Towards a Pragmatic Semiotic Perspective on the Development of Teaching and Learning Environments for Research Writing in Higher Education

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This thesis is presented for the degree of Doctor of Philosophy of Murdoch University

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I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

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Abstract

This thesis explores the potential of a pragmatic semiotic perspective to inform the design of research writing programs in higher education. Increasing numbers of international research students have highlighted the need for effective programs that develop the ability to construct research papers and theses. A particular challenge for international students is research from sources, which requires the use of discipline-based genres and texts, as well as the synthesis of ideas into original and meaningful compositions. New educational methods and technologies – such as the use of portfolios and diagramming software – can help to promote such skills, provided their use is informed by sound understandings of the research writing process.

A paradigm shift in educational theory has also brought a range of constructivist perspectives that have challenged traditional approaches in several fields relevant to research writing, including composition studies and educational technology. The two currently dominant theoretical perspectives in these fields are the cognitive-constructivist and the sociocultural perspectives, both of which are largely concerned with the construction of knowledge and meaning. However, neither of these perspectives provides an entirely adequate understanding of research from sources, since they tend to emphasise the individual and social aspects of writing respectively.

This thesis, by contrast, explores the potential for a pragmatic semiotic perspective, based on the philosophies of Peirce, Dewey and Deleuze. Although the perspective has had a limited influence on composition studies, it has been promoted as a way of transcending the dualisms in the field. In Peirce’s semiotics and Dewey’s pragmatism, all knowledge construction and meaning-making is viewed as semiosis, or the action of signs, which is necessarily both an individual and a social process. The pragmatic semiotic perspective has a growing influence in education generally, particularly in connection with the use of new educational technologies. This thesis
investigates whether it can also provide a more suitable theoretical framework for
the design of effective research writing programs.
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Note on the Text

The citation style used in the body and References of this thesis follows the Harvard style guidelines provided by the University of Western Australia library. More information can be found at the following address:

http://libguides.library.uwa.edu.au/harvard

The appendices contain materials extracted with permission from the Academic English and Study Skills Bridging Course Study Skills and Research Handbook (Johnson 2007), published for internal use by the Centre for English Language Teaching at the University of Western Australia. The formatting of the Handbook materials has largely been retained, although numeration has been changed for convenience. The name of the student whose work appears throughout the handbook has been changed to preserve anonymity. Extracts from the materials that appear in the body of the thesis are identifiable by font style.
Introduction

The practical context of this thesis is the development of research writing programs that respond to the changing face of higher education. Two significant changes in higher education in Australia are internationalisation through the increasing number of international students and the advent of new learning tools and technologies (Absalom and Golebiowski 2002). Responding to these changes is an ongoing challenge for educators with the responsibility of designing and delivering effective programs for research writing as an essential activity in higher education.

Most universities have responded to internationalisation by providing a variety of support services for international students. Support for research writing is typically provided through a range of services including courses in English for Academic Purposes (EAP), transitional or bridging programs and workshops provided by student support or graduate centres. A major focus of such courses and workshops is research from sources, which is a kind of research writing that has been greatly transformed by new technologies and is particularly challenging for international students. The term ‘research from sources’ is used here to refer to research writing that involves ‘secondary research’ or the use of ‘secondary sources’ (generally defined as articles or books written by others). According to Carter (2007), research from sources is one of the main ‘metagenres’ in higher education, alongside empirical research, problem-solving and performance. In the humanities, research from sources is often the sole mode of inquiry that is used in the construction of
knowledge. The term ‘inquiry’ can be broadly defined as the investigation of problems or issues in need of resolution, involving the use of particular resources, processes and tools towards this end. All research is inquiry in this sense. Research from sources is a mode of inquiry in which the means include textual resources as well as the tools and procedures that enable the location, analysis, evaluation and use of these texts in the investigation of particular problems or issues. Although research from sources tends to be associated with the humanities, it is practised in various forms across all discipline areas and is often involved in the written composition or construction of a large range of academic texts, from undergraduate essays to postgraduate theses. In the sciences, particularly in the form of the literature review, research from sources often functions to provide the context and direction for empirical research. Therefore, research from sources is an essential mode of inquiry across most disciplines.

