The analogy task was an interesting exercise. It challenged the students to figure out how they could purposefully explain or describe in some visual way the four propositions. While the success rate was not high, as a group we were able to look at the successful images and discuss how a proposition can be explained through an analogy. This prepared the class for the textual passage which they themselves had to summarise down to a key proposition: the main message. And from that key proposition they had to devise a visual concept, which described the main message through an analogical situation.

#### *Awareness of comprehension process*

The question *Can you describe how you went about understanding the text?* was included in the first questionnaire. The purpose of the question was to determine what level of reflection and explicit awareness students could demonstrate as to their approach to the text. The influence of the comprehension sheet was, I believe, quite significant. Compared to cycle one students who, when asked the same question during their interview tended to talk about how they read the text a couple of times; cycle three students on the whole, offered a more systematic and analytical awareness of their method of comprehension. Below are three representative responses:

*I looked at the title, then skim read the text trying to pick up on the key words or phrases, then I linked the ideas from the first paragraph to the second, then read the text thoroughly over again. (Harriet)*

*Skim read through it first-quite fast-to get a general idea- picked up on some important keywords-read those twice or so-attempted a link/understanding of difference/tonal change between two paragraphs-*



*read through text again more carefully –acknowledging areas I didn't quite understand. Read through text about three more times- trying to make sense of all aspects, while keeping in mind what I thought might be key idea(s). (Lisa)*

*Thinking about the title, each reading focusing on these things → topic metaphors/paragraph breakdown and relation/hierarchy/ concepts/summary and key phrases that support my summary. (Tim)*

While the majority of students were able to describe an awareness of their process, there were a few exceptions where awareness of process seemed more limited.

*First I read the text briefly without dissecting the larger words (which is my habit) then read again 20 mins later. (Helen)*

The sheet *Reading Text. The development of understanding* (appendix e) was created by me to assist students with their text comprehension process. I had noticed in the past that too many students picked up on unimportant aspects of the text or failed to understand the key themes. This would often lead to visual concepts which brought attention to insignificant ideas within a text, or at worst, images which would seem to contradict the key theme within a text. It was my hope that the sheet would enable students to systematically go through a textual passage and follow a structure that would assist their comprehension of text and help them to understand the key concept as well as find the supporting concepts contained in a writer's text. Being equipped with a sound understanding of key themes as well as subtleties within a text can, I believe, provide illustration students with the necessary backdrop and material to interpret and conceptualise a text visually. When asked what effect the sheet had on their approach to the text, the response was overwhelmingly affirmative. Thirty out of thirty-two students replied very positively to this. As the inclusion of a formal strategy to assist students develop their illustrative skills in text interpretation through a focus on comprehension was something which I had never done before in a classroom setting, I have decided to present below the questionnaire responses of half of the 30 students who responded positively. In a design teaching environment where

creativity and individuality are highly valued, it is unusual to provide information which provides students with prescribed procedures that will ultimately lead to a creative output.

Q. What effect, if any, did the sheet *Reading Text: The development of understanding*, have on how you went about understanding *Through The Magic Door*?

*It had a big effect-giving examples to be clearer and understand the text better in steps rather than just reading it through without depicting ideas etc of the main ideas. (Anna)*

*It helped me construct a strategy as to how to go about understanding the story. I would not have done this otherwise and now I have a clear understanding. (Julie)*

*Taught me how to go about understanding the text. If I did not read this first I probably would have just read the text once and tried to figure it out from there. (Craig)*

*I found my process of understanding to be a much more conscious and directed effort. (Sally)*

*By skimming first and also taking onto account the title the understanding of the text became more visual, than word linked. When all methods were used it became a whole not just a list of meanings. (Eileen)*

*Requires you to focus on specifics and directs your concentration. It organises your thoughts. (Eleanor)*

*Progressive-really helped me. I followed the general steps given which gave my reading and understanding a lot more structure than usual. I felt like my understanding was 'building/growing' as I read –which was*

*really helpful. I was able to make sense of the text much easier than usual.* (Lisa)

*Made it easier to break it down and make it a process, without it it would have been harder to reach a concluded hierarchy.* (Tim)

*It helped me find the important parts of the text. Helping me to try and summarise what it was about. Through breaking it up into paragraphs, keywords and quotes.* (Jane)

*Made it easier to pinpoint what I needed to know, gave a broken down list of questions I needed to think about and answer.* (Sinead)

*It helps me understand the text much better by following the process of thinking.* (Belle)

*The sheet did help my understanding of the text in relationship to getting a deeper meaning of the text. And thoughts on how to structure my understanding.* (Jared)

*It made me consider the process I used to analyse the text, instead of just reading through. It encouraged me to systematically break down the text so that I gained fuller understanding.* (Kate)

*It made it easier to structure the text and therefore find the main ideas.* (Carol)

*It made me consider more, and become more aware of stages and processes I was going through as I read, and linking my thoughts with the authors became something I was aware of.* (Karen)

The responses above suggest a number of things:

1. Students found that the reading sheet helped them develop strategies for determining the important parts of the text.
2. The reading sheet encouraged students to become more aware of their thinking processes.

Only two students said that the sheet had little positive impact.

*None, I thought the text was quite straightforward in communicating its key ideas. (Malcolm)*

*It had some effect- some of the things I did automatically but in a different order. Overall it didn't improve my understanding but maybe it would if I went through it more thoroughly. (Anita)*

#### *Key concept and secondary concepts*

Determining the conceptual structures within a text is a key component of good comprehension. Good comprehension alone will not guarantee that an illustration student can transfer their understanding of a text into a good illustration. However, I am arguing that a solid understanding of key themes within a text, as well as themes of lesser importance, provides an illustration student with valuable material – numerous options to work with creatively. Even with a shared consensus on what a text's key themes are, illustrators are able to come up with multiple solutions and interpretations. Part of the reason for this is that secondary themes and how they are illustrated will depend on their hierarchical significance determined by the illustrator in relation to how they can support the key concept.

To ensure that interpretation, based on good comprehension, would embody Conan Doyle's key themes and main message, I asked my students to sum up the text into a few sentences and then explain it further through the use of a conceptual analogy. To determine my students' comprehension of the text I found it necessary to compile my own ideas about the text. As a teacher I would not normally trouble myself to write down my own thoughts and ideas about a text, but as an action researcher, conscientiously desiring rigour in my analysis approach, I decided that it would be necessary to cross-check my ideas with my students' ideas. My ideas can be seen as

the benchmark on which I have judged students' ideas. While this is indeed subjective, it is subjectivity based on 25 years professional experience illustrating expository text. The focus of analysis are ideas, not recurring words, although the key concept was most commonly communicated by the word 'escapism'. There are numerous ways to communicate through words the same idea. Thirty-two students did questionnaire one, 19 students completed both.

I highlighted the differences between the two paragraphs, created a hierarchy of concepts and summarised the textual message into a proposition. The key concept contained in the text is that even though we take them for granted, classic books written by authors from the past provide us with wonderful, magical forms of escapism; escapism from the 'worry and vexation' of real life. Secondary concepts are that real life is by comparison to the imaginary world created by dead writers, 'dull' and 'soul-killing', and also 'vulgar' and 'sordid'. Books, in a way, contain the 'mummified souls' of writers; the preserved thoughts of each of them waiting to be released when a book is opened. Other ideas in the text relate to us having great choice of subject matter and that the thoughts of writers are so powerful and compelling that we might not appreciate our own thoughts and ideas. The final points are that it is okay to be enthralled by reading the works of the dead and take the risk of not developing our own thoughts, as fantasy is much better than reality.

The focus is on the classics, books written by great authors from the past, described by Conan Doyle as 'the great dead'. Paragraph one focuses on the magical properties of great books by dead authors. Each book contains the thoughts of these writers and once opened the reader can be transported away from the real world to 'dreamland'. The 'magic door' and 'magic portal' are essentially environments where reading, and therefore magical journeys take place. The link between paragraph one and two is that we take books for granted. Paragraph two provides us with an example of this, by pointing out that if Shakespeare were to come back to life we would be so eager to engage with him and yet we hardly bother to read his works. Paragraph two also focuses on the diversity of topics we can engage in. It finishes with the idea that books are so powerful that we may get too taken up by the thoughts of dead writers that we may prefer this world to the real world which is 'dull' 'soul-killing' and one of 'monotony'.

### *Student understanding of key concept*

A question asking students to describe the writer's message was included in both questionnaires. The purpose of this was to determine if over a period of one week between questionnaires, student conceptions about the text had changed. This was not discernable with only minor adaptations being added by those who answered the question both times. However, I believe I was able to build up a more conclusive picture of student understanding of the key concept from the 19 who answered the question both times. Some wrote more eloquently and in-depth than others but I was able to clearly establish that the key concept, 'books provide escapism from the real world' was universally understood. This was usually stated explicitly. Seventeen students out of the 19 who answered the question in both questionnaires used the word escapism in context. Two students however, did not use the word escape or escapism but used thematically linked terms. Jane wrote *'That books can take you on a journey and adventure. They can take you to another place/world. That they are magical.'* Julie wrote, *'Forget the world you live in now and allow the 'great' writer to entertain you, capture you. You will enter a new world- a care free world...'* Escapism through books is implied in both Jane and Julie's comments. Jane used the word 'journey' while Julie uses 'a new world- a care free world' to imply escapism. While the remaining 13 students did not return the second questionnaire, and therefore wrote less than those who did both questionnaires, I was able to determine from their responses that only one student did not clearly understand the key theme. Four mentioned escapism explicitly and eight referred to it implicitly using similar terms to those of Jane and Julie. My conclusion here is that 31 out of 32 students who returned questionnaire one understood the key theme of the text. Twenty-one mentioned escapism explicitly and ten implied it in their comments. Two students did not return either questionnaire.

### *Student understanding of secondary concepts*

While the understanding of a key concept is critical if a text is to be illustrated and communicated to an audience; understanding secondary concepts allows for a much richer image. Students were asked to describe the differences between the paragraphs.

Contained in each paragraph are the secondary concepts. Secondary concepts can ultimately be communicated through a visual hierarchy where the key concept is clearly and predominately visible, supported by other ideas that originated in the text. More will be said of this later when I discuss the final illustrations.

Analysis of student understanding of secondary concepts is based on 30 of the 32 students who completed questionnaire one. Two student replies were discarded as they failed to either separate the paragraphs or, based on what was written, misunderstood the question. Students were asked to describe the differences between the two paragraphs. Variation between students' description of the secondary points and the differences between the paragraphs enabled me to create three distinct categories: *high level description*, *satisfactory level description* and *low level description*. Four students were placed in the high-level description category, 20 in the satisfactory level description category and six in the low-level description category.

Students placed in the high-level description category were able to describe subtle differences between the paragraphs and mention most of the secondary concepts. Roxanne's reply is representative of this small group.

Para1. Reading allows you to forget your worries and be transported somewhere else. Books are the souls of the now dead writers, in reading them they are brought back to life,

Para 2. We take books and the wisdom of their authors for granted. Books can satisfy any hunger and need; they are supplements to the monotony of daily life and fill the gaps. (Roxanne)

The largest group of 20 students were in the satisfactory level description category. These students were able to describe that paragraph one focuses on escapism and paragraph two talks about how we take books for granted. Subtle references such as real life is monotonous or books contain the souls of dead writers are absent. Craig's comments are representative of this group.

Para 1. The first paragraph seems to be trying to point out the magic of reading a book.

Para 2. While the second one also seems to be trying to point this out, it also seems to be trying to make out that this magic is often taken for granted. (Craig)

The low-level description group of six students did not describe main differences between paragraphs and seemed to pick up on ideas of lesser importance. Two of them, Jane and Martin, were in the previous group of 19 as they had completed both questionnaires. While they failed to describe differences between the paragraphs and subtleties within the text, Jane and Martin quite clearly understood the key concept. On the key concept, Jane wrote, *'That books can take you on a journey and adventure. They take you to another place or world. That they are magical'*. Martin wrote *'Reading is good-a great escape into another world'*. Of the other four students, I concluded after reading through their comments that only Malcolm failed to grasp the key concept and seemed to dwell on unimportant ideas from the text. The following are Malcolm's comments about the text.

Para 1. Speaks about each book containing the essence or spirit of the writer.

Para 2. Is about how we can access and share in the thoughts of the great writers by reading their literary works whilst being wary of becoming obsessed with them. (Malcolm)

Malcolm was the one student out of 32 whose comments suggest he did not understand the key theme. He wrote, *'Books contain the essence of those who wrote them, thus to understand the great authors and gain enlightenment from great authors, all we have to do is read their works'*. Please note Malcolm's comments (p. 161) in relation to the *Reading text; the development of understanding* sheet.

#### *From comprehension to interpretation*

Group two students in cycle two were given a very similar version of the *Reading text; the development of understanding* sheet to that provided in cycle three. It was noted earlier that group two wrote much more analytically about the text than group



one who concentrated on writing about their own illustration ideas. I decided to see if cycle three students would also write about the text or focus on their illustrative concepts. I would normally expect students to focus on concepts rather than on analysis, which in the past I have found to be largely an internal process. To determine which approach students took I looked at student workbooks. Workbooks are an extensive collection of fleeting, captured thoughts, embryonic ideas, gathered images, research material, analysis, experiments with techniques, media and style, iterations and systematic developments of concepts. In a four week project a workbook often contains many pages. Some workbooks are chronological, others are thematic, others seem to follow no clear structure. They do, however, embody how illustration students work. There is no prescribed structure as to how a workbook should be compiled, but throughout an illustration student's three years of specialised study all studio projects will require a workbook. Workbooks are assessed, most commonly on design process, level of enquiry and experimentation.

I developed three specific categories to describe variations in students' processes of comprehension to interpretation that students used in the workbooks: *visual*, *textual* and *blended*. Visual workbooks are characterised as largely being a collection of visual images, either hand rendered images (thumbnails and developments) or collected images such as photocopies of pictures which contain visual information which may be used to assist getting the details right in an object when it is being rendered. Written commentary is sparse, with an occasional few words or sentences. Blended workbooks also contain a collection of visual images. What varies between visual and blended is that in blended workbooks images are interspersed with numerous commentaries written by the students, mostly about ideas but also occasional references to the original text as well. Textual workbooks, in contrast to both visual and blended have a significant volume of writing, not just interspersed throughout, but also sectioned off separately with pages devoted exclusively to analysis of the Conan Doyle text.

I placed seven workbooks in the visual category. Of the three categories the final illustrations were the least successful in this group. Renata's approach is typical of the visual group. From the Conan Doyle text she underlines 11 phrases and then immediately starts conceptualising and collecting visual images. Next to her sketches

are occasional comments explaining her ideas. There is no documented evidence of any textual analysis. Renata's chosen concept was not analogical. In it we see an open book with an explosion of light coming out of it. I was unable to link any of her keywords such as 'kings of thought', 'The dead are such good company', 'choose your writer', 'hold up your hand to them', to her design. In terms of textual analysis based on the questionnaire, Renata's understanding of the text was satisfactory. What seemed to be missing was a kind of cross-checking between her understanding and how she used this to develop her concept. Renata may have benefited from working collaboratively between writing down her thoughts and impressions and working through them visually. It would seem that her tacit understanding needed to be made more explicit to enable her to work through her design process. Renata did not hand in the analogy exercise.

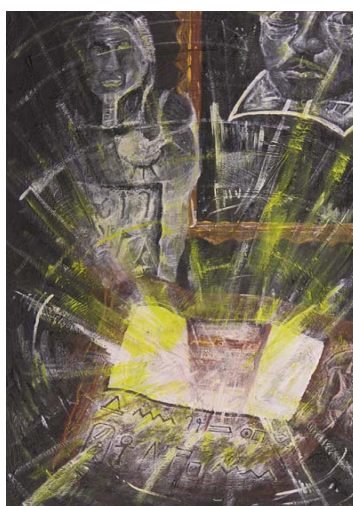


Figure 4.28. (Renata)

There was a notable exception in the visual group, from the point of view of quality of final image. Carol wrote very little in her workbook. She started off by underlining keywords and phrases from the text, most of which can be traced to the final design, and then followed this with an A4 page of notes focusing on key concepts. After that there are no further notes. What is noticeable of Carol's limited notes is that they are totally pertinent to the text. Hardly a word seems wasted or inappropriate. Carol quickly started to develop concepts, the first one being that of comparing great classic books to great paintings. A figure stands in a gallery and is sucked into the painting. She follows this with what ultimately became her final concept, comparing books to

attics. Keywords chosen by Carol from the text such as ‘reach out’ and ‘impalpable dust’ (connecting to dust in attics) can be traced to her final illustration. While Carol’s approach has been largely visual, it is clear when reading her questionnaire responses that she had a good understanding of the text. More will be said of Carol’s concept later. Of the previously discussed analogy exercise, Carol developed two analogies.



Figure 4.29. (Carol)

I categorised fourteen workbooks as textual. All students from this group produced good, communicative final illustrations. The boundary between textual and blended was determined through volume of analytical writing about the Conan Doyle text at the beginning of the project. Both textual and blended workbooks contained written comments throughout, but textual workbooks quite clearly contained more references to the actual text.

As with group two, cycle two students, this group dissected the text and wrote about it in some depth. This group also had, according to their responses in the comprehension questionnaire(s) a sound understanding of the text’s key theme. The main characteristic of this group of students is that they sought to record their understanding of the text before they started to conceptualise. They separated the paragraphs into separate units and wrote about them. It would seem that this group worked methodically through the text using the *Reading text: The development of understanding* sheet. It would also seem that this group of students used writing to consolidate their thoughts as they progressed through the project and also used words as concept generators. Roxanne’s workbook provides a good example.

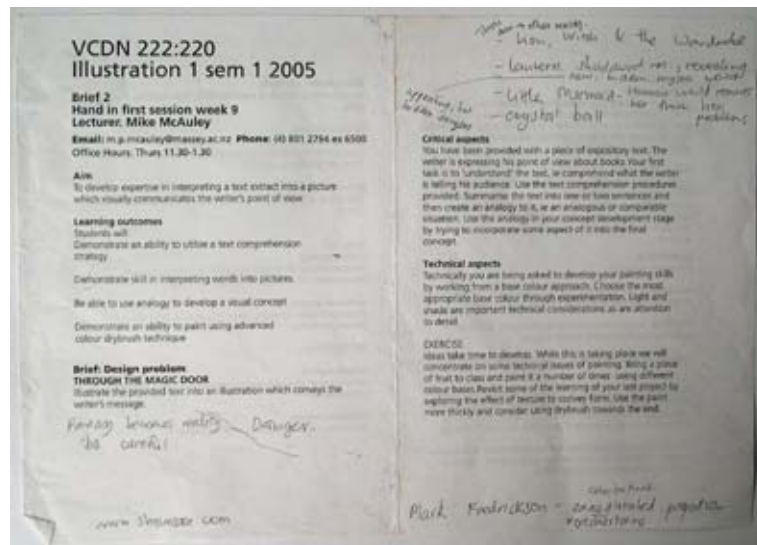


Figure 4.30. (Roxanne)

Roxanne's workbook is filled with written comments. The project brief itself, given out at the start of the project, has been written over (Figure. 4. 30). Already this shows embryonic concepts. In her workbook are three A4 pages of notes exclusively focussed on the text followed by another five pages where sketches and photocopied pictures are combined with written comments connecting ideas with the textual message. Words such as 'magic' from the text are cross-referenced to other words such as 'unicorn', 'Peter Pan', 'Wizard of Oz', 'Aladdin', potential signifiers in the right context for magic. Roxanne was also able to clearly demonstrate understanding of the need for hierarchy in an image (see Figure 4. 31). This comes from being able to determine what is important in the text and separate it from words and phrases of lesser significance. Figure 4.32 reveals a desire to connect text hierarchy to a visual hierarchy.

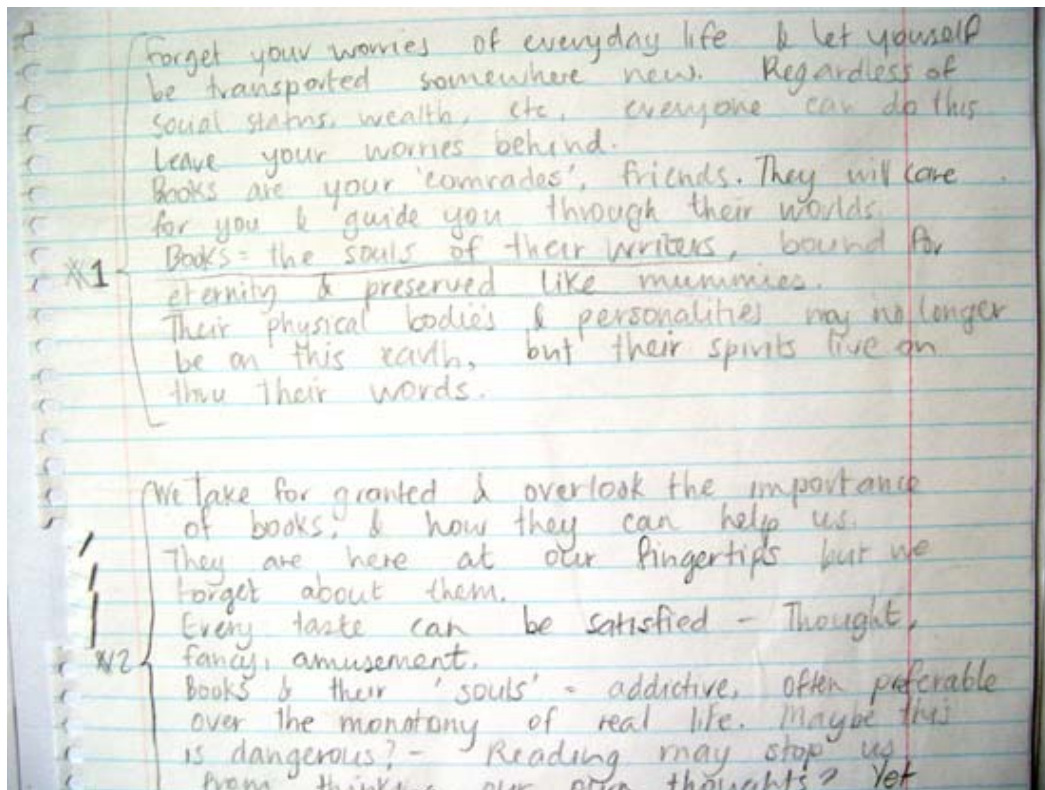


Figure 4.31. (Roxanne)

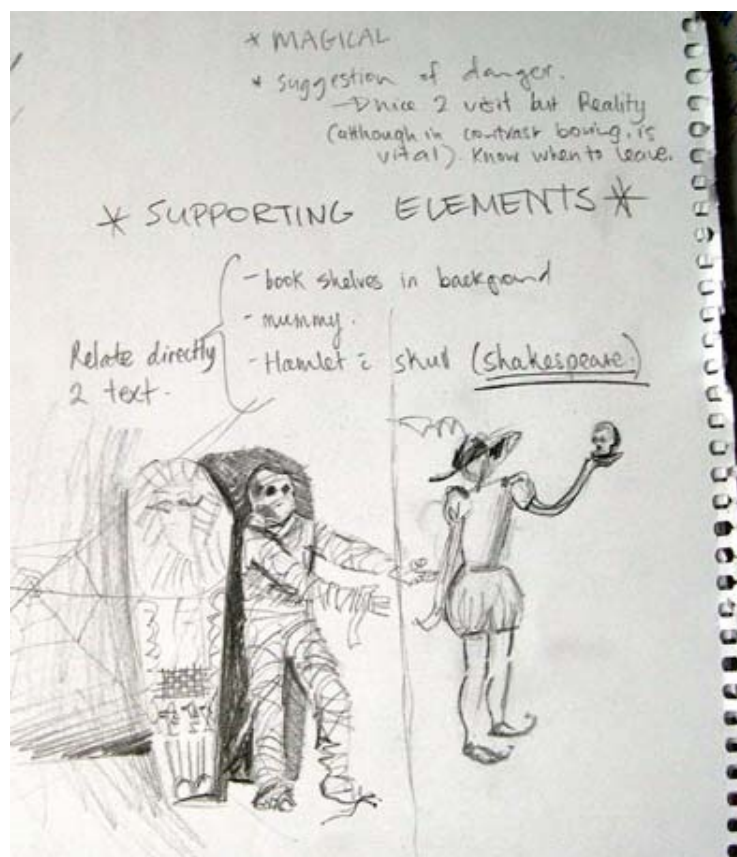


Figure 4.32. (Roxanne)



Thirteen students were placed in the blended category. I use the term blended to suggest a merging of stages between comprehension and interpretation. Students wrote less overall than the textual group and didn't write down any systematic breakdown of the text. While there were exceptions, overall the work in this group was slightly less accomplished than the textual group. The preoccupation in this group is to make sense of the text through picture making and then to write comments. Whereas the textual group formally broke down the text, the blended group merged references to the text with sketches. Eileen's workbook provides an example of this.

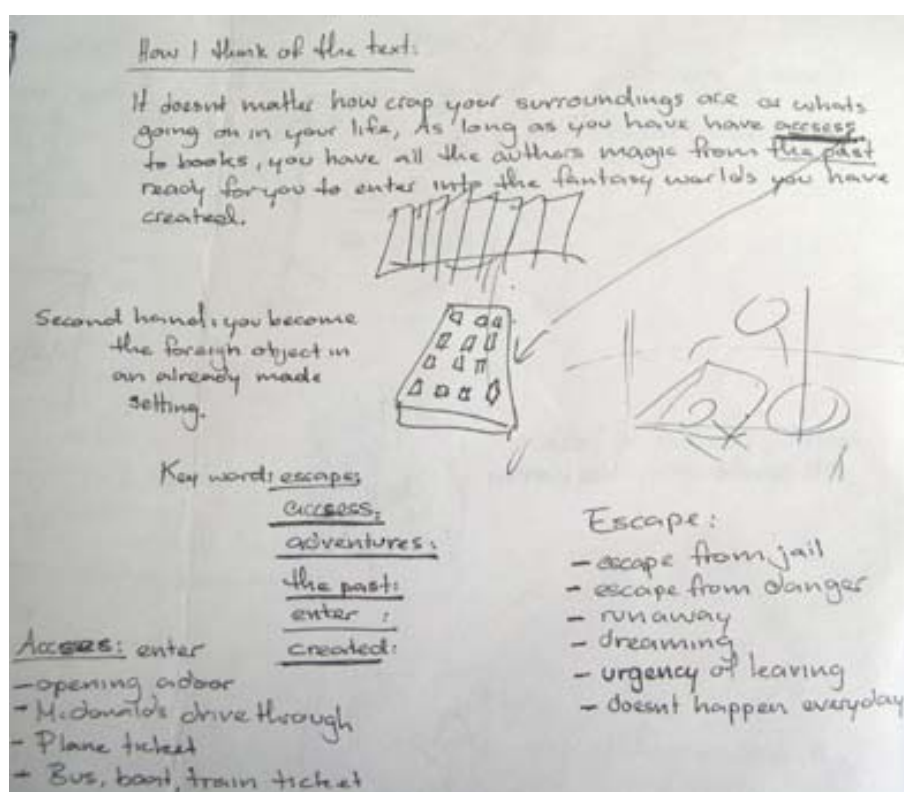


Figure 4.33. (Eileen)

Almost every page in Eileen's workbook has images and writing combined together. Her writing includes lists of connected words such as 'escape:-escape from jail-escape from danger-runaway-dreaming-urgency of leaving-doesn't happen every day'. She takes the key and supporting themes from the text, connects them to other situations and then visually conceptualises. Note on the top right of Figure 4.33 the word 'access' and a line drawn down to a TV remote in front of a row of books. The

blended group as a whole wrote down key themes from the text and looked for visual signifiers. Figure 4.33 is a typical example of this approach.

The visual group worked their way through the project almost exclusively by image making and image gathering. The blended group wrote little about the original text, focussing more on responding conceptually to textual themes. The textual group worked systematically through the text, describing it, looking for key ideas and themes and then responded visually to that material.

### *Final illustrations in cycle three*

The final design outcome of the four-week long project, delivered as a normal part of the curriculum (defined as cycle three of the research investigation), was a full colour illustration. Some illustration projects have a very specific audience, say six to eight year old children, but for the purposes of this project the intended target audience was the general adult public. At the end of a project, the lecturer and each student's peers take on the role of the audience. The formal assessment of the work as part of the Bachelor of Design paper 'Illustration 1,' was divided into the following categories: *Developmental* (35%), *Final art* (45%) and *Presentation* (20%). Developmental work is that which is contained in the students' workbooks. Final art is the full colour illustration. Presentation provides each illustration student with a platform to talk about their work to the class. This is where they explain the image, its codes, communication intent and what they as individuals learned from the project. It is also complemented by a written rationale, which attempts the same objective of describing the work and a written evaluation, which, again, enables them to describe what they have learned. Assessment of final art was based on two separate criteria: *technical* and *critical*. Technical issues are not connected to the research enquiry. They concern issues of medium application, technique and materials. Technical issues are essentially about rendering an image to create an 'illusion' of an event. The event itself, the idea, the communication intent is defined by the term 'critical'. Critical aspects are very much part of the research enquiry. This relates to students' interpretations of the text into an image, how they have communicated the writer's main message through analogy and how they have used composition and secondary pictorial elements to engage a potential audience and communicate their visual message. I have found that I have analysed the final images similar in many ways to how I would assess any project that is part of the delivered curriculum. The key differences have been the overall depth of enquiry, a move from tacit to explicit understanding and the interconnectedness to theoretical positions on creative process, comprehension and analogical reasoning. This has allowed me to develop my understanding of images and how they communicate.

The purpose of the analogy exercise and the reading sheet was to prepare students for the main design task where they were asked to develop a concept which communicated the writer's main message through analogy. The final image partly



demonstrates how effectively each student has been able to interpret the text through a conceptualised visual analogy. My analysis is based on a combination of using semiotics and, as with all previous data analysis sections, student notes contained in workbooks and in written rationales and personal evaluations. Analysis is therefore a ‘negotiation’ between what I have determined from the illustrations and what each student has written.

Through semiotic analysis and also the specific application of a source to target approach for each image, I have been able to determine which illustrations can be regarded as analogical concepts and which illustrations use other symbolic approaches such as metaphor. By prefixing the phrase ‘the experience of reading a great book is similar to’ I have also been able to determine what each student was trying to convey through similarity. The success rate overall was high. Compared to the analogy exercise when only 24 analogies out of a possible total of 88 were produced I have determined that 30 of the 34 illustrations were successful in visually enhancing the writer’s main message through a similarity based approach. I have categorised these 30 similarity based images into two connected groups: analogy and metaphor. Twenty-seven were, through applying a source to target approach, considered to be analogical and three were categorised as metaphorical (explained in methodology chapter). One image communicates through what I describe as *inference* (Jackie, Figure 4.34). I determined that mapping had not successfully taken place in the remaining three illustrations. As to anomalies, I note that one image classified as a successful analogy, failed to communicate its message as a consequence of the pictorial arrangement; its *salience*. I will describe this image in some depth. I will also describe another anomalous image which, while it does not use analogy or metaphor to communicate, still effectively conveys the mood of the Conan Doyle text. This image relies on salience to convey its message. The three remaining images already described as unsuccessful were analogical attempts where mapping from source to target was not accomplished.

I will begin by discussing the two anomalous images. Jackie’s (Figure 4. 34) and Helen’s (Figure 4. 35). Jackie’s image uses what I call inference to communicate and Helen’s contains an analogy but fails to communicate due to her arrangement of

shapes. The key terms are: *denotative/connotative, vector, participants, actor, goal, circumstances, salience, source/target, signified/signifier.*



Figure 4.34. (Jackie)

Jackie's image is situated in a room with books. I previously, in cycle one and two, described this approach as 'situational'. It relates to the opening sentences of Conan Doyle's text,

*I care not how humble your bookshelf may be, nor how lowly the room which it adorns. Close the door of that room behind you, shut off with it all the cares of the outer world, plunge back into the soothing company of the great dead, and then you are through the magic portal into that fair land whither worry and vexation can follow you no more.*

Essentially we see a woman with curlers in her hair reading a book. To her immediate left is a bookshelf. Some books are flying off the shelf towards an ajar door. In the immediate right is a table with a cup and saucer. Her expression is one of intent focus on the book she is holding. Her hair appears to be unravelling. These are the

denotative elements. The actual narrative of this image is determined by the diagonal line running between the figure and the door; this is the *vector*. The vector can be seen as the conduit or a link for what is happening between *participants*. The key represented participants are the figure and the open door. The door is the main *actor* in this image as it is 'causing' the books to fly towards it and is also causing the figure's hair to unravel. The figure is the *goal*, the participant to which something is being 'done'. The books, bookshelf, table and cup are also participants. These are referred to as *circumstances*; these are participants, which could be left out of a picture without affecting the main concept. They nevertheless provide further context. As what is happening to the figure is a mental abstraction, the flying books provide a concrete example that the figure is being pulled towards the door. The figure is not physically being pulled towards the door, but mentally. The door is causing the action, the figure displays the reaction. The *salience* of the image, that is, how the image's pictorial elements stand out, has been achieved by colour and tonal contrast. The door is seen as significant because it is the brightest element in the picture and it casts its light throughout. In her rationale Jackie writes, '*I have used golden light to symbolise the 'enthraling' power of those great writers*'. Contained in the image are a number of other signifiers. The tea cup (not coffee as Jackie describes the cup in her workbook) on a table acts as a signifier for normality and comfort. The hair curlers also act as a signifier for someone who is comfortable in their own environment.

Without the somewhat surreal pictorial element of the flying books, all we would essentially have is a picture of someone reading a book - a very literal concept. Jackie has tried to convey through her image the idea that when we get engrossed in a great book we can be mentally transported from the physical world to a world of fantasy. The concept is partly reliant on us understanding that the flying books moving towards a door (the magic door) represent the magical experience of being transported or moving to another place. It also relies on, (very successfully) the strong, salient effect through Jackie's use of colour and tonal contrast. The hair appears to be unravelling, so perhaps there is significance here too. But as readers we are unable to determine the significance of that. I am assuming that the books are flying off to the 'dreamland,' which Conan Doyle mentions. Perhaps the reader can fly off too.

The similarity based images attempt to communicate to us via a recognisable experience, not specifically related to books. Jackie's image is not based on similarity. Nor does it explore any of the secondary elements from the text. Jackie's comprehension was placed in the low level category, failing as she did to describe the differences between the paragraphs or subtleties within the text. She did describe the key concept in questionnaire 1. Her workbook was placed in the blended category. In the workbook a recurring word she writes is 'transport'. On one page she notes down the words 'writers/books -> transport'. Emanating from these words are lines with additional words, 'horse, train, car, road, lane, wings, aeroplane'. It would seem that Jackie was not able to develop an analogical concept based on transport. She also writes notes such as 'a book is like a key', but does not follow this up with a visual concept. She sketches a picture of a woman reader flying towards the door with a book in her hands. This is then developed towards the final concept. Keywords underlined by Jackie include 'familiarity' and 'dreamland'. I think it is possible that the table and the cup of tea, in some way represent the familiar. The door is 'dreamland.'

The partial success of this illustration lies in its salience. Jackie has inferred the power and magic of books through colour, tonal depth and contrast; conveying the mood of the text's message without an explicit signifier. Jackie has tried to imply that books can transport us to another place but was unable to develop a signifying concept for this. As a consequence source to target mapping does not take place.



Figure 4.35. (Helen)

Helen did not write a rationale for this image. My reading is based on her verbal comments during her presentation and her developmental sketches which led up to the final image. On the left hand side we see a sign with the words *'Step through the magic door to the manor of the mummified souls. Alive. Please present this library card at the issues desk'*. The sign also has an image of a walking mummy. In the distance there is a building which, based on what was said during the presentation and by looking through Helen's workbook sketches and collected images, is a haunted manor. On the right hand side is a horse. On closer inspection by looking through her workbook, I discovered that it is part of a merry-go-round. Note on the top right a pole emerging from the horse's neck. Contained in Helen's workbook are images of merry-go-rounds. I found it very difficult to determine the concept behind this image. I was unable to determine a vector, goal or actor, useful in determining an image's narrative. I was also unable to determine the role of the participants, who, I assume are the three visual elements. The key to a narrative is a 'happening,' embodied in what Kress and Van Leeuwen (1996) define as the 'vector'. The image is passive; there is no perceivable interaction between the participants. The salience of the image is dull and muted. The three key elements (sign, manor, horse) are of equal value. The

manor, despite its smallness is placed very focally and is strongly contrasted from its surroundings. The gaze of the horse, staring at the viewer suggests a significance which Helen did not intend. I think that what has happened here is that Helen has tried to create the concept that the experience of reading a book is like the experience of going to a fairground. The haunted manor has possibly been chosen because of its association with ghosts, and by implication, dead writers. Helen has tried to incorporate references to the text. There are two direct references to 'mummified souls' in the sign. Books are referred to by implication by the words 'please present your library card at the issues desk'.

The analogy of comparing fairgrounds to the experience of reading a great book is valid. When we go to a fair, certainly as children, we are excited by all the possible choices ahead of us – 'choose your writer'. The rides are thrilling, an escape from the 'dull, soul-killing monotony' of real life. The reason Helen's image has failed to communicate is because we are unable to look at the image and 'see' a fairground. A sign telling us to present our library card is confusing, not something we would expect at a fair. The horse is too closely cropped for us to see it as part of a merry-go-round. The salience is dull, again not conducive to our associations of fairgrounds where we would expect to see bright coloured signs and lights. During Helen's verbal description she talked more about her childhood experiences of reading scary books about haunted mansions. This has possibly taken on too much significance, hence the manor, instead of, say, a ghost train – a ride we can easily associate with fairgrounds. So what we have here is a concept which had potential but failed to clearly communicate through Helen's choice of pictorial elements, salience and composition. Source to target mapping cannot be determined by looking at the image. However, when one looks through Helen's workbook, it is clear that she had created a source to target mapping relationship. Therefore this image has not been placed in the 'not analogic' category.

I will now discuss two images which demonstrate the power of analogy to illustrate the key theme contained in a textual passage.





Figure 4.36 (Jane)

Despite being placed in the low level comprehension group and not developing any analogies during the analogy exercise, Jane overcame her initial difficulties, writing a considerable amount about the text in her workbook and developed one of the most successful illustrations during the project. She was placed in the textual category.

I will begin by describing the formal, denotative components of this picture. Dark grey window (top centre), blue written text on dull yellow flowing background emerging from window, possibly a quotation. Text joins on to a flying carpet metamorphosed into a book. On this form is a young female figure. The form also has hieroglyphic symbols on it. In the background we see from left to right a castle, William Shakespeare, Cupid, a laughing tree, a graveyard and a white rabbit. On the top right we see a flying saucer. Most of these shapes are evident in the final image. Confirmation comes from looking at the sketches and written comments the student made during the project.

The dominant 'represented participants' is the grouping of a figure on a flying carpet. The flying carpet/book is the actor, that which affects and the female figure is the goal, that which is being affected. In this instance the vector is the process of the participants travelling from one location to another. The vector connects two worlds. The grey window represents the real world. The flying carpet is taking the figure to 'dreamland'. I base this on the text from the essay *'You have left all that is vulgar and all that is sordid behind you'*. In her rationale Jane writes *'I have painted a magic flying carpet flying out from a dull room entering into a bright, magical world'*. In summing up the text she writes *'That books can take you on a journey and adventure. They can take you to another place or world. That they are magical.'* The driving concept in this image is the analogy that books are like magic carpets. This interpretation is validated by numerous comments, drawings, and source images collected by the student and of course the student's own written rationale. My reading of the analogy is consistent with the student's concept. The analogy created by the student allows me to think of books as magical systems of transport. Conan Doyle's text implies this with comments such as:

*'Close the door of that room behind you, shut off with it all the cares of the outer world, plunge back into the soothing company of the great dead and then you are through that magic portal into that fair land whither worry and vexation can follow you no more... you have but to hold up your hand to them and away you go together into dreamland'.*



Conan Doyle is suggesting that by choosing a book, in this instance he is referring to the work of dead authors, we can remove ourselves from the worries of our day to day lives and escape to a fictional realm he refers to as 'dreamland'. Jane's analogy makes the connection that, in a sense this magical experience is similar to being transported to wherever we desire, just like being on a magical flying carpet. While flying carpets are not themselves real, they are firmly fixed in popular culture mythology and therefore the connection is made. The source, in this instance the flying carpet is mapped, or transferred to the target which is books. Our familiarity and clear understanding of flying carpets allows us to think of books in a similar way. The analogy also works because as readers we are able to reflect on our own experience with books. And most of us can think back to certain books in childhood and adulthood which had an almost magical, transformative effect on us.