Research from sources poses many challenges for students at all levels of tertiary education. On the one hand, it requires a great deal of individual thought, problem-solving, conceptualisation and invention. As in all tertiary research, students are required to demonstrate creative and critical thinking, and a degree of originality that increases with the level of study. On the other hand, research from sources is a fundamentally social activity in which students need to work with others in a process of collaborative knowledge construction, and make use of existing literature within specific disciplinary or interdisciplinary contexts.
Indeed, research from sources involves the kind of learning difficulties that have long been discussed in terms of the so-called ‘learning paradox’ (Dewey 1933; Bereiter 1985; Sfard 1998; Prawat 1999; Hoffmann 2004; Paavola and Hakkarainen 2005; Semetsky 2006). Dewey (1933, p.128) introduces the paradox as follows: ‘the Greeks used to discuss “How is learning (or inquiry) possible? For either we know already what we are after, and then we do not learn or inquire; or we do not know, and then cannot inquire, for we do not know what to look for”’. Bereiter (1985, p.202) writes that ‘the learning paradox descends with full force on those kinds of learning of central concern to educators, learning that extends the range and complexity of relationships that people are able to take account of in their thought and action’ and he directly refers to ‘sophisticated reading and writing strategies’ (p.207). The enigma for research into such skills is ‘the problem of explaining how complex knowledge is constructed by the learner’ (Bereiter 1985, p.222) or ‘how new and more complex learning develops out of less complex learning’ (Prawat 1999, p.48). In other words, the task for educational researchers is to comprehend how ‘learners are able, somehow, to develop ideas that exceed in complexity the ideas they already possess’ (Prawat 1999, p.48) and ‘reshape their experiential worlds in ways that are more complex than the initial starting point’ (Prawat 1999, p.53). Research from sources is the kind of learning about which we can say, for some students, at least, that ‘whether it will take place at all is chancy and that educational means stop well short of eliminating the uncertainty’ (Bereiter 1985, p.221).
Although research from sources has been transformed by recent technological developments in education, the accessibility of information in the age of the Internet has not made the research process any easier. Student research writers now need to navigate their way through the vast quantities of information available online in developing and completing their research projects. Faced with the vast array of texts and opinions that are now available, choosing one’s own path in research is becoming increasingly difficult. As Cunningham (2001, p.2) points out, increasing information ‘leads to greater uncertainty rather than less, to divergence rather than convergence, to more choices rather than fewer’. He adds that:

We are awash in information and modern technologies have provided us with unprecedented access to it. Rather than reducing uncertainty, this knowledge has multiplied our options and opportunities making it all the more difficult to know what to do, what is right (2001, p.2).

The use of new information technologies also requires the use of new skills. Cunningham writes that ‘as we move through the Information Age and are continually being inundated by increasing volumes of information and patterns of potential significance, the need for reasoning skills, information seeking and conceptual navigation is ever more evident’ (1998, p.835). He adds that ‘in the current climate of learner-centered teaching and open access to information resources and tools undreamed of only a few years ago, students are being called upon to make choices and exercise skills as never before’ (2001, p.5). The lack of such skills can lead to problems for international students, such as the problem of plagiarism. While some have narrowly associated this problem with increased international student intakes, others have pointed out the sociocultural factors involved in the phenomenon of plagiarism, which largely relate to intercultural
variations in styles of thinking and writing (Pennycook 1996). A possible solution to the problem of plagiarism is to provide international students with the support they need to carry out research from sources successfully. The use of search engines and databases to locate sources, and the use of bibliographic software such as Endnote, to organise and reference them, have become standardised in universities. However, many students require further support, particularly with the difficult aspects of conceptualising and synthesising information in the production of original compositions.

There has also been a growing trend towards the use of methods and technologies that facilitate creative, critical and reflective thinking, including the use of portfolios and diagramming software. Johns (1997) advocates the use of portfolios as a practical way of developing academic literacy. She outlines some of the general features of portfolios that can facilitate the writing process: ‘they are student-created, include a range of artifacts, including texts and graphic representations, are assembled over time, and require and promote reflection’ (p.132). As Riedinger writes, portfolios have great potential to provide necessary ‘prompts, scaffolding, cycling, and other mining techniques’ (2006, p.91) and to support ‘reflection-in-action’, which takes the form of multiple drafts, peer review and coaching (p.92). Portfolios are also not just ‘autobiographical’, but also ‘collaborative and ‘communal’ (p.93). The use of portfolios can enable student writers to assemble the artifacts they create into a working display, to share them with others and get feedback, in order to rework and/or redraft them.
There is also growing support for the use of diagramming tools in research writing. Phelps, Fisher and Ellis (2007) recommend that all research students use diagramming software to ‘map their ideas’. They suggest that ‘in the course of any research project, but especially in the early stages and during data analysis, [students] will generate ideas and thoughts in a way that is often difficult to capture in a linear fashion’ and that ‘a mind map helps [them] explore and organize [their] thoughts and make connections between them’ (p. 43). They also provide a list of ways in which mapping ideas can be useful in research, including ‘brainstorming and generating ideas and organizing those ideas’ and ‘charting links between theoretical concepts’ (2007, p.44). Fraser (2006) recommends the use of ‘conceptual frameworks’ by both teachers and students. She suggests a number of uses for conceptual frameworks, including the construction of concept maps to summarise texts and to plan and sequence materials in writing assignments. O’Leary (2004) recommends the use of concept maps in the development of research proposals, while Hart (1998) recommends the use of concept maps and other diagrams in the development of literature reviews.