Other elements in Jane's picture were interpreted by looking for implicit and explicit references to the text. The very nature of analogy is that the idea comes from an external source. However, good visual communication can also harness an explicit or literal approach, particularly as a secondary, support mechanism. In the text Conan Doyle says, *'Let us suppose that we were suddenly to learn that Shakespeare had returned to earth, and that he would favour any of us with an hour of his wit and his fancy. How eagerly we would seek him out!'*. Jane refers to Shakespeare explicitly with an image of him behind a tree holding a quill. Other images in the picture are implicit. Conan Doyle talks of 'mummified souls'. Jane picks up on this through hieroglyphics on the magic carpet, which is an implied reference to Egypt. On closer inspection the hieroglyphics are not of Egyptian origin. We see a magnifying glass suggesting mystery, a sand timer, suggesting suspense and a flower next to an eye with a tear suggesting romance. These implied references can also be tied back to Conan Doyle's text: *'If you be thoughtful, here are the kings of thought. If you be dreamy, here are the masters of fancy. Or is it amusement that you lack? Second-hand romance and second-hand emotion are surely better...'*. Most of the secondary elements in the picture relate to images that we would expect in fiction, hence the castle, the flying saucers, Cupid, the laughing tree. The graveyard is a reference to dead writers mentioned numerous times in Conan Doyle's text *'plunge back into the soothing company of the great dead... The personalities of the writers have faded into impalpable dust, yet here are their very spirits at your command... out comes the*

*dead writer and they hold you enthralled by the hour... the dead are such good company*'. Context is a highly significant factor in visual interpretation. A magnifying glass, for example, does not mean mystery. And we do not associate graveyards with dead writers. It is when the image is read in the context of its placement that the reader is able to make a connotative reading of what it signifies.



Figure 4.37. (Carol)

While Carol was placed in the visual workbook category, what comments she wrote were succinct, insightful and appropriate. In this image we see the hand of a figure emerging from under a floor into a room. There is a ladder connecting the two spaces. Looking down and holding the hand of the emerging figure is another figure in a green deerstalker's outfit. He is holding a pipe in his left hand. Behind him are four other figures. In the room are a chest and a creeping vine. There is an open hatch between the two spaces. The words are slightly covered but it is likely they say

‘Magic Portal’. On the left hand side the roof is arched and in the background is a small window.

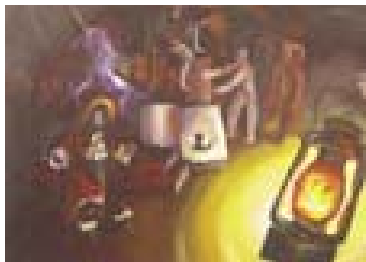
The vector in this image is the connection between two hands. The participant below is the goal and he is being pulled into the attic by the other participant who is the actor. The other participants are circumstances, connected contextually to the actor. Each could have taken on the role of actor. The connotative significance of the image is that it picks up on Conan Doyle’s reference to books as being unappreciated yet full of richness. Carol compares books to attics, the similarity being that both can lie gathering dust, unused. Yet both contain rich, interesting things when opened. *‘It is our familiarity also which has lessened our perception of the miraculous good fortune which we enjoy. Let us suppose that we were suddenly to learn that Shakespeare had returned to earth, and that he would favour any of us with an hour of his wit and his fancy. How eagerly we would seek him out! And yet we have him—the very best of him—at our elbows from week to week, and hardly trouble ourselves to put out our hands to beckon him down’*. In response to the question ‘What is the writer’s main message/point of view?’, given out as part of questionnaire two, Carol writes *‘Books are deeper than we originally think because we are climatized to their presence and fail to see the richness of each journey as a significant form of escapism’*. Her use of the word “climatized” is, I believe, a reference to Conan Doyle’s text which says, ‘familiarity has deadened our sense of it’. In her rationale she writes *‘the setting for dreamland is an old attic. The attic works as analogy for books because it is a place where we can find objects which tell stories and offer us a window into the past. Also an attic has the dusty and mysterious qualities which Conan Doyle connects with books’*. The analogic source of the attic maps onto our target of books because many of us have at some time in our lives climbed up into attics and found the experience fascinating and also a bit ‘eerie’ (again a word Conan Doyle uses). The attic analogy allows us to think of books as containing great treasures even though we tend to forget about them and let them gather dust. The experience of opening a book is therefore genuinely similar in a conceptual sense, to that of opening an attic door. Another reason why this analogy works well is that Conan Doyle refers to ‘dead writers’, that is, works from the past. He doesn’t discuss contemporary writers. Attics contain our relics from the past.

Text specifically underlined in the Conan Doyle essay by the student is ‘door’, ‘magic portal into that fair land’, ‘dreamland’, and ‘world’s greatest storytellers’. The student has successfully interpreted these key elements into her picture. As to the various pictorial elements in the picture the student tells us about the world’s greatest storytellers through the characters ‘Mowgli’ from ‘The Jungle Book’, ‘Sherlock Holmes’, Conan Doyle’s famous detective, ‘Dorothy’ from ‘The Wizard of Oz’, and a character from ‘Where the Wild Things Are’. Carol refers to these characters in her rationale. Shakespeare, the one writer specifically mentioned in Doyle’s text has been explicitly referenced, standing in the attic. Salience in this image is characterised as a contrast between the darkness below the attic and the brightness above.

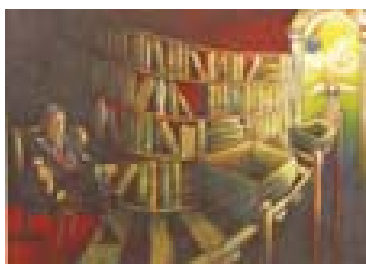
### *The outcome of conceptualising analogically*

I have discussed a few individual final illustrations in some depth. I will now discuss them as a group to provide a broader perspective on their communicative value as illustrations. Of particular interest to me was what effect thinking about a text from an analogical perspective would have on the final outcome. It was my belief that if this approach had not been taken many students would have produced what I described as ‘situational’ or ‘fragmentary’ images—illustrations located in rooms with bookshelves or images, which focus on supporting themes (see student comments on this in next chapter). What I as the teacher wanted to encourage was the creation of images which intrigued the viewer but, more importantly, ‘illustrated’ something of the emotional effect of books; a very ‘abstract’ state requiring ‘concrete’, physical examples that the viewer could relate to. I believe that within this context the project has been very successful. Also, I believe students were able to think of designing as a mental process, despite it having a physical, visual output. The following are the ‘experiences’ that students conjured up. I also briefly describe some of the secondary references to the text made by students in their images. Across from each image is a short descriptor of its concept. This is based on each student’s own written description and is not my own personal interpretation. My own comments relate to ‘secondary elements’ and ‘source’ and ‘target’. I have added the words ‘not analogic’ to some student images where I have concluded that the student concept was not based on an analogical approach. The descriptors attached to each image are summaries and do not contain full references to content. They do, collectively, provide a holistic impression of the work produced, the ideas behind each picture and

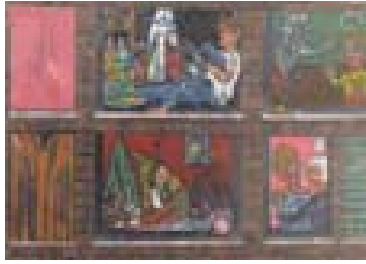
the effect of using an analogical approach to concept creation. Each image has been given two grades; 'idea' and 'salience'. 'Idea' relates to: (1.) the concept contained in each image in relation to the key message (even if pictorial placement and technical rendering of paintwork made it hard to determine what the concept was), (2.) secondary elements (implicit or explicit references to aspects of the text) and how they support, enhance the concept and indicate supporting themes within the text. Concept and secondary elements are linked as one because the secondary elements provide context, understanding and enhancement of the basic idea. Salience relates to (1.) placement of shapes to indicate informational values, (2.) contrasts in colour and tonal value to attract audience attention. While the final images are the material outcomes of the project, the images have been placed in relation to their workbook category where most activity took place, starting with the largest group, 'textual':



**Roxanne.** High comprehension category. Textual workbook category. **Concept:** The idea of books are like shining lamps revealing many things that we wouldn't otherwise see. **Secondary elements:** Various fictional characters, an Egyptian mummy, a shadow of a wolf, a reference to Sherlock Holmes, an exit sign, books and bookends. **Source:** shining lamp. **Target:** books reveal. **Idea A.** **Salience A+**



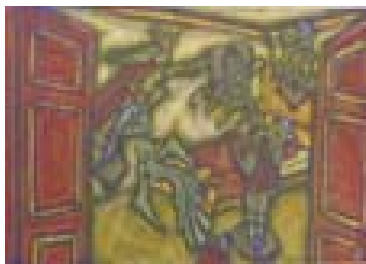
**Kate.** High comprehension category. Textual workbook category. **Concept:** The idea is based on contrasting our dull, sedentary existence with an exciting rollercoaster journey. **Secondary elements:** Books, bookshelves, mummy bookends, a doorway, a globe. **Source:** rollercoaster. **Target:** books excite. **Idea A-.** **Salience A+**



**Belle.** Comprehension category not determined. Textual workbook category. **Concept:** A group of similar flats, homes are transformed by books. **Secondary elements:** Each room refers to different genres, characters and stories, Shakespeare is present. **Not analogic:** Belle uses metaphor of architectural sameness to represent real life. This sameness is transformed through reading. **Idea B+.** **Salience B+.**



**Harriet.** Satisfactory comprehension category. Textual workbook category. **Concept:** Real life is like a prison. Books allow us to escape from it. **Secondary elements:** Foreground figure is holding a book by Shakespeare. **Not analogic:** Prison is a metaphor for real life. We can escape from it through reading. **Idea B+.** **Salience A.**



**Craig.** Satisfactory comprehension category. Textual workbook category. **Concept:** Books are like dreams, full of strange, wonderful happenings. **Secondary elements:** a king, representing 'kings of thought', Shakespeare is reading, cupid is flying, representing 'romance', a doorway. **Source:** dreams. **Target:** books allow us to fantasise. **Idea A-.** **Salience B.**



**Lisa.** Satisfactory comprehension category. Textual workbook category. **Concept:** Books are like boats, allowing us to chart unfamiliar waters to new lands. **Secondary elements:** Bookcases metamorphose into trees and mountains, a sign says 'Fair Land', a golden light is seen in the distance. **Source:** a longboat. **Target:** books let us travel to imaginary lands. **Idea B+.** **Salience B+.**



**Jane.** Low comprehension category. Textual workbook category. **Concept:** Books take you on magical journeys, just like flying carpets. **Secondary elements:** References to Shakespeare, different story genres, gravestones representing dead authors, grey window representing our dull, real world. **Source:** flying carpet. **Target:** books are journeys. **Idea A+.** **Salience A+.**



**Matt.** Satisfactory comprehension category. Textual workbook category. **Concept:** The idea is that reading a great book is like walking in the footsteps of the author. Tracks in lunar soil are used to suggest that these are fantastic journeys. **Secondary elements:** Doorway, lunar soil implies fantasy, things we can't do in real life. **Source:** footsteps on the moon. **Target:** writers leave their imprint in their books. **Idea B+.** **Salience B+.**



**Mary.** Satisfactory comprehension category. Textual workbook category. **Concept:** Books are being used as a ladder to climb from the real world to 'dreamland'. **Secondary elements:** The grey area at the bottom represents the 'dull, soul-killing monotony of real life'. The bright colours and forms at the top are 'that fair land whither worry and vexation can follow no more'. **Source:** a ladder. **Target:** books help us climb to better places. **Idea B.** **Salience A.**



**Gayle.** High comprehension category. Textual workbook category. **Concept:** Books are like fancy dress costumes, they allow us to take on the identity of other people. **Secondary elements:** References to Shakespeare through the Romeo and Juliet tag, 'choose your writer', referenced by different choices of costume, door with star, representing 'magic door'. **Source:** fancy dress costumes. **Target:** books let us imagine being other people. **Idea A-.** **Salience B+.**





**Tim.** Satisfactory comprehension category. Textual workbook category. **Concept:** When we take a bath we forget the worries of daily life, just like when we relax with a good book. **Secondary elements:** On the bath there is an Egyptian figure bath salt, a reference to mummies, the dog is from 'Hound of the Baskervilles', the fantastic landscape represents dreamland. **Source:** relaxing in a bath. **Target:** books are a great way to relax. **Idea B+.** **Salience B+.**



**Anna.** Satisfactory comprehension category. Textual workbook category. **Concept:** A book is like a ticket for a journey. **Secondary elements:** Doorway with sign, aircraft with name of 'comrade' on it, the words 'Romeo Montague' as reference to Shakespeare. **Source:** airplane ticket. **Target:** books allow us to go on journeys of our choosing. **Idea A-.** **Salience B-.**



**Ricky.** Satisfactory comprehension category. Textual workbook category. **Concept:** Books are like rollercoasters, they take you on thrilling journeys. **Secondary elements:** Shakespeare is sitting in one of the seats, so too are other fictional characters from literature. **Source:** rollercoaster. **Target:** books are thrilling journeys. **Idea B+.** **Salience B+.**

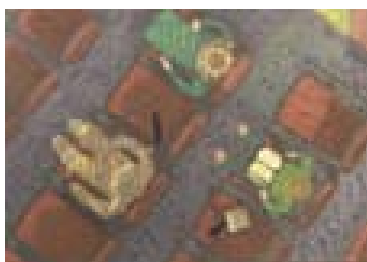


**Gina.** Satisfactory comprehension category. Textual workbook category. **Concept:** Books are like space rockets, they take you to places you ordinarily couldn't go. **Secondary elements:** A mummy, different planets represent different book choices. **Source:** a space rocket. **Target:** books take us to amazing places. **Idea B.** **Salience B.**

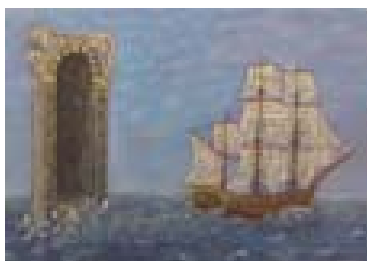




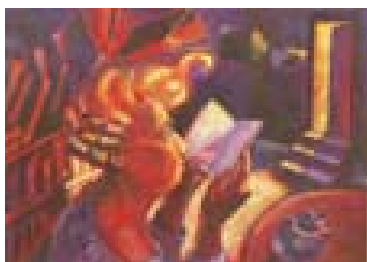
**Sinead.** Satisfactory comprehension category. Blended workbook category. **Concept:** Books are like trains, they take you to your destination of choice. **Secondary elements:** The old steam train is called 'Dreamland Express', the smoke has symbols of magic in it. **Source:** Old steam train. **Target:** Books allow us to go on journeys. **Idea B-. Salience B.**



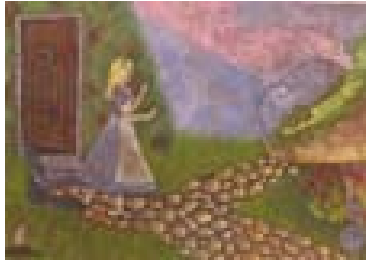
**Jared.** Satisfactory comprehension category. Blended workbook category. **Concept:** Reading a book is like going to the cinema. **Secondary elements:** 'kings of thought' represented by a crown, a mummy, a doorway. **Source:** watching a movie **Target:** reading is like going to the movies. **Idea B-. Salience B+.**



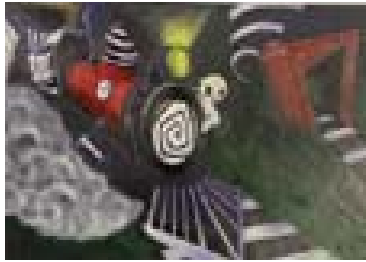
**Karen.** Comprehension category not determined. Blended workbook category. **Concept:** Books are like the sail ships of old, they let us sail off into undiscovered lands. **Secondary elements:** The magic door is explicitly represented, the dark grey represents the 'dull' real world, words appear on the sails. **Source:** a sailing ship. **Target:** books let us journey and discover new things. **Idea B. Salience A-.**



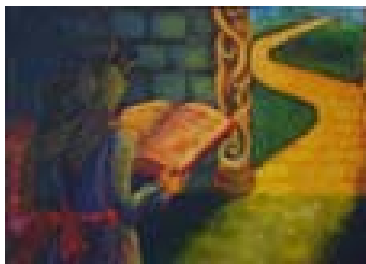
**Jackie.** Low comprehension category. Blended workbook category. **Concept:** When we read a book we get totally drawn into it. **Secondary elements:** The tea-cup represents familiarity, the books and bookshelf relate explicitly to the text. **Not analogic:** the magic door is literally pulling books towards it, the inference being that books mentally draw us into their environments. **Idea B-. Salience A+.**



**Eileen.** Satisfactory comprehension category. Blended workbook category. **Concept:** The idea here is based on us associating Alice's journey to Wonderland to that of being transported elsewhere by books. **Secondary elements:** The two paths represent different choices, 'choose your writer', the door represents the magic door. **Not analogic:** mapping from Alice to the experience of reading does not take place and the image stays too close to source. **Idea C+. Salience B+.**



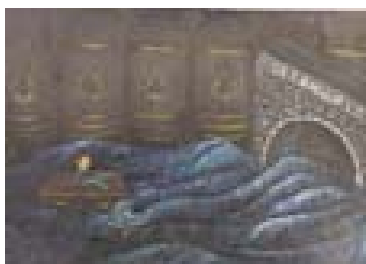
**Eric.** Satisfactory comprehension category. Blended workbook category. **Concept:** Books are like ghost trains, they can take you on scary, thrilling journeys. **Secondary elements:** Shakespeare, a mummy and a doorway. **Source:** ghost train. **Target:** books can be scary, thrilling journeys. **Idea B. Salience C+.**



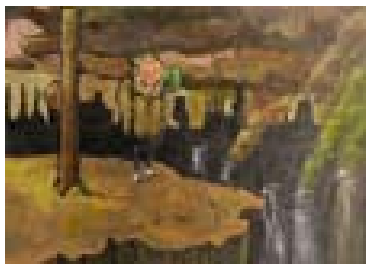
**Anita.** Satisfactory comprehension category. Blended workbook category. **Concept:** Books are like path-ways, we can follow them to distant lands. An association with the yellow brick road is also being made to suggest fantasy. **Secondary elements:** doorway, dark interior to suggest the 'dull' real world. **Source:** golden yellow path. **Target:** books are pathways. **Idea B. Salience A-.**



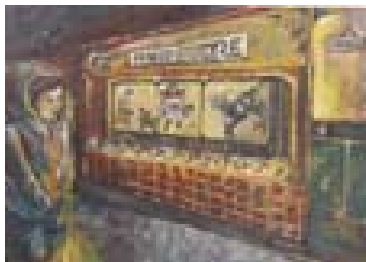
**Martin.** Satisfactory comprehension category. Blended workbook category. **Concept:** Writers are like magicians, their books can amaze us. The idea is about making us think that books are magical. **Secondary elements:** Shakespeare, Gandalf represents choices of genre, grey window represents the dull real world. **Source:** a magician. **Target:** books are magical. **Idea B. Salience C.**



**Julie.** Satisfactory comprehension category. Blended workbook category. **Concept:** Books are thrilling, like travelling on a white water raft. **Secondary elements:** a row of books representing different genres, the bridge with a sign saying 'Dreamworld' represents the magic door. **Source:** raft or fast river. **Target:** books are thrilling journeys. **Idea C+. Salience B.**



**Jen.** Satisfactory comprehension category. Blended workbook category. **Concept:** Books are like sign posts, each one helps us choose a different destination. **Secondary elements:** The background represents the 'dull' real world, the signpost represents different book choices. **Source:** sign posts. **Target:** each book points to a new destination. **Idea B+.** **Salience B.**



**Brianne.** Low comprehension category. Blended workbook category. **Concept:** Window shopping is like choosing a book—so many tempting options. **Secondary elements:** the sign saying 'magic store' and the door with an 'open' sign represent dreamland, the figures in the window represent choice of genres. **Source:** window shopping. **Target:** there are so many books to choose from. **Idea C+.** **Salience B.**



**Eleanor.** Satisfactory comprehension category. Blended workbook category. **Concept:** A great story is a magical, flying journey. **Secondary elements:** The background is dull in colour, representing the real world, books and bookends represent different genres, Conan Doyle referenced through Sherlock Holmes., stars relate to magic. **Not analogic:** The flying book has itself become a metaphor for travel. **Idea B-.** **Salience A-.**