A recent challenge for educators is to incorporate these technologies into effective research writing programs. A large part of this challenge is the need for ‘grounded design’ (Hannafin et al 1997), which provides sound understandings of each element in the learning environment within a coherent theoretical framework. Therefore, the aim of the present thesis is to develop a theoretical framework that provides sound understandings of both the research writing process and the effective use of new
methods and technologies, such as portfolios and diagramming software, which can facilitate this process.

The design of many current research writing programs is largely influenced by two broad perspectives on writing and learning. These are the cognitive-constructivist and sociocultural perspectives, which have greatly influenced approaches to writing in composition studies (Johns 1990, 1997; Silva 1990; Kennedy 1998; Hyland 2003a; Prior 2006). They underlie many of the dominant teaching methods and techniques in the teaching of research writing in EAP courses, bridging programs and writing workshops in Australia. The cognitive-constructivist perspective underlies the widely practised method of process writing. The sociocultural perspective underlies the equally widespread practice of teaching particular genres of writing.

The cognitive-constructivist and sociocultural perspectives have also greatly influenced contemporary teaching and learning environments and the use of new educational technologies. The two perspectives have been the dominant influences on constructivist learning environments (Cobb 1994; Duffy and Cunningham 1996; Bonk and Cunningham 1998). The cognitive-constructivist perspective has also greatly influenced the development and use of diagramming software (Hyerle 1996, 2000; Fraser 2006; Kim 2006; Preston 2007).
However, these two dominant perspectives, as we shall see, may not provide an adequate theoretical framework for the development of research writing programs. On the one hand, the two perspectives are seen to be in conflict with one another. On the other hand, neither perspective in itself provides a complete explanation of the process of research writing, which involves both individual inquiry, as well as social interaction and the use of social resources.

There has been much discussion of the apparent divide between individual and social perspectives on writing, which is often traced to Bizzell’s (1992) division of writing theory into ‘inner-directed’ and ‘outer-directed’ approaches. Ronald and Roskelly (1990b, p.2) summarise the division as follows: ‘inner directed theorists … explore only what happens within individual writers’ minds, while outer-directed theorists look at the contexts in which writers compose’. The divide has resulted in dualisms such as individual versus social and process versus product. According to Ronald and Roskelly, the ‘overarching opposition’ is ‘the dichotomy between personal ways of knowing and impersonal knowledge, between subjective and objective views, between the individual and the community’ (1990b, p.7). In fact, this debate in writing theory can be seen as part of a wider debate in constructivist approaches to education generally (Phillips 1995; Prawat 1996; Larouchelle et al. 1998), in which cognitive-constructivist approaches influenced by information processing and schema theory (Derry 1996; Mayer 1996) are contrasted with sociocultural approaches (John-Steiner and Mahn 1996). It can also be viewed as part of broader historical differences between rationalist, empiricist, progressivist
and pragmatist theories of learning (Greeno, Collins and Resnick 1996; Phillips 2005).

Within the field of writing or composition studies, it also has been argued that such diverging points of view have failed to produce a perspective that adequately encompasses the different aspects of writing. The cognitive-constructivist perspective focuses on individual problem-solving and the transformation of individual knowledge and ‘cognitive structures’, but largely ignores the social dimension of writing. On the other hand, the sociocultural perspective views knowledge construction as situated in communities of practice and mediated by the use of tools and resources, but is less concerned with individual meaning-making (with some exceptions, such as Prior 1998; Prior and Shipka 2003).