**Sally.** Satisfactory comprehension category. Blended workbook category. **Concept:** Books are like stepping stones, they help you make your journey. The hand represents the real world, calling the standing figure back. **Secondary elements:** The foreground is a fantasy landscape representing dreamland. **Source:** stepping stones over water **Target:** books assist us in our journeys. **Idea C+.** **Salience C+.**



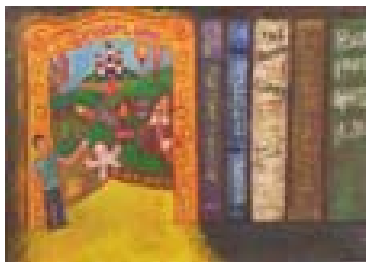
**Malcolm.** Low comprehension category. Visual workbook category. **Concept:** Books are like stepping stones, they help you make your journey. The hand represents the real world, calling the standing figure back. **Secondary elements:** The yellow doorway represents dreamland. **Source:** stepping stones. **Target:** books assist us in our journeys. (similar concept to Sally's). **Idea C+.** **Salience C+.**



**Tom.** Comprehension category not determined. Visual workbook category. **Concept:** Opening a book is like opening a door, behind each is a new experience. **Secondary elements:** The white writing is from Shakespeare's Romeo and Juliet. **Source:** opening door to reveal something new. **Target:** when we open a book we reveal a new experience. **Idea C+.** **Salience B.**



**Helen.** Satisfactory comprehension category. Visual workbook category. **Concept:** Reading book is like going to a fairground, so much choice and thrilling experiences. **Secondary elements:** The sign contains references to 'mummified souls'. **Source:** a fairground. **Target:** books provide lots of thrilling choices. **Idea B-.** **Salience D.**



**Yvonne.** Comprehension category not determined. Visual workbook category. **Concept:** When we enter the contents of a book it is like entering a fairground – lots of enjoyable experiences await us. **Secondary elements:** Shakespeare, to the right are references to choice of different genres. **Source:** a fairground. **Target:** books provide lots of thrilling choices. **Idea B.** **Salience B.**



**Carol.** High comprehension category. Visual workbook category. **Concept:** A classic book is like an attic, it can lie gathering dust for years but when opened reveals many wonderful treasures. **Secondary elements:** Various characters from different stories and genres. The bright window contrasts to the dark below representing the transition from real world to dreamland. **Source:** an attic. **Target:** books are unappreciated yet they contain many interesting things. **Idea A+.** **Salience A+.**



**Kathy.** Low comprehension category. Visual workbook category. **Concept:** Books allow us to escape from the real world. **Secondary elements:** The outstretched hand holding a book is Shakespeare. **Not analogic:** While books are a form of escape, comparing them to fire escapes does not enable appropriate mapping to take place. **Idea C.** **Salience C+.**



**Renata.** Low comprehension category. Visual workbook category. **Concept:** The bright light emanating from a book represents the power and magic of a book. **Secondary elements:** Shakespeare can be seen as a ghost, hieroglyphic writing, a reference to 'mummified' souls'. **Not analogic:** The concept is not based on comparing the experience and effect of reading books to that of something else. **Idea C.** **Salience C.**

Figure 4.38. Cycle three final images.

### *Relationship between process and design success*

The data suggests that some students decided early in the project to focus on concept development. This can be seen in the workbooks which I titled visual. It is extremely unlikely that the students whose workbooks were in the visual category would have written notes about the text elsewhere. Students hand in all work connected to a project. As mentioned previously in this chapter I describe workbooks as “*an extensive collection of fleeting, captured thoughts, embryonic ideas, gathered images, research material, analysis, experiments with techniques, media and style, iterations and systematic developments of concepts*”(page 166). I believe that this group’s focus was on making an image. The workbooks described as ‘blended’ showed a different process. Writing and image making were intertwined with sketches which could easily be connected directly to written comments. Eileen’s (Figure 4.33) workbook showed this connection quite clearly. The blended workbooks demonstrated an interchange between the text and how students used it to develop concepts. The third group of workbooks which I labelled textual also demonstrated an interchange between the text and developing concepts. What made this group of workbooks different was that each of them at the beginning showed that there had been significant analysis of the text —the written notes being the evidence of that. These written notes seemed to follow a structure which was akin to that suggested in the sheet I produced titled ‘*Reading text: the development of understanding*’. Paragraphs were described separately, differences described, keywords and phrases were highlighted and there was discussion about the main points of the text. Often these keywords and phrases could be seen in the workbook next to images which suggest that students were attempting to connect the words with visualised concepts. Roxanne’s workbook provides a good example of this relationship between word and image (Figure 4.32).

The educational purpose of the analogy exercise was to provide students with an opportunity to experience the process of conceptualising a proposition through the description of an experience, which through similarity explained the meaning behind the proposition. I was not able to determine if success or failure at the analogy exercise affected students’ ability to develop analogies for the main design task. What I can say is that I believe the critique session afterwards had a beneficial effect on

most students. By looking at successful examples produced by peers, students were able to see how the process from proposition to analogical explanation could be done. Student evaluation of the analogical process will be discussed fully in the next chapter but Kate's evaluation comments about the project in general indicate that despite initial difficulty in thinking about text from an analogical perspective, it can be done successfully with positive learning benefits.

*I think this project has definitely encouraged my thinking process.  
Initially I found the idea of analogy quite daunting, but I have found I  
have now developed the ability to think at a deeper level. (Kate)*

As mentioned previously, I have defined illustration which accompanies written expository text as "*imagery which encapsulates, supports and enhances a hegemonic reading of a written text.*"(p. 84) One of the main reasons for this enquiry was to determine if an expository passage could be illustrated by novice students through analogy, the idea being to assist students avoid coming up with what I describe as either fragmentary or situational concepts. By illustrating through an analogical approach the idea is that, as analogy comes from an external source to that which is being described, it is possible to devise novel concepts which still encapsulate a textual message through a similarity based description. Novelty resides in the fact that the analogy does not exist in the text; it is created from an external source. However, as context is extremely important, what is required is that secondary elements within a text must be harnessed in such a way that they can be incorporated into a concept as supporting factors. My analysis shows that the textual group overall did a slightly better job of that than the other two groups. There are of course exceptions and I will discuss these in the next chapter. The students whose workbooks were categorised as visual performed less well. It may well be that less engagement with what the text had to offer meant that secondary elements from the text were not fully considered and ultimately not implemented into the final illustrations. As mentioned earlier, context is extremely important. Analogy alone cannot explain the text.

One of the more unexpected consequences of analysing student design work was the almost revelatory discovery (personal discovery) that salience, the arrangement of shapes, colours and tonal value, has a considerable influence on whether or not an

idea translates into a piece of visual communication. The consequences of this will be discussed later.

*Main findings in cycle three:*

1. Without instruction students found it difficult to interpret textual propositions analogically
2. Most students were able to describe a systematic comprehension approach
3. The comprehension sheet was perceived by students to have had a beneficial effect on how they comprehended and interpreted the Conan Doyle textual passage
4. Thirty one students were able to describe the text's key theme
5. Understanding of secondary themes in the text varied between students. Three recognisable categories were identified: high, satisfactory and low level comprehension
6. Student approach from comprehension to interpretation varied with three recognisable categories identified: textual, blended and visual
7. The majority of students created an analogical concept which communicated the main theme of the text
8. Secondary elements from the text need to be incorporated to provide context
9. In the final images, salience is a significant factor in enabling the idea to be communicated.

Figure 4.39 shows what student activity took during each of the three cycles and the data that was generated from them. It also shows summarised findings of each cycle and demonstrates the unfolding and linked nature of action research. I have discussed each cycle separately with occasional references to other cycles. While each cycle had its own conditions and parameters, some common links and patterns between them were found.





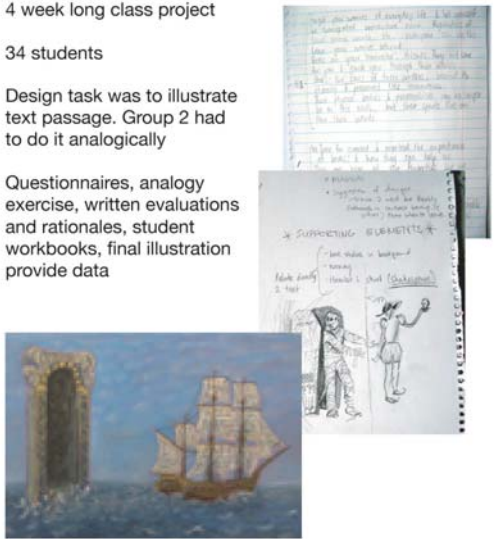
| Structure of student activity and summarised findings  |   |
|--|---|
| <p><b>Cycle 1</b></p> <p>30 minute situated study</p> <p>Eight volunteer students</p> <p>Design task was to illustrate text passage</p> <p>Semi-structured interview, thumbnail sketches and student notes provide data</p>   | <ol style="list-style-type: none"> <li>1. Verbal descriptions of textual message and the concepts produced rarely matched</li> <li>2. The key concept of escapism was not mentioned by five out of eight students</li> <li>3. Keywords and phrases from the text were rarely adapted into the visual concepts</li> <li>4. Some concepts based on making comparisons between different situations complemented the text by providing something new and novel</li> <li>5. The majority of students developed concepts which were fragmentary or situational</li> <li>6. Descriptions of reading strategies were limited and generic</li> <li>7. Student notes focussed on describing concepts, not on text analysis</li> </ol>  |
| <p><b>Cycle 2</b></p> <p>30 minute situated study</p> <p>Twelve volunteer students split into two groups</p> <p>Two interventions in group 2</p> <p>Design task was to illustrate text passage. Group 2 had to do it analogically</p> <p>Semi-structured interview, thumbnail sketches and student notes provide data</p>  | <ol style="list-style-type: none"> <li>1. Group 2's description of the text, on the whole, captured more of the main points</li> <li>2. All six students in group 2 talked about escapism during their interview and referred to it in their notes. Two students in group 1 wrote about escapism in their notes and one of them mentioned it during interview</li> <li>3. Group 2's notes were considerably more extensive, characterised by in-depth analysis of the text's structure</li> <li>4. Group 1's visual concepts were largely 'situational', rooms and bookcases being very common, or 'fragmented', focussed on secondary elements within the text</li> <li>5. Group 2's analogical visual concepts were largely 'experiential', scenes which attempted to demonstrate the experience of reading or the effect books can have on us</li> </ol>   |
| <p><b>Cycle 3</b></p> <p>4 week long class project</p> <p>34 students</p> <p>Design task was to illustrate text passage. Group 2 had to do it analogically</p> <p>Questionnaires, analogy exercise, written evaluations and rationales, student workbooks, final illustration provide data</p>                            | <ol style="list-style-type: none"> <li>1. Without instruction students found it difficult to interpret textual propositions analogically</li> <li>2. Most students were able to describe a systematic comprehension approach</li> <li>3. The comprehension sheet was perceived by students to have had a beneficial effect on how they comprehended and interpreted the Conan Doyle textual passage</li> <li>4. Thirty one students were able to describe the text's key theme</li> <li>5. Understanding of secondary themes in the text varied between students. Three recognisable categories were identified; high, satisfactory and low level comprehension</li> <li>6. Student approach from comprehension to interpretation varied with three recognisable categories identified; textual, blended and visual</li> <li>7. The majority of students created an analogical concept which communicated the main theme of the text</li> <li>8. Secondary elements from the text need to be incorporated to provide context</li> <li>9. In the final images, salience is a significant factor in enabling the idea to be communicated</li> </ol> |

Figure 4.39. Summarised findings of the three cycles.

### *Common links and patterns between cycles*

Most students who were given the sheet '*Reading Text: The development of understanding*' responded to the question, 'what is the main message?' with answers that revolved around the idea that escapism is provided by books. This question was asked verbally as part of a semi-structured interview in cycle one and two and through two questionnaires in cycle three. Cycle one students were not given the sheet and neither were group one students in cycle two. Only three students out of eight in cycle one suggested escapism was the key concept and only one out of six student in group one mentioned it during his interview whereas all students in group two referred to escapism.

My analysis revealed patterns in note taking approaches among students. Group two students in the second cycle wrote a considerable amount about the Conan Doyle text, describing each paragraph and the writer's message in some depth. Another group of students did this also. These students were identified in cycle three. By looking at differences in structure and content of cycle three workbooks I described 14 out of 34 workbooks as textual. The characterising factor, which determined which workbooks were textual as opposed to blended or visual was the presence of a written section, focussed on text analysis. As with group two, cycle two students, workbooks, which were textual, contained references to each paragraph and the main textual message. Cycle one students wrote mostly about their concepts as did group one students in cycle two. This was also noticed in cycle three where students whose workbooks were described as being visual only wrote about their ideas for illustrations.

My analysis of cycle one thumbnails showed that most student concepts were either fragmentary or situational. In contrast to this I identified two students whose concepts were what I termed as experiential; describing the textual message through an analogical approach. This pattern of fragmentary, situational or experiential concepts re-appeared in cycle two. Group one students developed concepts which were fragmentary and situational. Group two students developed concepts which were experiential. This can be directly tied to the request made to group two students to develop an analogical approach towards illustrating the text. Cycle three students'

concepts were also largely experiential, illustrating through analogy the effect or experience of what reading great books is like.

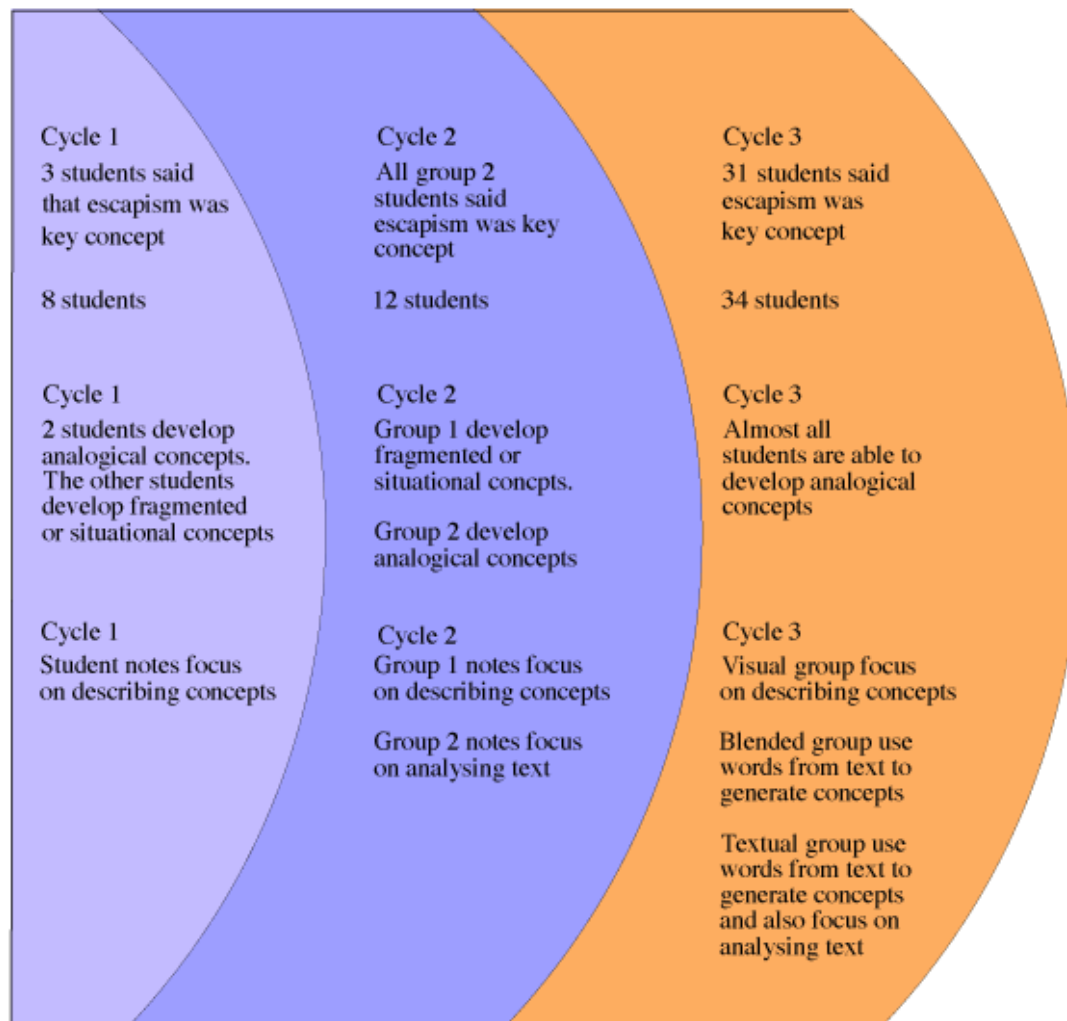


Figure 4.40. The three cycles, patterns and links.

## Conclusion

An action research approach has enabled me to develop a plan, incorporate it, observe its effects, and consider adaptations for future plans. This chapter shows that I have worked incrementally from cycle one through to cycle three. While the first two cycles involved working with volunteer students in a non-teaching situation they provided much insight and laid the groundwork for effective action to change the learning experience of students in a classroom setting. What has been established in this chapter is that thinking about text from an analogical perspective can enable students to develop novel and interesting concepts which bring new ideas to the text as well as encapsulate the key message within it. Cycle one demonstrated clearly for me that novice students, when given expository text to illustrate, would often develop fragmentary or situational concepts. This confirmed what I had seen in many classroom situations involving text interpretation. Cycle one also demonstrated that an accurate summary of a text's main message may help students to develop concepts which describe a text's message in a symbolic but accessible way; through analogy. This was the case with two students in cycle one. What cycle one suggested was that assisting students to develop accurate text summaries and then asking them to think about the summary from an analogical perspective might lead to visual concepts which described a key concept through association.

The reading sheet I developed was an attempt to give students assistance in developing a strategy for getting the most meaning out of a text. It seemed to have a positive effect on group two in the second cycle. Group two students summarised the key theme of the Conan Doyle text and they developed analogical concepts while their peers in group one often failed to mention the key message and developed fragmentary and situational concepts. However, not all analogies produced by group two were illustratively successful, bringing with them unexpected and negative connotations. Perhaps more focus on secondary themes within a text might lead to concepts which more successfully illustrated the text. This led to cycle three and the formal introduction of the reading sheet and the request to illustrate the text through analogy. The analogy exercise at the beginning of the project showed that most students found it difficult to take a small summarised piece of text and illustrate it analogically. However, some analogies were produced and they demonstrated that a

short proposition could be explained by a conceptualised visual analogy. The final illustrations varied in quality with a suggested link between good textual analysis and the likelihood of a successfully developed concept. One thought here is that textual analysis encourages the incorporation of secondary elements from the text into a picture as integral components of the concept, providing not only context but also a strengthening of the concept itself. As said previously, analogy itself cannot illustrate a piece of text.

One of the more surprising findings in this chapter relates to student note taking. As a teacher I had not much considered the valuable function of note taking. Designers design after all! What the data relating to note taking suggests for me is that note taking can consolidate thinking. Key ideas written down can act as anchors, and as concept generators, steering (slight mix of metaphor) students in the right direction. A single word written down can lead to a multitude of possible visual responses. Overall, the data I have analysed suggests that analogy is a powerful thinking method, which can be successfully harnessed when expository text requires some form of illustration to accompany it. My experience and expertise as a professional illustrator and design educator has enabled me to use my tacit understanding and insider knowledge of design and teaching as a resource and incorporate structured methods of application and analysis to develop an explicit understanding of my students' experience of interpreting text into a visual image.

Much of what I have touched on in this chapter's concluding statement will be developed further in chapter five, where I discuss the findings of my study.



# 5

## CHAPTER 5: DISCUSSION



This chapter consolidates the various ideas and thoughts that have developed over the course of the enquiry, connecting personal conclusions within a theoretical framework established through relevant literature. Within it are certain claims to new knowledge. These will be presented in relation to what is described as *key propositions*, seven of which have been identified. While the three cycles were implemented and discussed separately in the previous two chapters, I will now weave between them where appropriate, guided by the propositions which interconnect them.