Witte (1992) stresses the need for a theory of writing that goes beyond the dichotomy between cognitive and social approaches. He notes that ‘the principal criteria that a theory of writing would need to meet, then, are two: (a) comprehensiveness with regard to stipulating a means of bringing together the textual, cognitive, and social and (b) viability with regard to how writing is defined operationally (i.e., in practice) through its production and use in the culture’ (1992, p.242). Witte adds that ‘at present, researchers do not have a theory capable either (a) of bridging the gaps among the textual, cognitive and social dimensions of writing or (b) of addressing questions that arise with regard to the nature of writing, whether writing be defined as process(es) or product(s)’ (p.248).
A final reason why the cognitive-constructivist and sociocultural perspectives fail to provide an adequate theoretical underpinning for the teaching and learning of research from sources, is that neither is directly concerned with inquiry. Any adequate account of research from sources needs to explain this form of research writing as a mode of inquiry. Similarly, an adequate account of the use of portfolios and diagramming tools in research from sources needs to explain these techniques as means of inquiry.

This thesis, then, explores the potential for a pragmatic semiotic perspective to provide such a theoretical framework. This perspective views research from sources as a complex mode of inquiry in which writers experiment with and explore the ideas of others, while making their own meanings and developing their own ideas and theories. In this way, it transcends any dualism between cognitive and social approaches. The term ‘pragmatic semiotic’ is used to associate the perspective with both practical action or experimentation and meaning-making through the action of signs (or semiosis). It also alludes to the philosophies of Peirce, Dewey, and Deleuze (which are intrinsically concerned with both pragmatics, or pragmatism, and semiotics) as the main theoretical influences on this perspective on research from sources. In fact, Rhodes (1998), uses the term ‘pragmatic semiotic’ to describe the theoretical influence of Peirce and Dewey on composition studies. The philosophy of Deleuze also has strong affinities with the work of Peirce and Dewey, as Semetsky (2006) points out. Just as the philosophies of Peirce and Dewey are largely focused on semiosis and inquiry as a movement from uncertainty and doubt towards
the ‘fixation of belief’, a key aspect of Deleuze’s philosophy is a conception of learning as a process of becoming that unfolds through practical encounters with problems and signs. This thesis explores the insights that this theoretical perspective can bring to the design of teaching and learning environments for research from sources.

Firstly, Peirce’s ‘triadic’ semiotics and Dewey’s transactional educational philosophy have had an implicit, but important influence on composition or writing studies and related fields, such as the study of reading, although they have yet to be fully developed as a theory of writing and do not appear to have been applied to research writing or more specifically to research from sources (see chapter 4). Secondly, a key aspect of the pragmatic semiotic perspective is its power to transcend dualisms. According to Rhodes (1998, p.237), ‘the greatest significance of Peirce’s pragmatic semiotics’ is its ‘potential to take us beyond current dichotomies’. This potential is largely due to Peirce’s triadic approach to meaning-making (Berthoff 1981) or ‘thinking in thirds’ (Ronald and Roskelly 1990a, preface; Ronald and Roskelly 1990b). Witte writes that ‘Peirce’s semiotic theory has several implications for [a] broader conceptualization’ (1992, p.283) that is ‘able to account for both the meaning-constructive and social-constructive dimensions of writing’ and for the ‘protracted and collaborative nature of composing’ (p.249). In relation to Dewey’s work, Prawat (1996, p.224) writes that because ‘Deweyan, idea-based social constructivism is evenhanded in its treatment of the individual and the social, the private and the public…it avoids the pitfalls of other constructivisms’.
Koschmann (2003, p.265) argues that ‘Dewey’s notion of transactional inquiry [offers] a third metaphor for thinking about learning, one that overcomes the limitations of viewing it as a purely cognitive or social matter’. With specific reference to the field of composition studies, Crick (2003, p.270) writes that Dewey ‘dissolves the binary between external discourse and inner experience’.

This thesis investigates the relevance of this semiotic pragmatic perspective for research writing instruction. It explores the possibility that it can not only provide a fully adequate account of research from sources as a mode of inquiry, but can also inform the development of inquiry-based research writing programs that make use of recent educational technologies.

The first chapter provides the practical context of the thesis, which relates to my own work in designing the research writing component of the Academic English and Study Skills Bridging Course (AESSBC) at the University of Western Australia (see Appendices). The chapter describes the major research paper assignment of the course and the innovative design of the research paper portfolio – incorporating the use of diagramming software – which was developed to provide support for the assignment. The design of the portfolio integrates a range of practices and resources with the aim of supporting the process of writing a secondary research paper. It was influenced both by the cognitive and sociocultural perspectives that dominate the field of EAP and by the semiotic pragmatic perspective explored in this thesis.
Finally, the chapter discusses several problems that result from the lack of a clearly articulated theoretical framework.