Chapter two outlined the current situation in design education where, as a consequence of design's arts and crafts background, the emphasis on teaching has been on the products of design, not the design processes leading to them. When improved student learning of design process is required the educator as researcher requires methodological practices which can be harnessed to gain verifiable insights into student learning. In chapter three I established that my perspective was based on a constructivist-interpretivist outlook, which sought a negotiated meaning between what I as the researcher understood and what my students understood. Chapter four's focus on analysis was based on students' comments in interviews and questionnaires, as well as comments written in workbooks. As a consequence of this, multiple perspectives of what was essentially a universal task—the illustrating of a short piece of text—were described. This approach was aligned with a systematic analysis of numerous designed images and developmental sketches which were analysed semiotically in such a way that others could follow my approach.

This project has at its heart the guiding principle that action research is about bringing change to a situation identified as requiring improvement. As highlighted in my discussion of Swann (2002) in chapter two, the iterative, cyclical process of action research is similar to the design process itself. This leads me to how my research question developed. As the key findings relate to how my research question developed I shall briefly describe its evolution.



In chapter three it was asserted that action research starts off with a fuzzy set of propositions (Dick, 1993). The investigation started off with a ‘big picture’ outlook. My first question was, *How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of design?* I had, prior to cycle one, developed an interest in analogy through the work of Goldschmidt (2001) and was interested to find out if students would develop concepts which were analogical or metaphorical in nature. Cycle one, carried out in April 2004, was situated within the context of this question. As a first cycle however it was less about bringing change to a learning situation and more about observing a situation as close to a natural classroom setting as could be devised. In relation to the question, I was interested in determining if there were identifiable variations in student approaches to the design task and whether they could be tied to students’ own meta-cognitive awareness. This can be related to my awareness of a new and developing paradigm shift from product to a process focus in design.

A minor change to the research question was added by the introduction of cycle two, *How can our increasing knowledge of cognitive processes in design thinking be applied to the teaching of illustration?* This change was required in order to more closely focus on illustration, my teaching area. These two questions were sufficient for the first two cycles. By cycle three the question changed to: *Can the application of learning strategies involving text comprehension and idea generation through analogy assist illustration students’ visual interpretation skills?* This provided a clearer idea of the next logical step in the process. Cycle three, unlike the previous cycles, implemented changes directly into a normal classroom setting over a period of four weeks.

### **Key propositions**

Analysis of the data led to the development of seven main propositions which will be discussed. Propositions one, two and three are linked and relate to analogy. Propositions four and five are also linked and relate to comprehension. Proposition six relates to how, once a concept has been devised, its communication is reliant on modality, how it has been composed. These six propositions are closely related as

they themselves are attributable to the three transitional stages I described in chapter three—*comprehension—interpretation—illustration* (see Figure 3.3). The final proposition relates to my own learning, and reminds us that, with educational action research, the researcher is central to the investigation. The rest of the chapter is based on the following:

1. *Expository text can be interpreted and developed into an illustration through the development of a conceptual analogy*
2. *Analogical reasoning can be taught as a learning strategy*
3. *The analogical strategy led to holistic, experiential concepts*
4. *The comprehension strategy encouraged analysis and a process oriented approach*
5. *The comprehension strategy helped students interpret the text*
6. *Concept communication is dependant on how the idea has been contextualised, with full consideration of modality*
7. *My own understanding of the design process has developed and improved my approach to teaching.*

### **1. Expository text can be interpreted and developed into an illustration through the development of a conceptual analogy**

The case studies by Goldschmidt (2001) and Bonnardel (2000) described in chapter three suggested that analogical reasoning, as a meta-cognitive strategy in designing, enabled students to develop explicit creative learning strategies which they could apply to a design problem. While both of their studies involved visual analogy, which is essentially comparing the physical properties of two visual objects, I set out to discover if a similar approach could be carried out through the creation of conceptual analogies, where two situations or scenarios are compared. In this instance, a further step is required. It involves translating the conceptual analogy into a visual image—an illustration. I thought that if students were able to successfully illustrate a text through the use of analogy and were able to articulate their understanding of their process for doing so, they would have achieved what Oxman (2001) refers to as “a learning increment” (2001, p. 269). Oxman defines a learning increment as an identified

thinking tool. As discussed at length in the literature review, the current focus of design teaching is “generally equated with the evaluation of the product of designing” (ibid). By isolating analogy as a creative method in illustration my intention was to demonstrate some of the cognitive properties of design learning, properties that seem missing in much of today’s design teaching (ibid).

Goldschmidt (2001) suggests that while analogical reasoning is a natural faculty of cognition, it is not necessarily something which a novice designer will use spontaneously. In cycle one, two students, Frances, (Figures 4.2, 4.3) and Dana (Figures 4.4, 4.5) devised concepts which interpreted the text’s key message through describing similar experiences. Frances’s and Dana’s work differed significantly as regards their creative strategy in relation to the other six students in cycle one because they spontaneously developed an analogical strategy while the others focused on literal aspects of the text or lesser points made by the author. Because Frances and Dana framed their approach to the text by thinking of the experience of reading text and escaping, they related it to another experience which they were then able to develop into pictures. They therefore thought of the text’s message in terms of an experience. The other students in cycle one didn’t think of the text in those terms. I discuss this more fully in proposition three.

While reasoning by analogy is a natural function of cognition (Goldschmidt, 2001; Holyoak, 2005; Holyoak & Thagard, 1999), it does not mean that novice students will automatically think about a design problem through this form of reasoning. Therefore, as a learning strategy, the research suggests that it could be introduced to students as an option— a useful creative method when expository text interpretation is required. Chapter four identified two different approaches to the experiential approach— situational and fragmentary. Students who chose a situational approach thought of the text in literal terms, hence the high incidence of pictures involving people sitting on chairs near books. This was the situation described in the text. Those who chose fragmentary approaches didn’t choose literal ideas but their concepts focussed on secondary elements from the text. The analogical (experiential) approach allowed for a holistic idea to be developed.

While analogical reasoning is a useful creative method in text interpretation, it should be emphasised that not all analogies are equally valid or useful within an illustration. This method is therefore not a silver bullet. In cycle two, James, (Figure 4. 15) developed the analogical concept that books allow us to escape from real life, just like drugs. His image was that of an open book with a cut away section revealing a syringe inside it. A powerful image, but one which brings with it too many negative associations. We can accept that drugs and books provide escapism from the real world. The mapping from drugs to books takes place; there is a semantic connection.

James created an analogy but there is no evidence in his notes or sketches that he made any attempt to modify it. The associations we have with hard drugs are too powerful and negative to serve the goal of providing a visual example of escapism which equates to the experiences we can have when we read great books. What was required of James was for him to consider, once he had retrieved from the target his source analogue of hard drugs, what inferences his mapping between the two would make. His goal, as with all other students in cycle two, group two, was to create an image which encapsulated through analogy the writer's main message. He achieved that goal to some extent, but the inferences which he mapped between source and target were too powerful to act as a useful conceptualised visual analogy.

Goldschmidt (2001) suggests that analogies in the design process require a two-way approach, switching from source to target and back from target to source, "the source is not merely retrieved from memory; it may be retrieved and transformed, or actually reconstructed and reorganised almost from scratch until its representation is suggestive enough so that mapping and transfer to a candidate target that is being constructed becomes possible" (2001, p. 207). This would suggest that James, once he had retrieved the drug analogy, needed to evaluate and modify it in some way so that it became more acceptable, or he should have discarded it and searched for another source analogue. Holyoak and Thagard (1999) point out, "Notably, many constructed analogies are visual" (p. 263). As a creative tool for a designer, analogy would therefore seem to be a very powerful method for idea generation, particularly if, as Holyoak and Thagard (1999) suggest, their reconstruction is through a visual process. What seems likely is that conceptualised visual analogies are initially generated from

memory and then transformed visually. However, Holyoak and Thagard postulate that “cognitive science still lacks a good general theory of the structures and processes that make human visual reasoning so powerful” (ibid). My own research does not seek to explain why human visual reasoning is so powerful, but it has demonstrated that designers can use it to generate new concepts.

## **2. Analogical reasoning can be taught as a learning strategy**

Cycle two of the research investigation required group two students to develop thumbnail concepts based on analogy. Group one students were not prohibited from doing so but no students in that group spontaneously devised an analogically based concept. In cycle three, as discussed in the previous chapter, I introduced an analogy exercise for all students involved in the project. As mentioned in chapter four I did not prescribe a particular way to go about the exercise. The largest number of recognisable analogies produced for an individual text proposition was 14. That was out of a total of 22 students who handed in the exercise. The lowest number was two, in the first proposition (see Figure 4.16). Despite being directed to create an analogy based on each of the four text propositions most students found it difficult to do so. I argue that the reason for this is that in most instances students did not isolate the key ideas in the propositions in such a way as to enable them to think about it from a similar perspective. Jen’s illustration (Figure 4.19) provides an example of this. She wrote in her notes the word ‘blindfold’ and her image was of a blindfolded person. It is possible that she based her idea on the word ‘aware’ from the proposition *‘Education is the answer to many of society’s ills but not all of us are **aware**, [my emphasis] of its powers’*. Jen conceptualised an inability to see something, but was not able to infer what it was her character could not see.

It was from examples such as Jen’s that I developed the term ‘fragmentary’ to define concepts which picked up on some aspects of a text based proposition. The successful examples from the analogy exercise described in chapter four all managed to encapsulate holistically the gist of each text-based proposition. Interestingly, each of the successful analogies were accompanied by short, hand written notes which I argue, anchored students’ thoughts on the design problem. Jen, as mentioned earlier,

wrote the word blindfold and Helen (Figure 4.25) didn't write anything next to her unsuccessful concept for proposition three, *'The writer tells us we love fast food because we have been conned by advertisers to buy it'*.

The analogy exercise demonstrated that it is possible to conceptualise a text-based proposition through the application of analogical reasoning, the outcome of which is a visual image. Students were left to their own devices as to how they should go about the task. What is evident is that most of the successful outcomes were accompanied by a short written note. The successful images, examples of which were discussed in the previous chapter, all managed to holistically capture the essence of the textual proposition. As there were 14 successful outcomes for proposition four this also indicates that text based propositions can be looked at from an ill-structured perspective, with multiple possible outcomes each attaining success. There are, I argue, many ways to explain the essence of a proposition.

Analogy does not reduce the number of creative options. With a group of 34 students in cycle three, twenty seven were able to devise concepts which were analogical in nature. The data I have analysed suggests that an analogical approach does not restrict creative options to a design problem. It also suggests that expository text can be conceptualised through analogy. Prior to the study I was unsure whether a consequence of reducing the text to a set of key propositions would be a limited range of possible analogical concepts. This did not turn out to be the case. As Holyoak & Thagard (1999) point out, analogies are created, not discovered. As they are born in memory, each individual has the capacity to bring something new to the fore, based on their own life experience.

Learning strategies in design education tend not to be taught (Goldschmidt, 2001; Oxman, 2001). Creativity in the studio is expected to occur largely through trial and error methods where ideas incubate over time. After the analogy exercise, I realised that the next stage in the project, illustrating the Conan Doyle text through analogy, would require a clearly articulated strategy. Just giving students the task would have been insufficient to lead to a successful conclusion. After the critique session of the analogy exercise, some key points were made. In order for students to successfully

develop an analogic response to the text they would have to summarise the text down to a key proposition, based on understanding the text's macrostructure. Their articulated macroproposition would be what they individually understood as the main message contained within the text. Once they had identified that, they were then encouraged to look for an example which embodied a similar experience, something which was 'like' the experience contained in their text summary. Lakoff and Johnston (1980, 2003) describe how we often partially structure "one experience in terms of another" (2003, p. 77) reminding us that reasoning by similarity is a natural function of cognition. They say that because so many situations we deal with, such as emotions, ideas and time, are difficult to define, we "need to get a grasp on them by means of other concepts" (p.115). This is what Frances and Dana in cycle one did spontaneously without instruction. In cycle two, James, Lianne, Kris, Noline, Mark and Iain devised concepts which related to escapism. As the escapism provided in books is essentially a mental experience, each student was able to devise a concept which related to a physical experience. Again, this relates strongly to Lakoff and Johnson's (2003) assertion that understanding something by explaining it through another experience demonstrates that our conceptual system is "structured by natural dimensions of experience" (p. 235).

From an educational perspective, incorporating analogical reasoning into the design studio as an explicit learning strategy requires instruction. Students require to be told that when they have the task of illustrating a concept which is abstract, they can tap into memory and think of a physical experience which embodies some elements of similarity to that which is to be explained. Thus, the abstract concept that books are a form of escapism can be related to other, physical forms or acts of escapism; the more recognisable physical scene provides insight into the abstract mental experience of reading. Cycles one and two were carried out with volunteer students over a period of thirty minutes. The more challenging test of how successful this learning strategy can be was cycle three when 34 students were involved in a normal design studio setting.

As discussed in chapter three, action research is an iterative process (Dick, 1993). Knowledge gained from the analogy exercise enabled me to develop a more explicit procedure which assisted students develop a strategy for interpreting the Conan

Doyle text analogically. This is very much in keeping with the principle of action research which enables the researcher to modify the research in light of emerging insights (McNiff & Whitehead, 2006, p.30). The instruction I gave was for students to use the word 'like'. It focussed students on the task of comparing their understanding of the text and being able to say 'it is a bit like...' That is what Frances and Dana did in cycle one. I reflected on their comments '*It's like, how would you put it, a holiday, like getting away*' (Frances) '*I thought oh it's kind of like Aladdin's lamp*' (Dana) and realised this was a way to get students in later cycles to frame their understanding of the text from an analogical perspective. This was my 'eureka' moment.

I identified 27 student final works as analogical, three as metaphoric with the other four as having failed in the mapping process. I argue that this is a high success rate and indicative that analogical reasoning as a creative strategy can be taught. It indicates that as a learning structure a group of students are able to describe a written text's main theme through the strategy of visualised conceptual analogy.

### **3. The analogical strategy led to holistic, experiential concepts**

Chapter four identified three different types of concept, described as situational, fragmentary, or experiential. Figure 5.1 describes the main differences between different types of concept.




| Situational<br>focus on literal aspects   | Fragmentary<br>focus on lesser themes  | Experiential<br>focus on similarity  |
|---|--|--|
| Students who created situational concepts played safe. They literally picked up on text descriptions and translated them into visual images. As illustration requires an element of novelty this approach fails to captivate an audience. | These students focussed on parts of the text to the exclusion of the key message. The ideas were conceptual, often using metaphoric imagery. They illustrated secondary, supporting themes within the text, not the primary message. | Those students who thought of the text holistically were able to translate that understanding by describing it through an analogical example. This translated the abstract textual message into a concrete, physical experience. |
|  <p>Example (Amy fig 4. 11)</p> <p>I just wanted this room and the size, the cosiness of the room was to do with the humble bookshelf.</p>              |  <p>Example (Carrie fig 4. 10)</p> <p>I kind of thought the whole mummified book thing was a kind of juxtaposition to the rest of it.</p>          |  <p>Example (Dana fig 4. 4)</p> <p>I thought oh it's kind of like Aladdin's lamp.</p>   |

Figure 5.1. Three different conceptual strategies.

My first revelation happened after cycle one. Frances and Dana's illustrations stood out from the rest. It was while they were being interviewed that I realised they had framed the design problem differently to other students in the group. Their concepts were based around comparing the text's message to an experience that is not directly related to books but which can be visualised and seen as similar in some respect to the experience Conan Doyle is discussing. As such they were free from the confines of the text itself. The six other students in cycle one were embroiled within the words, the minutiae of the text. This is of course understandable. Nevertheless, this is why Harry (Figure 4.6 and 4.7) and Amy (Figure 4. 11) devised literal concepts which showed a person reading a book. It also explains why Brenda (Figure 4.8) and Carrie (Figure 4. 10) created concepts which focussed on one single part of the text to the exclusion of the overall message that Conan Doyle provided.

Only when the analogy learning strategy was formally applied did students avoid situational or fragmentary concepts. It was first employed in cycle two with group two students. Because students in this group were asked to develop an analogical approach, they were able to take a macro perspective on the text. As their illustration had to be based on the main theme of the text, group two did not get bogged down in secondary themes. All students were asked to illustrate the writer's message but group one had no clear strategy for how they could do this. That is why they either created situational or fragmentary concepts. Group two had a clearly articulated strategy and it had a considerable effect on the outcomes which, in this cycle, were pencilled thumbnails. Figures 4.14 and 4.15 show the differences between the two groups. The former is characterised by images of books and rooms, the latter, a diverse range of experiences that relate to escapism.

The third cycle was an opportunity to apply the analogical reasoning strategy in a design studio setting. Within the context of the design problem, which was essentially to encapsulate the writer's point of view through the conceptual strategy of analogy, 34 students went about the four-week project in their own way. As described in chapter four, I identified three different workbook categories—visual, textual and blended. The workbooks record each student's unique design process. Despite there being variation in approach, twenty seven students developed an analogical concept.

Some analogical concepts were stronger than others. Most required additional secondary elements from the text to support and contextualise the concept. What needs to be stressed here is that, while I have identified that analogical reasoning can be taught, in a situation involving written text, the analogy can only get across a main idea. For an interpretive illustration to work successfully, the analogy must be supported by secondary elements from the text. Hierarchically, what this means is that the analogy can set up the visual message, but for the relationship between image and text to work fully in an expository situation, the illustrator has to also bring in literal and/or fragmentary elements into the image. There is no formula for such a balance between an image's intended meaning and the arrangement of shapes, colours and textures which constitute it. Such decisions involving arrangement and hierarchy are made during the process of developing a concept. What can be done in an educational

setting is to encourage students, when they are going through their creative process, to re-visit the original text to see if there are further aspects of it which can be brought in to support the main concept. It may be that some of the more successful design outputs in cycle three were as a result of a more successful concept re-evaluation process. Workbooks, characterised as textual suggested to me that these students' vertical transformations, to use Goel's (2001) idea development term, indicate greater awareness of the value of re-visiting the text. This leads me to my next proposition concerning note writing and its relation to analysis.

#### **4. The comprehension strategy encouraged text analysis and a process oriented approach**

The literature review described how the historical legacy of design education's arts and crafts past has led to a situation where there is still a tendency in many schools of design to focus on product rather than process (Findeli, 2001; Friedman, 1997, 2002; Norman, 2000; Oxman, 2001). Such a strong cultural legacy creates a situation in which many design students are themselves product oriented. It has long been accepted that experiential learning—learning by doing—is the fundamental rock on which design education is based (Oxman, 2001). As the outcome of most design projects is a material outcome, it is perhaps understandable why there is currently so much focus on making design and less on analysis and systematic breakdown of the design problem. In the context of this study, note writing is seen as a bridge between problem analysis and problem solution. I now turn to this issue within the context of my research with specific focus on student note writing during each cycle. In cycles one and two, note writing refers to what students wrote on paper during their 30-minute task. In cycle three it refers to all writing incorporated into student workbooks during the four-week project.

Chapter four identified different note writing, analysis and developmental strategies. This was evident within the short time spans of cycles one and two. Workbooks included notes as well as gathered visual material and concept development. Cycle one students only wrote notes about their ideas. I believe this relates to a product-focused approach. It suggests that while the time span was short, students

automatically considered that explaining concepts was the appropriate thing to do. However, much of the success of illustration comes from a good understanding of the text. This involves analysis, breaking down the text to its key macrostructures and then seeking a way of creatively explaining a personal understanding through visual means. Barthes (1977, p. 32) asks “How does meaning get into the image?”, noting that “images are polysemous” (p. 39). He resolves this communication paradox by postulating that the text is able to “fix the floating chain of signifieds” and act as “anchorage” (ibid). Despite such considerable importance with text and how its meaning acts as an anchor for the visual image, cycle one students nevertheless chose to write notes about only about their ideas, not on the text and its relationship to the ideas produced. This suggests a problem-solution focus with little emphasis on problem-scoping/defining. There was no evidence of text analysis, the first aspect of the enquiry. Focus on product in design relegates analysis; in the instance of this research, analysis of the supplied text. This supports the literature explored in chapter two which suggests there is a high placement of value on the end product and not on the processes involved in its creation (Drew et al., 2002; Friedman, 1997; Norman, 2000). Analysis and accurate comprehension of text, as a consequence is only implied, not explicitly related to descriptions of concepts. Rather than separate text analysis out as a different and valuable phase in the design process, cycle one students concentrated only on describing concepts. I argue that concepts are regarded by students as more closely associated with the final design artefact than text analysis which is seen as distant from the product production focus.

No particular learning strategy was given to cycle one students to explore. As is common in design teaching, students were only given the specific design problem—to illustrate the text in such a way that the writer’s key ideas were encapsulated. As mentioned in the previous chapter, group two students in the second cycle made particular reference to the text in their notes; all the more interesting because they were not specifically asked to do so. The key difference in implementation was that group two students were provided with two clear learning strategies: an information sheet which focused on developing macropropositions and an intervention in the design task which required analogical reasoning. As mentioned in chapter two, identifying macrostructures is essential to good comprehension (Harvey & Goudvis,

2000). Group two students were not asked to write about the text. The data suggests that they did it because the learning strategies focused their thinking towards systematic analysis of the design problem. That is why most students in group two referred to the key proposition in the text, that books are a form of escapism, and why all group two students went to considerable lengths to write about the text. Group two were more focused on process than on product. They went to greater lengths to scope the problem before they considered solutions. This is more characteristic of deep learning as opposed to surface learning. Group one students wrote about their ideas because their preoccupation was with getting to a design solution quickly. They spent very little time analysing the text because understanding the text and analysing it systematically were less important than creating concepts.

The three workbook categories in cycle three—textual, blended and visual—were identified in relation to how students went from comprehension to interpretation and in relation to the balance between idea generation and text analysis. While each workbook was a unique document that charted a student's approach to the project; en masse, I was able to identify broad patterns of workbook structure. Providing all students with two identifiable learning strategies did not mean that all students would necessarily produce workbooks which were systematic and analysis rich. Visual workbooks were, on the whole, representative of students who performed less well in the project, with the notable exception of Carol (Figure 4. 29).

Carol's work shows that we can only look for preferred patterns of learning behaviour and that there are no absolutes. Workbooks which clearly contained systematic analysis of textual meaning were indicative of a deep approach to learning. I argue this because the project brief did not specifically require students to demonstrate evidence of text analysis activity. I also believe that the majority of my students whose workbooks were visual took a surface approach, focusing as they did from an early stage on idea generation, problem solution. This group converged on their chosen solution early and, as evidenced in their workbooks, did not re-visit the text for further material on which to develop their ideas. However, Carol's work shows that we must not prescribe in black and white terms how deep learning will manifest

itself. In an area of study such as design, where creativity is an important focus, powerful concepts can emerge at any time in the process.

Overall, I believe the introduction of the learning strategy on how to comprehend text and develop macropropositions encouraged a deep approach to learning and encouraged most students to value and re-visit the analysis stage of the design process involving text comprehension. The visual workbooks, with the exception of Carol's, tended to have few ideas and were characterised by a focus on vertical transformations of a single idea as opposed to lateral transformations which showed multiple concepts. Visual workbooks demonstrated early fixation. In the case of Carol, that was not a problem as she, very early on devised a particularly strong concept. However, other visual workbooks suggested that students did not consider options or look further into the text for secondary elements in the text which could be used to enhance a main concept.

It wasn't the case that students whose workbooks were categorised as textual created stronger analogies. What was more likely for students whose workbooks were more systematic and analysis rich, was for them to consider from a range of options interpreted from the text, which secondary elements would enhance their main analogical concept. Note writing enabled some students to consider more creative options for their illustration as a whole. Roxanne's workbook (Figures 4.32-33) demonstrates the value of options based on textual analysis. However, as mentioned in the previous section of this chapter, there is no formula as to how much visual support is required from secondary elements to guarantee effective communication to an audience.

Illustrations are only visual indicators of what is contained in a text (Barthes, 1977). They are not complete instructions for understanding in the way, for example a passenger aircraft provides illustrated instructions to passengers in how to deal with an emergency. Conceptual illustrative language "provides a way of intimating what cannot be said through literal accounts" (Smith-Shank, 2004, p. 63). What is being suggested here is that note writing in cycle three allowed students to explore more creative options, avoiding literal explanations. Students also developed an explicit

understanding of the relationship between the text and their concepts before making final decisions as to the compositions of their final illustrations. The workbooks categorised as visual suggest that these students, in comparison to the textual group, did not re-visit the text for additional secondary support ideas. On the whole, I would argue that, as a group, their lesser success compared to students in the other workbook groups, in illustrating the text passage, was to do with their eagerness to move on to image content and the actual execution of their painting. The visual group gathered significant amounts of source material for their paintings showing less emphasis on the image-text relationship and more on the practicalities of executing a painting.

### **5. The comprehension strategy helped students interpret the text**

While reading comprehension begins at primary school, I put forward the argument that we cannot make an *a priori* assumption that novice illustration students have the necessary skills to translate a text into an illustration, involving as it does at the initial stage, text comprehension. Novice illustration students will have had few formal opportunities to interpret text into illustrations prior to undergraduate study. It is also relevant to point out that previous tasks students may have had involving text comprehension in school or other university situations, will rarely have been contextually tied to a visual translation. So, context is a key issue here. When illustration students are given text to illustrate, the context and purpose for reading the text is to illustrate it visually, not just comprehend it for its own sake. The relationship between comprehension, interpretation and illustration is therefore one with which novice students are unfamiliar. The pre-requisite knowledge I am therefore referring to is understanding of how to proceed with the inter-related task of comprehending text and interpreting it through visual imagery. The data discussed in chapter four suggests that the comprehension strategy assisted most students. Student comments included in chapter four support my position that the strategy assisted student learning.

The comprehension sheet outlined procedures students could use to get the most meaning from the Conan Doyle text. It can, within Mayer's (1989) definition, be seen

as an instructional learning model which encourages a systematic approach to learning, “Explanative material allows students to think systematically” (p. 45).

The learner characteristics of group one, cycle one, as described in chapter four, were, in relation to recalling how they proceeded to comprehend the text, limited because they relied on implicit, intuitive approaches to text comprehension. The data, based on questions asked during the semi-structured interview indicates this. Replies, as to strategies and approaches used during comprehension, were vague and limited because group one students did not use consciously applied learning strategies for reading the text. In contrast, group two recalled their approach to the text, mirroring the steps and procedures outlined in the reading sheet/model.

Mirroring steps and procedures supplied in an instructional learning model are only of value if the outcomes of such approaches are successful (Harvey & Goudvis, 2000; Mayer, 1989). Usefulness has been demonstrated in this study. Group two students not only recalled their learning approach to the text but each individual was able to describe the key theme of the text—that of escapism. This demonstrates that their approach assisted them, unlike most of group one, in articulating the key macroproposition. This is further backed up by outcomes of cycle three. While cycle two students were interviewed about their comprehension approaches shortly after the 30-minute task, cycle three students described their approaches in week two of the project, a full week after the reading sheet had been handed out and well into the project itself. I argue that these students recalled their procedures because (1.) following an explicit procedure enables recall and (2.) they genuinely found the approach useful. This is supported by student replies in cycle three to questions which related to text comprehension. Replies to these questions, samples of which were presented in chapter four, indicate that formal strategies for comprehending written text allowed students to develop explicit learning strategies, strategies which can be recalled after the learning event. To briefly re-visit and compare types of responses I have included one student response from each group of students.

Q. Can you describe how you went about understanding the text?



*Literally at first because it had a lot of, it was quite descriptive and it was exaggerated but also real descriptive and just pictures started coming into my head when I first read it, rather than words. (Carol, cycle one)*

*I read through it heaps of times. (Ben group one, cycle two)*

*At the beginning the title is often the key to the context of the text, so 'Through the magic door' was the title of the piece and already that sort of conjures up, this is gonna be something, you know, an escape of some kind and as I read through the text I created links back to the title, you know, how does this title relate to what I'm reading? (Iain group two, cycle two)*

*I looked at the title, then skim read the text trying to pick up on the key words or phrases, then I linked the ideas from the first paragraph to the second, then read the text thoroughly over again. (Harriet, cycle three)*

Awareness and recall of strategy suggests that the approach students took facilitated meta-cognition in cycle two, group two students and most of cycle three students. No two students in cycle three recalled their procedure exactly the same as others. This suggests that the learning strategy was personalised, made relevant to each individual as opposed to an approach that was rote learned.

The data suggests the effect on learning strategies concerning text comprehension and process recall was significant with cycle two's group two students and most of cycle three's students. As mentioned previously in this chapter and in chapter two, learning strategies in design education tend not to be taught (Goldschmidt, 2001; Oxman, 2001). I argue that this is partly to do with a perception among design educators that, as design is to do with imagination, creativity and innovation, students should be given free rein as to how they approach a design task. Design is certainly an ill-structured activity which requires multiple solutions and perspectives. However, a written text, if it is to be purposefully illustrated into an image which can communicate to an audience, must initially, at the problem-analysis stage be

accurately comprehended—certainly within the context of a design task which requires students to convey what they understand to be the writer’s point of view.

Design activities in a learning situation do not exclusively involve imagination, creativity and innovation. These three abilities are creative responses to information, which itself must be accurately understood. To further illustrate my point I would like to return to Swann’s (2002) design process model introduced in chapter two.

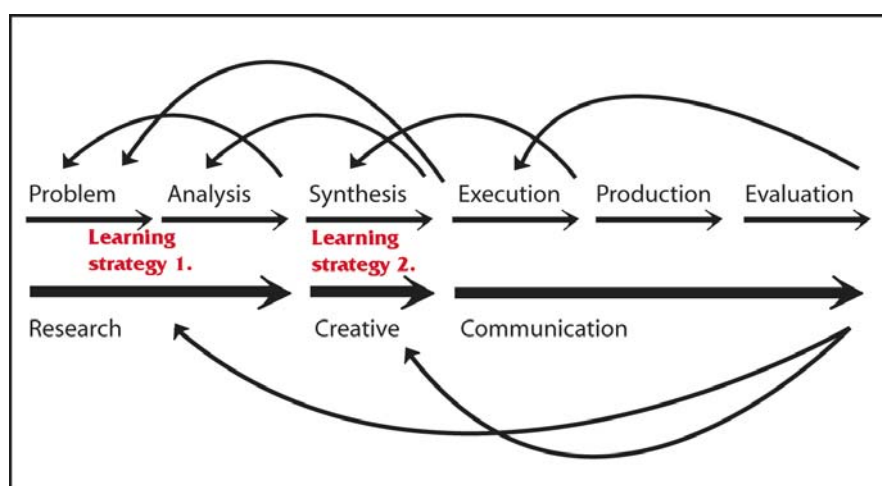


Figure 5.2. Learning strategies in relation to Swann's (2002) design process model.

Swann’s model begins with problem, research and analysis. These stages precede the synthesis and creative stage of the design process. What I believe my first learning strategy has done is highlight the importance to the design process of thinking methods which are not based on creativity but on analysis. However, the model shows how the creative stage in the design process is dependent on what preceded it.

Mayer (1996) points out that while many students believe reading every word is the most appropriate strategy for reading expository text, this approach does not lead to effective transfer of meaning, “In short, reading or listening to every word is a default strategy that is used when students lack more effective strategies” (p. 359). Kintsch (1998) points out that individual words and sentences contain a text’s microstructure. For good comprehension to take place the microstructures must be hierarchically organised into a macrostructure. That is when holistic meaning takes place (p. 65-66).

Cycle one students and group one students in cycle two demonstrated, in their comments, that they lacked effective strategies for determining the global structure of the provided text. This was further emphasised by their design outcomes, concepts which were (with a few exceptions) situational or fragmentary. The relationship between comprehension and interpretation can be seen here, where concepts, which are created from an understanding of the text, can be limited as a consequence of poor reading strategies. Hence, in this study, a high incidence of situational and fragmentary concepts in cycle one and cycle two's group one students.

Comprehending text, when it is for an illustrative/communicative purpose, requires a well-structured approach at the beginning, something which I have previously considered as outside the considerations of a creative, design studio environment. Even though comprehension is only part of the task involved in illustrating text, and the other stages involving interpretation and illustration require creativity and imagination, this is nevertheless a linked activity. The formal approach to comprehension in this study suggests that a design problem, in this instance the problem of interpreting a text into an image which can visually encompass the key idea in the text, can benefit at the problem-analysis stage from a systematic approach. Systematic approaches are, in essence, strategies and, as a consequence are metacognitive processes (Alexander & Murphy, 1998; Baker, 2002; Mayer, 1996, 1989). Metacognition is well established in the theoretical literature of reading comprehension (Baker, 2002, p. 77). Baker, (2002) suggests that consensus is "high that metacognition plays an important role in reading comprehension" (p. 78).

The data discussed in chapter four suggests that group two students and the majority of cycle three students developed meta-cognitive ability and awareness of macrostructures contained in expository text. I therefore argue that this intervention improved many of my students' approaches to written text and provided them with valuable material which they could use to develop illustrative concepts. Systematically this involved breaking the text down to its key elements and then summarising the text into one or two sentences as a prelude to developing a conceptual analogy. I would say however, that success in understanding the macrostructures and then developing macropropositions, cannot guarantee a creative

outcome, but it does help. As has been discussed in chapter two and previously in this chapter, the design process has various phases. In relation to these phases, comprehension and interpretation relate to earlier stages of design process, what Swann (2002) refers to as problem – analysis – synthesis. The next phase in a design project is, to use Swann's terminology, execution and production. The next proposition discusses this.

## **6. Concept communication is dependent on how the idea has been contextualised, with full consideration for modality**

This study has had numerous threads of enquiry, the most dominant being text comprehension, interpretation and the use of analogy to develop visual illustrations. However, commencing with cycle one and moving progressively towards cycle three, the practical material outcomes of student enquiry in all of the cycles have been visual images. While cycle one and cycle two only required thumbnails, this was because of time restraints, not because there was lesser significance placed on the designed output. Cycle three was the opportunity for student learning to take place in a classroom environment with the final design activity being a fully rendered colour illustration. The literature chapter described how design and design education has historically had a focus on the design artefact—the product of designing—and paid less consideration to understanding the processes involved in designing (Buchanan, 1998; Findeli, 2001; Friedman, 1997, 2002; Oxman, 2001; Norman, 2000). This study is not suggesting that the design artefact should be relegated in some way. It is ultimately design artefacts which affect us, the communities, the audiences, the consumers of artefacts. What this section seeks to achieve is a more explicit understanding and articulation of why some of my students' concepts translated less effectively than others as observed in the final design outputs.

In a project with 34 students there are numerous factors relating to creative output which I attempted to address in the last chapter. There is a difference between assessing the value of a student's concept and how it is applied to a final design. Variables such as colour, tone and composition affect how we, the audience, engage with a concept (Kress & Van Leeuwen, 2006; Rose, 2007). I addressed that issue in

chapter four by the use of the term salience. Some analogical concepts were stronger than others. Most required additional secondary elements from the text to support and contextualise the concept. What needs to be stressed here is that, while I have identified that analogical reasoning can be taught, in a situation involving written text, the analogy can only get across a main idea. For an interpretive illustration to work successfully, the analogy must be supported by secondary elements from the text. Hierarchically, what this means is that the analogy can set up the visual message, but for the relationship between image and text to work fully in an expository situation, the illustrator has to also bring in literal and/or fragmentary elements into the image.

There is no formula for achieving a balance between an image's intended meaning and the arrangement of shapes, colours and textures which constitute it. However, such a balance is important for meaning to be transferred (Rose, 2007). Referring more to the interpreter than the creator of an image, Rose, (2007) talks of "the good eye" and how it requires "visual connoisseurship" for the encoding and decoding process to be completed successfully (p. 35). This connoisseurship is essentially what Giorgis et al. (1996) describe as visual literacy, the "ability to construct meaning from visual images" (p. 142). I argue that visual literacy or visual connoisseurship, is required by both creator and the receiver of an image. Such artistic decisions involving arrangement and hierarchy are made during the process of developing a concept. What can be done in an educational setting is to encourage students, when they are going through their creative process, to re-visit the original text to see if there are further aspects of it, which can be brought in to support the main concept. This approach supports the previously discussed design process models of Cross (2001) Edelson (2002) and Swann (2002) discussed in chapter two which are all based on the idea that design process, while it has identifiable, progressive stages, is nevertheless characterised by a backwards and forwards approach where ideas and decisions are re-visited and re-evaluated. It may be that some of the more successful design outputs in cycle three were as a result of a more successful concept re-evaluation process. Workbooks, characterised as textual suggested to me that these students' vertical transformations, to use Goel's (2001) idea development term, indicate greater awareness of the value of re-visiting the text for additional supporting ideas which can enhance the key visual concept.

In chapter four a number of cycle three final illustrations were discussed at length. A semiotic analysis enabled a consistent approach to be taken and it allowed for systematic breakdown of each image's separate parts. Common semiotic terms used were: denotative/connotative, source/target, signified/signifier. Additional terms such as: vector, participants, actor, goal, circumstances and salience were added. Such terms are closely associated with the work of Kress and Van Leeuwen (2006).

In the previous chapter I used semiotic analysis to describe the work of a cycle three student, Helen (Figure 4. 35). Helen's concept was to compare the experience of reading books to that of being at a fairground. There are semantic similarities that allow analogic mapping: access is usually gained by paying a fee; both are forms of entertainment and escapism. Fairgrounds have a certain magical association to them. So this can clearly be linked to the title, 'Through the Magic Door' There are numerous rides and experiences we can choose to have, just as there are different genres of books. So, semantically, Helen did conjure up an analogical concept which helped convey many of the positive associations we have with books. However, when one looks at Helen's final image, the actual concept is not effectively communicated.

Helen's workbook was placed in the visual category. She gathered numerous pictorial examples of fairgrounds. Visual sourcing is an important component of the design process relating to image construction and can be related to Swann's design stages of *synthesis* and *execution*. Authenticity, or what Kress and van Leeuwen (2006, p. 155) call "truth value" are important considerations in visual communication. Source images allow illustrators to construct two-dimensional images which look like the objects being represented. When creating an image, with the purpose of communication, it is important that the designer can persuade the audience to accept the image as a representation of reality. The semiotic term *modality* comes from linguistics and it relates to the notion of authenticity. Kress and Van Leeuwen (1996) point out that images have varying degrees of modality. The work produced in this project relate to *high modality*. This is where attention to detail, tone and colour authenticity are of prime significance in the creation of images which look like the physical world. Colour photography is, say Kress and Van Leeuwen (2006, p. 158)

the closest mechanical means by which we can create high modality. I believe Helen focussed her attention on modality to the detriment of meaning and interpretation. She focused on representing a fairground. It is argued here that if Helen had spent more time analysing the text and re-visiting it, she may have made more consideration as to how she could incorporate more elements from the text into her picture.

There is one other element which essentially guaranteed that Helen's analogical concept would not communicate—the composition of the image itself. This can still be related to modality. According to Kress and Van Leeuwen (2006) one of the key elements of modality is *contextualisation* and background elements are a crucial factor in this. Kress and Van Leeuwen describe the absence of settings as a decontextualising factor (p. 161). While it was Helen's intention to provide a contextualised setting, i.e. a fairground, the individual pictorial elements are composed in such a way as to preclude the audience from recognising the represented location. Jen (Figure 4. 19) made a similar omission during the analogy exercise with her blindfolded figure. We had no context to inform us why her figure was blindfolded.

In relation to contextualisation and composition, Kress and Van Leeuwen (2006) identify three closely linked principles: *informational value*, *salience* and *framing*. Informational value and salience relate to the hierarchical relationships between pictorial elements. While informational value relates to the actual perceived importance of an element and its relationship with others, salience is more to do with how informational value is brought to an audience's attention through scale, tone, contrast and colour. Framing relates to how an item is included within a picture and whether it is connected or disconnected from other elements. These three composition principles are extremely important as—and Helen's is a good example here—their placement is not simply an issue of aesthetic balancing, but of communication of message. In relation to text interpretation as evidenced in an illustration, the intended message can be lost. Perhaps more emphasis in the teaching studio of the symbiotic relationship between the written word and the visual image could have encouraged Helen to be more aware of this relationship. I believe Helen was more concerned with the craft of compositional balance and the creation of a pleasing image than that of

communicating her understanding of the writer's message. If so, this would enforce the argument, made numerous times in this thesis, that much of our current teaching in design encourages a product focus to the detriment of process. Awareness of process encourages reflective practice.

On the right hand side of Helen's final illustration we see a horse (Figure 4.35). Helen intended it to represent a merry-go-round, but it was cropped too close for it to be recognised as such. As a consequence we are left wondering what the horse represents. Not only are we unsure as to what she intended, but such prime compositional focus suggests a significance that Helen did not consider. The merry-go-round as a signifier for a fairground is no more significant than the small building we see in the distance which represents a house of horrors.

I believe that absence of analysis throughout Helen's work led her to produce an image which did not communicate the intended message. As mentioned in the last chapter her answer to the question '*Can you describe how you went about understanding the text?*' was quite vague in contrast to many of the other students whose answers suggested meta-cognitive awareness of comprehension strategy (see Harriet, Lisa and Tim's replies in contrast to Helen's, pp. 157-158). There would seem to be in Helen's process, as evidenced in her workbook and questionnaire responses, an absence of analysis and evaluation. She was able to sum up the text and conjure up an analogy, but focused too much on constructing her image without re-visiting the text for supporting elements. This was certainly suggested by my analysis of her workbook which contained very limited note-taking and seemed to be focussed from the start on fairgrounds. It is also likely that because she knew what her concept was, she assumed we the audience would too. Perhaps Helen's learning would improve if she were to adopt a more analytical approach and engage more fully in note writing.

The composition of a picture should not be seen as an aesthetic exercise. In relation to a picture which is an illustration of a written text, textual meaning and interpretation should be the driving factor in determining layout. Students in this study, who spent more time on textual analysis, tended to compose more purposefully, arranging



shapes hierarchically, thinking of them in relation to the text and what they represented from it. Contextualisation in relation to Kress and Van Leeuwen's (1996) *informational value, salience* and *framing* is the bringing together of pictorial elements in relation to what they conceptually represent.

In contrast to Helen's final design, Jane's (Figure 4.36) concept of comparing books to flying carpets was translated very effectively into her illustration. Jane's illustration is filled with textual references, both implicit and explicit. We have the subtlety of a graveyard in the distance, contextually tied to Conan Doyle's reference to dead writers. Shakespeare himself appears in the image holding a writing quill. Jane has even managed to incorporate a reference to the 'soul-killing monotony' of every day life, a point made by Doyle to compare reality with imagination, by the grey window in the distance. So many references to the text throughout Jane's picture ensure that, not only do we, the audience, understand the analogical connection between books and flying carpets, but we also understand the numerous implicit and explicit references Jane makes to the text. Jane's design process, as evidenced in her workbook was one whereby she continued to mine the text for additional supporting imagery. Compositionally, Jane's informational value, salience and framing were very well considered, structured in such a way that the key idea, the experience of reading is like being transported on a flying carpet, is highly focal and immediately communicated. Secondary, supporting elements then reveal themselves, ensuring that the image is communicatively rich and sustaining, beyond the immediate impact of the analogy. Jane, in contrast to Helen, seemed concerned with the text and how to communicate it effectively through visual interpretation. She spent considerable time analysing the text and once she developed an analogy, she strove to support it with pictorial elements which represented secondary themes and references.

Constructing knowledge through active learning involves information processing. Individuals attend to information, in the form of learning materials, differentially and selectively based on their prior knowledge, understanding, values, attitudes, styles and level of motivation (Renzulli & Dai, 2001, p. 23). While I am pleased that my two introduced learning strategies were, on the whole, successfully adopted by my students; with so many factors relating to such things as prior knowledge and

attitudes, it can be seen that not all students will be able to adapt a learning strategy successfully. I would argue that even though most of the visual group developed an analogical concept, their patterns of workbook activity demonstrated that they retained a production-focused approach. Analysis of text was absent from their workbooks and therefore, with the exception of Carol, activity was focussed on image production rather than on developing deeper understanding of the text and how such understanding can be used as a resource for idea generation. In my view this is why the visual group produced less successful visual communications/illustrations.

## **7. My own understanding of the design process has developed and improved my teaching**

Up to this point I have discussed the learning of my students. Chapter four focussed exclusively on analysing the outputs of my students and the preceding sections of this chapter discussed the findings in relation to student learning and their implications for teaching practice. This final section will focus on my own learning.

Chapter three traced my methodological choice, action research, to the ontological and epistemological premises that guide how I make sense of the world around me. As a consequence of a constructivist-interpretivist outlook, I find myself at the centre of my enquiry, not a disengaged observer. Therefore, when I develop strategies to assist the learning of students', my own learning is also affected. As a teacher I wanted to improve my practice. With large numbers of students studying illustration at the introductory level I found that too many of them had difficulty with the process of interpreting text into an illustrative piece of visual communication design. Despite all my years of teaching practice I was often frustrated and perplexed that a large minority of my students struggled to develop interpretive concepts based on written text. As a researcher I was able to systematically enquire into my practice in the hope that, not only would my students' learning be demonstrably improved, but that my teaching practice would also improve and—as a consequence of rigorous enquiry—my findings would be sharable and of value to others.

In April 2004 at the CLTAD conference, ‘Enhancing Curricula: towards the scholarship of teaching in art, design and communication in Higher Education’ in Barcelona, I was fortunate to listen to Oxford scholar Keith Trigwell’s inspiring keynote speech on the scholarship of teaching. In his speech, and subsequently published paper (Trigwell, 2004), he identified three levels of knowledge a teacher engaged in understanding their practice will develop: *personal*, *local* and *public*. Personal knowledge is that which informs the individual about his teaching. Local knowledge is that which informs a group within a shared context. Neither of these forms are necessarily scholarship. It is the third type—public knowledge—which requires verification from outside and if it stands up to scrutiny, it can be regarded as scholarship of teaching (Trigwell, 2004, p. 15-16). As discussed in chapter three, my enquiry, to use Zeichner’s (2001, p. 276) definition is ‘self-study research’.

I have learned that learning strategies can help overcome recurring problems in learning. I refer to the recurring problem of students having difficulty in interpreting written text into an illustration. While individuals have their own learning styles and preferences, I believe that when fundamental principles and practices are being introduced, holistic, embracing strategies can be beneficially employed. When students are being introduced to expository text interpretation for the first time at university, it should not be assumed that students have in place effective strategies for the linked process of comprehension-interpretation-illustration. That is one of the assumptions and mistakes I have made in the past. Because I have, assumed that all students have satisfactory comprehension skills, I have concentrated on the interpretive-illustrative process. When I have seen poor quality work I have put it down to lack of creativity in individuals. This research investigation has demonstrated to me just how important the first stage of an illustration project involving text interpretation is; the stage where text is analysed as to its content and meaning.

Analysis of text is not so much to do with creativity but with determining context—in unravelling what the writer is saying to his audience, filtering the important points from those of lesser significance. This is fundamental to good comprehension. In essence, analysis and comprehension of expository text for the purposes of illustration, first of all requires identifying a text’s macrostructure. In chapter three I

described how macrostructures are determined by applying macrorules to the text with the outcome being a set of macropropositions which sum up the gist of the text (Louwerse & Graesser, 2006). By providing a strategy for students to determine the macrostructures of '*Through the Magic Door*', I have learned that such a system can be an important addition to a teacher's strategy in helping students develop expertise in illustration.

I have been better able to facilitate students in their process towards creating a visually communicative image. I noticed in cycle two that group two students wrote more and spent more time analysing text than group one students. This made me realise that my use of a reading comprehension strategy sustained group two's analysis phase. This was, as mentioned in chapter four, in contrast to group one students who started to conceptualise much sooner than group two. This suggests that more emphasis on analysis and comprehension at the beginning of a project might encourage students to be more process than product oriented. I have, as a consequence of this, become more aware of the stages involved in a design project, and that not all stages necessarily involve creativity. As a teacher I am now much more aware of the analysis stage in a design project and how I can encourage students to use analytical methods to scope a design problem in preparation for a creative response. When the design problem relates to illustrating written text then comprehension becomes a critical component of the analysis stage in the design process.

Until this study began, I had not considered how useful the incorporation of a learning strategy involving text comprehension could be. This is because, as a design educator I have focused on assisting my students to develop their creative and imaginative skills, skills that are normally applied to ill-structured activities. Comprehending text, when it is for an illustrative/communicative purpose, requires a well-structured approach at the beginning, something which I have previously considered as outside the considerations of a creative, design studio environment.

It is now possible to argue that the creative process is a misunderstood term. The very word creative suggests that it is all about being innovative and imaginative. As a teacher I have, prior to this study, supported this perspective. I have encouraged my

students to focus on their unique and individual approach to text interpretation, assuming that any intervention might hinder their creative process. I had previously considered that an individual's learning style/approach was sacrosanct and that an introduced strategy might only be of benefit to those whose approach most closely resembled the nature of the prescribed strategy. But what I now realise is that comprehension-interpretation-illustration are linked processes which require at the start a sound understanding of an expository text's macrostructure. This first stage therefore is not about innovation and creativity, but of understanding. Greater emphasis on analysis of text, I now realise, allows students to move on to the next stage involving creativity with a better understanding of what the text contains. In chapter two I referred to Swann (2002, p. 53) who states that *synthesis* is the key stage in the creative process. And this stage, in his creative process model comes after *analysis*. This further emphasises for me the importance of analysis in a design project and the need for strategies to enhance student analysis processes. Synthesis, the key stage in the design process where concepts gestate, are in a sense, nourished by the analysis stage. What this study has taught me is that analysis and synthesis have a symbiotic relationship.

In chapter two I discussed different models of the design process (Cross, 2001; Edelson, 2002; Swann, 2002). Figure 2.1 described Swann's model in a diagrammatic form. I have found Swann's model particularly useful to my teaching practice. Swann says, "The act of designing is a problem-solving 'performance' that is not necessarily the same as research and analysis" (2002, p. 53). What this model has allowed me to appreciate is how important the early phases of the design process are, phases which are not necessarily designing at all. I was familiar with Swann's model prior to the commencement of this study but I will now use it to plan learning outcomes in future curriculum projects. The research/problem, analysis stage relates to knowledge and critical thinking skills while the later phases of the design process—execution and production—relate to applied skills. Therefore Swann's model has allowed me to separate, from the point of view of learning outcomes, the various steps an individual will go through in a design project. The model shows that design process is iterative but also incremental. During my analysis of student work my understanding of this model helped me explain why some students performed

more successfully than others. Those who took a visual approach, on the whole, did less re-visiting of the problem; they made their creative decisions early and did not value further analysis of the text. So, in relation to Swann's model, their process was more linear than those students in the textual group who returned to the problem analysis phase and recorded this in their workbooks.

Newstetter and McCracken's (2001) study of student *misconceptions* of design, discussed in chapter two can be related to my own personal discoveries. They describe *ideation without substance*, *design arrogance*, *design shutdown* and *design jumps* (pp. 36-38) in relation to how some novice students go about the process of designing. I am now much more able to detect similar behaviours in students and how I can assist them to develop more analytical, process oriented approaches to designing. So, my increased understanding of the design process through reflection "in action" and reflection "on action" (Swann, 2002, p. 50) has helped me to not only analyse my students' processes but also consider how I will teach design in the future.

I have also learned that structuring my teaching to include a focused application of a thinking strategy—analogical reasoning, has allowed me to think of teaching as an activity which can be improved, not just by trial and error activities but also by the application of theory to one's practice. Certainly action research has at its roots a responsive, reflective nature, suited to iterative practice, but it can also allow a teacher to systematically apply theory to a teaching situation. By working from a theoretical premise, one can gain verifiable insights from personal practice and link them to a wider body of knowledge and enquiry. Having looked at education studies into analogical reasoning by Goldschmidt (2001), Oxman (2001) and Bonnardel (2000) as well as a large number of works describing the nature of the analogical process (Gangulyi, 1995; Goel, 2001; Holyoak, 2005; Holyoak & Thagard, 1999, 1997; Lakoff & Johnson, 2003; Sloman & Lagnado, 2005), I was able to incorporate a learning structure based on analogical reasoning into my teaching and research its efficacy. However, I realise that the participatory nature of action research is crucial. I refer in particular to the 'eureka' moment in cycle one when Frances and Dana autonomously developed analogical concepts. It was their actions which determined

much of my future direction. When I realised the significance of what they had done I decided to find out more about analogical reasoning and how I could formally incorporate it into my teaching.

While the literature on analogy was, at first, difficult to navigate—much of it coming from cognitive science—I immersed myself in it to the point where I could theorise about its application to an educational situation of my own choosing. I would argue that this scholarly approach is different to a teaching situation where a teacher may have an idea they want to try out in the studio. Much of my teaching in the past was based on personal ideas. While these various teaching and learning activities may well have been traceable to literature and theories of learning, my previous teaching has not been based on theories of learning, but on tacit, intuitive hunches. So, this enquiry has taught me the value of theory and how it can inform and improve teaching practice. In fact, now that I have conducted this study, I believe that the best way to improve one's teaching practice is to implement change based on an arguable, theoretical premise. This is of course also dependant on reflection and analysis of the results.

I now have a new way of thinking about my teaching practice. In a sense, my epistemology of practice has developed with the realisation that I am capable of developing through systematic enquiry, a clearer understanding of what I do to assist student learning. Within this epistemology of practice is the realisation that action research and the action of designing have similar theoretical frameworks and seek similar aims. I therefore agree with Swann (2002) who says “Action research has been described as a program for change in a social situation, and this is an equally valid description of design” (p. 56). Both respond to an identified need, they require reflective practice and they are iterative in nature. Both involve the crucial stage of synthesis, where data is interpreted and something new is created.

In chapter three (p. 77) I discussed Zuber-Skerrit's (1992) CRASP model. As a designer and design educator I have learned that Zuber-Skerrit's CRASP approach is totally suitable to my situation. I have learned to be critical, reflective, accountable, self-evaluating and participative (CRASP). The iterative process of plan-act-observe-

reflect, characterised as the action research cycle, has suited me as a researcher very well because it parallels the design process. The action research cycle though, is structured in a more transparent way. I have therefore used the action research cycle to gain knowledge about the design process. I have not simply used action research as a methodology for this study, I have assimilated it into my epistemological framework. It is now embedded in how I go about my teaching and how I research.

## **Conclusion**

I conclude this chapter by making links between each of the seven propositions discussed separately. As mentioned in chapter three and chapter four, action research is a cyclical, iterative process-involving plan-act-observe-reflect. At this stage I am able to reflect on the various plans carried out over the study.

A passage of expository text will contain numerous pieces of information. When asked to illustrate an expository passage students know that it is their job to be creative. Frances and Dana from cycle one demonstrated that a very valuable creative strategy is the use of analogy. In chapter two I described how Koestler, (1975, p. 201) suggests analogies are created through a process of “selective emphasis” and that Bonnardel (2000, p. 505) says they come about through being in a “constrained cognitive environment”, meaning that analogies are created in relation to the constraints of the situation. By encouraging students to apply a particular thinking method, in this instance, analogical reasoning, I have demonstrated that students can become more aware of their designerly thinking processes and achieve what Oxman (2001), in chapter two describes as “learning increments” (2001, p. 269). While Frances and Dana spontaneously created analogical concepts to illustrate the text, students benefit from being shown how to develop analogical concepts. The analogy exercise carried out by cycle three students and described in chapter four, revealed that text based propositions need to be summarised down to key elements. Once this is achieved students are able to abstract meaning from the proposition and communicate it by the development of a conceptualised visual analogy which is based on a recognisable physical experience. This backs up Lakoff and Johnson’s (2003) assertion, that our conceptual system is grounded in sensory experience. In essence,



illustrations can embody, in their recognisable physical shapes, abstract thoughts, ideas and emotions. The analogical emphasis enabled students to think of the text as a whole, while still being able to determine the hierarchical relationship between its separate parts—the macrostructure.

As discussed in chapter four and earlier in this chapter, the learning strategy based on the reading comprehension sheet encouraged students to become more aware of their comprehension process. While it may not have worked for all cycle three students, many did demonstrate an engagement with text analysis beyond the initial, cycle one stage of the project when the Conan Doyle text was given to students. This would suggest that the strategy encouraged deep learning. As almost all students in cycle three, no matter which category their workbook was placed, determined the main proposition in the text, I would further argue that the strategy was a valuable intervention into the learning process. I am also mindful that learning strategies are not common in design education settings (Oxman, 2001). So, I would further argue that there is a place for learning strategies in creative areas such as design. We need not fear that learning strategies negatively affect individual creative process. Thirty four individual and unique design outputs from cycle three support this view.

While analogy relates to synthesis, the stage in the design process which Swann (2002) says is the most crucial phase in the design process, the synthesis stage is a response to the problem stage. In the context of this study that relates to the Conan Doyle text passage, I have demonstrated that comprehension is an important stage in problem definition, as it requires of students an understanding of the hierarchical relationships contained in the text. This can be summarised under the term macrostructures. I have demonstrated that design students can benefit from the formal use of comprehension strategies.

A concept, which we can consider initially as a mental construct, requires a visual translation process for it to be understood as an illustration. What I have discovered, as a consequence of carrying out this study, is that this stage requires the illustration student to be aware of the relationship between the various pictorial elements and what they represent in relation to the original text. Perhaps a fourth cycle would have

enabled me to incorporate another strategy to ensure that students had explicit awareness of this relationship. This demonstrates that my own learning, while it has improved, is an ongoing process of discovery. In my final chapter I will consolidate my ideas and conclude with a discussion of possible future directions for research into design education.



# 6

## CHAPTER 6: CONCLUSION



It is here that I now bring the findings together, summarising the themes that emerged in previous chapters. The chapter traces my actions to the theoretical underpinnings and methodological rigour which have allowed me to make some claims to new knowledge. It will also describe how my engagement with the literature enabled me to develop a conceptual framework on which to base my claims. In the previous chapter I described how the research question evolved. I will now, in this concluding chapter, focus on its final variation and the implications that arise as a consequence of developing some answers to it.

### **The research question**

The problem at the beginning of the study was broadly understood to reside with some students' difficulty with the interpretation process. It was not understood why difficulty existed, but I could see time and time again that some students found the process difficult and, as a consequence, they developed illustrations which failed to explain or clarify textual content. As this could be identified at the synthesis stage of the design process, where ideas begin to emerge, I was able to, on conclusion of cycle one, make a clear connection between student macropropositions of the text and the interpretations that emerged from the analysis stage of the process. When the study started there was more focus on the ideation process. After cycle one this was adjusted to also encompass the stage of the design process which precedes ideation, that of analysis.

All three versions of the research question relate to thinking skills. The final version demonstrates my developed understanding that thinking strategies may be key to assisting illustration students develop their communication skills. I will now focus on this final version.

*Can the application of learning strategies involving text comprehension and idea generation through analogy assist illustration students' visual interpretation skills?*

The short and simple answer to that question is, yes I believe they can. As to their value I would argue that they help novice illustration students systematically structure their approach to text interpretation and they help them develop meta-cognitive awareness of their design processes. They help students to develop expertise as illustrators and designers in general by being more aware of their processes and therefore become less reliant on tacit knowledge and an intuitive approach to a design project. In short, the two strategies I introduced are 'thinking tools'. What this study also demonstrates is that, while I have focused on a very specific designing situation, that of illustrating text, the findings are arguably of relevance to the field of design in general. This study has demonstrated that meta-cognitive awareness of design process can be attained. This has implications for learning as it suggests that such awareness may lead to the transference of skills. By this I mean that, while design disciplines are defined in terms of the artefacts that are produced, design process is indifferent to the artefact (Friedman, 1997). Design process permeates throughout all design disciplines. Therefore, this study suggests that the thinking skills developed by students in this study may be applicable to the field of design in general and may be also transferable to other design learning situations.

### *Drawing comparisons*

In chapter two I discussed a number of case studies in design student learning. Drew et al. (2002) found that some students take a production-focused approach to designing and equated this with a surface approach to learning. In contrast to this approach, they also found that other students took a process approach to designing and that their engagement was aligned to the characteristics of deep learning. My own study was able to draw comparisons to Drew et al.'s research. I pointed out in chapters four and five that cycle two, group two students spent considerable time analysing and writing notes about the text extract. Group one appeared to be much more focused on developing concepts and wrote very little about the text. I argued that this suggested a more production-oriented focus. The argument was further developed in my analysis of cycle three students, some of whom, the visual group, were production focused and did not seem interested in re-visiting the text once they started conceptualising.

I found parallels in my own research to Newstetter and McCracken's (2001) study. In chapter two I described how they explored novice design students' misconceptions of design and identified five misconceptions which affected student learning: *ideation without substance*; *design arrogance*; *design shutdown*; *design jumps*; *design routinisation*. They argued that encouraging students to develop more awareness of their design thinking processes assisted their learning. I discussed in chapter four how some students from the visual group displayed similar characteristics to those identified by Newstetter and McCracken. The visual group tended to work in a linear, non-reflective manner which appeared to be production focused. A key indicator of this was that they tended not to re-visit the text.

Studies by Goldschmidt (2001) and Bonnardel (2000) were influential in how my research was designed. Both these studies into analogical reasoning as a creative method for designing suggested that I too could introduce analogical reasoning as a learning strategy into my own teaching environment. However, there were some risks here. Both of the analogy studies mentioned were based on visual analogy, comparing objects to other objects by way of structural similarity. My study, as far as I could determine, entered new territory, involving conceptualised visual analogy, comparing situations or experiences to others. There were no preceding studies that I could discover carried out in this area to inform my approach.

### **Assisting learning**

Essentially then this thesis has established an argument that illustration can be more effectively taught and learned at university by the incorporation of explicit learning strategies. The strategies themselves can be thought of as thinking tools. My discussion of the literature helped develop the argument that learning strategies tend not to be taught in design and that intuitive, trial and error methods still prevail in the design studio. My thesis is situated within this new paradigm of increasing awareness of design as a thinking process.

My study has focused on the process of interpreting text into a visual image. Two learning strategies were developed, one which related to comprehension and the other

which related to interpretation. Both can be linked to the design process model developed by Swann (2002): *problem-analysis-synthesis-execution-production-evaluation*. The first learning strategy focuses on the early stage of the design process requiring problem definition and analysis. This is followed by the second strategy which relates more to synthesis, the stage where ideas formulate and develop. As the research question asks whether learning strategies can assist students to develop their visual interpretation skills, and I have put forward the claim that they can, I will now focus on summarising findings of the two learning strategies I developed and defend the argument.

### **Learning strategies**

Without the implementation of learning strategies in this study, students were less likely to identify or describe the key textual message and develop a holistic, encompassing conceptual illustration. Chapter four describes how I arrived at this conclusion. No learning strategies were incorporated into cycle one. However, Frances's and Dana's work stood out from the rest because their interpretations of the text's key idea were holistic and understood in terms of comparing through similarity. While both of these students used their own strategies, and were not assisted in developing an analogical approach, they demonstrated the innate capacity humans have to reason through analogy. The connection being made here is that the analogical concepts developed by Frances and Dana were a consequence of their ability to think of the text in holistic, big-picture terms, carrying out what Harvey and Goudvis (2000, p.119) call "overviewing". The other students picked up details from the text. I argue that situational and fragmentary ideas are attributable to this details oriented approach.

It is conceivable, and certainly it is the viewpoint I am putting forward, that because a written text can be illustrated in multiple ways, a novice may not have the skill of an expert in determining what aspects of the text should be highlighted. A text contains many pieces of information, but without determining a hierarchical relationship in the text between the various pieces of information, a novice may, through lack of expertise, focus on a lesser theme or a very literal aspect of it and then during the



synthesis stage of the design process, develop a concept or range of concepts based on the hierarchically misunderstood relationships of the textual information.

*Learning strategy one: comprehension*

The decision to develop the comprehension sheet *Reading text: the development of understanding*, demonstrates the flexibility and responsive nature of action research as a methodology. Data from cycle one that came from the semi-structured interview supported what was previously a hunch, that key macrostructures in written text are not necessarily identified by novice illustration students. This may be because students' conceptions of designing are such that they start to conceptualise too early, not fully aware of the value of analysis or an appreciation of the symbiotic relationship between word and image. By not identifying the significance of key ideas in text as the source material for creative ideas, the synthesis stage in the creative process is affected. The learning model concerned with comprehension was not considered prior to cycle one. It became a significant component of cycle two and cycle three. As McNiff and Whitehead (2006) point out, "action researchers start with an idea and follow it where it leads them" (p. 31). Through an iterative process I was able to establish that the comprehension strategy encouraged cycle two, group two students and many students from cycle three, to spend more time on text analysis. By thoroughly analysing the text, students identified the text's macrostructure and created macropropositions, personal understandings of the text. According to Kintsch (1998, p. 177), in the process of creating macropropositions, micropropositions—less important information—gets deleted, allowing students to create a generalised understanding of the text. This can be very useful when creating an illustration. A general understanding allows students to summarise the text into a short proposition. The key proposition in the Doyle text is 'books allow us to escape the real world, but we take them for granted'. Micropropositions can be returned to once the gist has been established and they can be visually embodied in a picture as secondary supporting imagery. I argue that fragmentary and situational concepts are a result of not consciously developing macrostructures.

Because cycle three students worked over a period of four weeks I was able to identify through their workbooks that some students—the textual group in particular—

re-visited the text throughout the project. The visual group tended to conceptualise early. In relation to Swann's (2002) design process model, the visual group's activities were far less looped than the textual and blended group. Looping, in the context of Swann's design process model entails moving back and forward between various stages of the design process, from say, analysis to synthesis and the back to analysis again. The textual and blended groups' activities were more looped in the sense that these students appeared to move back and forward between text analysis, idea creation and refinement.

Learning strategy one which related to comprehension, helped the majority of students who used the strategy to focus on the problem and analysis phase of the design task and it helped them develop meta-cognitive awareness. It addressed the position that many design students are product focused, eager to move on to the execution and production stage of a design task without fully engaging with activities which are not associated with creativity, those which can be described as 'well-defined'.

By analysing the text more thoroughly students were able to consciously develop macropropositions, articulate them in a summary and use that as the basis for strategy two. From text comprehension students moved to the next stage of the process, text interpretation. This is where learning strategy two begins.

#### *Learning strategy two: analogy*

The transition from comprehension to interpretation in this study is based on the idea that information once understood and summarised by the process of applying macrorules to delete the unnecessary and keep the important, allows an individual to identify the macrostructure and articulate its key proposition. The comprehension sheet provided students with directions on how to do this and enabled them to reflect on their process. Once the gist of a text has been determined it is ready to be interpreted. This requires contextualising the information and preparing it for the third stage in the process, illustration. Learning strategy two is essentially an idea generation strategy, a learning approach that helps students generate communicative concepts about the text. I believe the outcomes of this approach in both cycle two and

three were successful. The key advantages of this approach over what would be essentially leaving students to their own devices, is that students are able to use it meta-cognitively. This means that they are able to use an explicit creative thinking method rather than rely on traditional creative approaches which are based on intuition. This is not to belittle the significance of tacit knowledge, but it does support the developing argument encapsulated by Oxman's (2001) reference to 'the third paradigm', that designerly thinking methods can be identified and taught systematically.

While I have discussed that analogical reasoning is an innate function of human reasoning and that people are essentially "pre-wired" to see relations between different situations (Sloman & Lagnado, 2005, p. 99), Goldschmidt (2001) reminds us that novice design students should be taught to use analogical reasoning "when it is doubtful that they would do so spontaneously" (p. 211). So essentially what I have done in this study with the introduction of learning strategy two, is facilitate students in the use of a cognitive faculty that they already possess. Frances and Dana provide credibility to Sloman and Lagnado's (2005) pre-wired argument. The fact that the other six students did not use analogy supports Goldschmidt's (2001) argument that not all students will use it spontaneously. While Frances and Dana did think analogically, the other six participants in cycle one did not, based on their design outputs and interview comments, consider thinking about the text's key proposition by describing it analogically. I believe a consequence of this was their tendency to develop situational (figure in room with books) or fragmentary ideas (concepts which focus on secondary theme).

If we accept that Frances's and Dana's analogical approach was spontaneous and intuitive, in the sense that they didn't deliberately set out to reason by analogy, we can concurrently support the argument that intuition is a powerful creative tool and challenge its limitations. We can support it in the sense that Frances and Dana's intuitive approach was successful and it allowed them to spontaneously use analogy without consciously being aware that was what they did. We can challenge intuition in that when it is used unsuccessfully to develop concepts it is difficult to trace an idea back to the thought processes that gave birth to it and reflect on its effectiveness.

What can be argued here is that when consciously applied to the design task, cycle two group two students and the majority of cycle three students were able to use analogical reasoning as a creative method. These students demonstrated its use as a thinking and creative tool.

### *The effect on creativity*

Designing is a creative act involving invention (Rust, 2004). It is also characterised as a form of problem solving by way of providing physical solutions (Swann, 2002). In addition to that it can further be defined as an activity aimed at changing a situation into a preferred state (Simon, 1996). Certainly in this study the situation that required changing, in the sense that it was to be translated visually, was that of a written text extract and the challenge was that it be interpreted into a visual text. My students had to translate a written text into a visual text in such a way that the writer's perspective was embedded in the image. The purpose of both learning strategies was ultimately to enable students to produce interesting illustrations and in so doing, develop expertise as designers. The analogical approach, I believe, encouraged students to go beyond the obvious content of the text. Student feedback certainly supports that perspective.

*I would be drawing a person sitting reading a book in a gloomy looking study, maybe with bright light outside the window. Thinking about analogy, although a lot more difficult, has enabled me to think of much more interesting ideas, instead of the obvious. (Gayle)*

While each illustration is a unique interpretation of the text, what the majority of cycle two, group two and cycle three students did was choose a moment in time which hints at what 'dreamland' is all about. Doyle says: *Choose your writer. And then you have but to hold up your hand to them and away you go together into dreamland.* The students' images, on the whole, described dreamland, the world that you can go to when you read a great book. The images either take you there or they suggest you are about to be taken there or can go there if you wish. By summing up the text into a short statement and comparing the writer's message to an experience not directly related to books, the students have avoided the traps that so many students have fallen

into in the past. Instead they have, on the whole, created magical, interesting images which describe a physical experience which, by implication, has some level of similarity to the mental experience of reading. Both strategies combined to allow that to happen.

The text extract, if broken down to its most basic proposition is about going from A to B. Our physical reality, A, is the world we live in. B is an alternative reality, a world we can go to when we read books. To communicate this in a picture we have to understand that reality B is one experienced mentally, it can only exist in our heads. Reality A is experienced physically. To meaningfully develop a concept which illustrates reality B we have to develop a conceptual approach which is based on human experience. This is why the analogical approach has worked in this project; reality B is being described through an experience we can visualise and understand.

#### *Student evaluation/summaries*

As mentioned in chapter four, students in cycle three were asked to provide a personal evaluation of what they learned. Because of the summarising aspect of a written evaluation I have left some of my students' evaluation comments until this final chapter. I have resisted incorporating them earlier as it would seem that, if I myself am summarising and evaluating this project, now would be an appropriate time to incorporate the findings of my collaborators—my students. Students were asked to describe what they learned. There are two main recurring points that emerge from their comments: (1) learning strategy one helped students identify the main points in the text and separate them from the lesser points, (2) Students found learning strategy two difficult but also an effective way to conceptualise the text

Learning strategy one:

*Reading the text in a very structured way so that it's easier to decide what is the principal message and what are the secondary messages which can support my image. (Janina)*

*I feel I have learned a lot from this. It has taught me to dig deep into the text and look at the main aspect. After reading the comprehension sheet it allowed me to look at the text in a different way. (Holly)*

*I feel as though I have learned how to better my analysis of text—by summing up main points into a broader perspective, and then looking at smaller details—and determining their importance. (Louise)*

*I definitely learned how to find the main message of the text and how to incorporate details into a rich image. I enjoyed this project a lot. (Carol)*

Learning strategy two:

*The analogy process was quite daunting but in the end I really enjoyed it. (Anita)*

*Coming up with an analogy was difficult at first, but with more understanding it became quite easy. It has broadened my mind. (Anna)*

*I found making an analogy a really effective way to make an illustration not so literal but still understandable to the viewer. (Gina)*

*Analogy-creation, ways of integrating elements of text to create a cohesive whole that can be read by the viewer. (Karen)*

Learning strategy one is really quite practical and pragmatic. It is structured in such a way to maximise comprehension of the text. It does not require creativity, novelty and innovation. The task students were given was well-defined, based on asking them to determine the writer's point of view. Learning strategy two does require creativity, novelty, innovation and the possible outcomes are ill-defined. As Koestler

(1975) points out, analogies are not discovered like facts, they are created. And as Bonnardel (2000) suggests, they are created in relation to the context they are to be used for. So, it is reasonable to claim that different cognitive mechanisms are at work in strategy two. Learning strategy one is about discovery, but strategy two is more linked to creativity. Combined, the strategies assisted students in the task of developing their visual interpretation skills. One can even think of strategy one as being about sense making and strategy two being more concerned with strange making, i.e. novelty, newness, originality.

### **Limitations of this study**

The study has not attempted to uncover “truth”, but has, within its constructivist-interpretivist base, determined plausible explanations for the results that have been discussed. The thesis has described the problem area, the research design, and the outcomes that have resulted within the framework of the methodology of action research. However, each study and its chosen methodology or methodologies has limits as to what can be learned and argued. This study has the following limitations:

1. the research design
2. the objectivity of the researcher
3. the shared experience of designing: verstehen.

### *The research design*

As has been described in both chapters two and three, action research is iterative, incremental and cyclical. One of the limitations of this approach is that while others may be able to follow the researcher’s analysis method, they would not be able to repeat the cycles of enquiry. My investigative process was iterative and responsive to a developing picture. Cycles one and two, while they were systematic and structured were also reactive, responsive to change and unfolding circumstances. The cycles themselves are not repeatable by others.

Other limitations of the research design relate to the compromise between breadth and depth of study. Qualitative research opts for depth but is unable to go for breadth (Patton, 2002). This study has depth, but lacks breadth. Overall, the data is based on

the outputs of 54 students, eight in cycle one, 12 in cycle two and 34 in cycle three. All students were novices. So, this study has had quite a specific focus which limits how its findings can be generalised.

### *The objectivity of the researcher*

As Denzin (1989, p. 23) points out, “All scholars are caught in the circle of interpretation. They can never be free of the hermeneutical situation”. Nevertheless, Patton (2002) says that constructivist-interpretivist researchers deal with this “through conscious and committed reflexivity” (p. 570). As an action researcher and reflective practitioner I have been at the centre of my enquiry. Any attempt to claim that I have been a detached observer would not only be foolish, but it would deny the underlying epistemological outlook which guides this thesis. As a design educator and practising illustrator I have used my design expertise to set up this enquiry into the interpretive process from written to visual text and the learning that results from this kind of design activity. This is both a strength and a weakness. Guba and Lincoln (1981) write of researchers as “instruments”:

Fatigue, shifts in knowledge, and cooption, as well as variations resulting from differences in training, skill and experience among different “instruments”, easily occur. But this loss in rigour is more than offset by the flexibility, insight, and ability to build on tacit knowledge that is the peculiar province of the human instrument.  
(p. 113)

The compromise, as far as this thesis goes, is that, while my values have influenced my hermeneutical understanding, my experience and tacit knowledge of illustration have allowed me to present a considered argument for others to judge and become, themselves, part of the hermeneutic circle.

### *The shared experience of designing: verstehen*



I have endeavoured to make my findings accessible to non-designers even though many of my own insights, and indeed those of my students, come from what can be described as *verstehen*, empathic understanding that comes from shared experience. This relates to judgments, or certainly viewpoints, that have been expressed on the intrinsic meanings that my students and I have sought to create, unravel and understand during the three cycles. All participants in this study, and I include myself, are students of design, separated by levels of expertise. The readers of this paper need not feel excluded if they themselves are not designers. I have gone to considerable lengths to explain as clearly as possible the kinds of activities designers engage in and the features of the outputs they produce. But it must be accepted within the context of study limitations, that without expertise in illustrating text, the reader can only surmise what the experience of illustrating a piece of written text is like.

### **Ideas for future research**

I believe the results of this thesis are potentially of value to both practitioners and researchers. Teachers of illustration can adopt or modify the learning strategies, which I describe as thinking tools, into their own practice, when dealing with the learning and designing task of interpreting written text. They can do this as reflective practitioners and develop personal knowledge. As researchers they can use the work carried out here as a case study, just as I used Goldschmidt (2001) and Bonnardel (2000) and develop public knowledge. I have identified a few areas worth considering:

1. idea refinement: a fourth cycle
2. making design process explicit
3. assessment
4. conceptualised visual analogy
5. sense making.

#### *1. Idea refinement: a fourth cycle*

This study's formally applied learning strategies terminated at the design stage in which lateral and vertical transformations take place, the stage where ideas are born and developed (Goel, 2001). The refinement of a chosen idea in relation to its final

form may also benefit from a learning strategy which consciously encourages students to re-visit earlier decisions made during previously applied learning strategies. Thus analysis—based on comprehension, and synthesis—based on analogy, can be reassessed in relation to how the pictorial elements in their final form combine to make meaning. This would complete the three linked stages of *comprehension-interpretation-illustration*.

One way to look at where future personal research might head is to consider what a fourth cycle would have achieved. Cycle three incorporated what I had learned from the previous two cycles. It was however, the only time that the learning strategies were used in a design studio setting over the length of a design project. Analysis of the data has led me to conclude that the strategies focus on the early stages of design process—*problem-analysis-synthesis*. A learning strategy which bridges synthesis and execution could help students make more conscious decisions about how to compose their images to maximise communication. Had there been a fourth cycle, I believe I would have incorporated such a strategy. This would have meant that three strategies applied in such a project would have encompassed the whole design process.

## *2. Making design process explicit*

When this study began I did not have such a clear understanding of the relationship between design learning strategies and how they relate to the design process. It seems incredible to me now that I never once discussed with my students how learning is tied to the various stages of the design process itself. I now see a strong link and believe that design learning strategies explicitly tied to the design process could yield positive learning results. Future studies involving design learning strategies should, I believe, bring the design process itself into clear focus and not, as my study, and perhaps others have done, simply use it as a backdrop and a research analysis tool.

Further research in design curriculum structure should consider the benefits of a holistic approach to teaching design. Design curriculums tend to offer specialisms and as such the focus is on the specifics of a discipline. Therefore, something as encompassing as the design process itself is not taught. However, the design process permeates throughout all design subjects and is not determined by the artefacts which

are to be produced, unlike disciplines which are structured in relation to what will be produced. More pedagogic research should be carried out which enquires into the benefits of looking at the common ground of design, that which is encapsulated in the design process itself. Curricula in design tend to value the unique aspects of a discipline and as such, they close the door to the universal properties of design.

### *3. Assessment*

Encouraging students to relate their activities to the design process may also be of value in assessment. Developing assessment methods more closely tied to the design process may enable students to identify areas of weakness and strength in how they work. Using a design process model as a cross-checking system can make designing a more consciously driven activity rather than one based on intuition. Also, by encouraging students to equate what stage they are at any particular time may also help them to work strategically towards better design solutions and self assess. I believe this can happen because, despite the linear sequencing in designing from analysis to synthesis and so on, design is a cyclical and a looping back and forward process.

### *4. Conceptualised visual analogy*

My study chartered new territory, that of conceptualised visual analogy, the comparing of different situations or experiences through semantic similarity. The case studies which inspired this study were based on visual analogy, the comparing of physical properties between objects. I was not, throughout the time taken to carry out this study, able to identify any other studies in illustration or related design areas which have explored conceptualised visual analogy. So, the research terrain is wide open. Visual communication is well understood to be a language which uses complex coding structures to convey messages. What this study has allowed is for us to see that this complex language is possible because people are as, Sloman and Lagnado, (2005, p. 99) point out, “pre-wired” to see similarities between different situations. This language, therefore is based in human thought. Audiences can receive and understand visual messages because they have the same fundamental cognitive attributes as the designers who create the messages. So, I think more research which looks at the relationship between analogical concepts and how they are understood is worth

pursuing. The designer is capable of creating the analogy, the encode, but its success rests in how the receiver decodes the message. So, the shared experience, between the designer and the audience, is an area where further research concerning analogy could be carried out.

### *5. Sense making*

My study has also demonstrated that designing is not all about creativity, the invention of novelty. Designing is also about sense making, understanding situations. And I have demonstrated that, when text is to be illustrated, we may have overlooked the obvious. If we accept Simon's (1996) often quoted maxim that design is "courses of action aimed at changing existing situations into preferred ones" (p. 111) then we must accept that to change a situation, the better we understand it, the better the changes that we can make.

### *A final thought*

In 1965 on that life changing Friday afternoon in school when I was six years old, I compared my thin blue strip of ultramarine to that which I saw outside and decided to change it. My increased understanding led me to modify how I represented the world. And the additional ultramarine brush strokes visually represented that new understanding. This thesis is yet another bold wash of ultramarine. It represents my new understanding of the world, of illustration and design, of teaching and learning, of practice and research, and, most of all, myself.

It is now 2008, the dark grey clouds of self doubt which often cast their shadow over me as I toiled to put this thesis together, page by page, are gone. I have built my fort on the hill, my caer-pen-tullach, and I defend its existence. A new blue sky has appeared and it beckons me forward. The horizon is wide open and there are more discoveries to be made.

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