The second chapter investigates the concepts, principles and methods of a cognitive-constructivist perspective on writing that encompasses cognitive process approaches to writing and constructivist approaches to the use of diagramming tools and software. This perspective views writing as a complex goal-driven, problem-solving process, in which knowledge is transformed through the orchestration of cognitive processes. The main method of the cognitive-constructivist perspective is to provide writers with a range of heuristics or strategies that they can use to reach these goals. Within this perspective, diagramming tools are seen to both represent cognitive structures and facilitate various cognitive strategies. The chapter argues that while the cognitive-constructivist perspective draws attention to problem-solving and inquiry as a complex, recursive activity, its predominant focus on cognitive processes results in an inadequate theoretical framework for research from sources as a mode of inquiry.

The third chapter investigates the concepts, principles and methods of the sociocultural perspective on writing that encompasses genre approaches to writing and sociocultural approaches to the use of writing technologies. This perspective views writing as a complex social and multimodal activity, mediated by various tools and resources. The main methods of the sociocultural perspective are to build communities of practice or activity systems and to provide models, scaffolds and
other resources for students to use as novices or apprentices within these social contexts. The chapter argues that, while the sociocultural perspective explains writing as a socially mediated activity involving the use and reuse of semiotic resources, it is not directly concerned with inquiry and therefore cannot fully explain research writing as a mode of inquiry.

The fourth chapter explores the possible principles and methods of a semiotic pragmatic perspective on writing. Within this perspective, writing is viewed as a process of inquiry that begins with uncertainty or doubt and moves towards the resolution of doubt or the fixation of belief. The chapter explores the use of methods such as abductive and diagrammatic reasoning as part of the practice of research from sources. Following these methods, student writers experiment with tools and resources as instrumentalities or means of inquiry and create and experiment with diagrams as signs of relations, as they identify problems and work towards their resolution. The chapter investigates whether this perspective can provide a better explanation of research from sources as a mode of inquiry.

The conclusion explores the potential contribution of the semiotic pragmatic perspective for the development of inquiry-based research writing programs. It seeks to answer the following questions: How can a fully articulated semiotic pragmatic perspective explain the complex acts of thinking that interact in research from sources as a mode of inquiry? How can methods such as abductive and diagrammatic reasoning inform the use of learning tools and technologies such as
portfolios and diagramming software? On a broader level that relates to the
development of the field: In what ways might the perspective complement or surpass
the dominant cognitive-constructivist and sociocultural theories in providing a better
understanding of research from sources as a mode of inquiry?
Chapter 1: Practical Context – the Development of a Research Writing Program for International Students

This chapter presents the practical context of the thesis, which concerns the provision of research writing instruction for international students. The chapter reviews the development and design of the research writing component of the Academic English and Study Skills Bridging Course (AESSBC) at the University of Western Australia. The AESSBC is a pre-sessional bridging course that provides support in academic English skills, study skills, and research writing to international students with conditional offers of entry to undergraduate and postgraduate programs at the University. As in many EAP and bridging courses in Australia, academic and research writing is a major focus of the course. The research writing component aims to prepare students to write assignments and theses in their future undergraduate and postgraduate degrees. The research paper portfolio task (see Appendix 3) was developed to help international students overcome the difficulty of writing secondary research papers. The innovative design of the portfolio was influenced by the dominant cognitive and sociocultural perspectives on writing, as well as by the pragmatic semiotic perspective that this thesis seeks to further develop. Although the educational context of the chapter is quite specific, the issues it raises are relevant to the practice of research from sources throughout higher education, and to the development of effective programs designed to support this activity.
1.1 The AESSBC Research Paper Assignment

The major written assignment of the AESSBC is a 1500 word secondary research paper.¹ The main aims of the assignment are to ‘provide the opportunity to practise essential skills necessary for tertiary study, including the ability to carry out independent research and to assimilate secondary information in original written work, through the use of paraphrasing, quoting and referencing’ (Johnson 2007, p.3). The requirements of the assignment are that the paper should investigate a specific problem chosen by the student that relates to his or her discipline area and that it should make use of at least three academic sources (book sections or articles).

One of the major expectations of the AESSBC research paper assignment is that students will engage in a genuine process of inquiry involving analysis and synthesis of sourced material, critical and creative thinking and a certain degree of originality. The handbook stipulates the need to ‘assimilate secondary information in original written work’ and to ‘present your own ideas and conclusions’. In fact, these are conventional expectations for secondary research papers and assignments in higher education. Brooks and Warren (1972, p.361) write that the goal for the writer of the secondary research paper is to ‘make a study of some particular subject, to assemble materials, organize them, and incorporate them into a unified composition, with footnotes to indicate his authority for the various statements that he makes’. They also state that ‘the aim of the research paper is to assemble facts and ideas from

¹ The term ‘secondary research’ is used in the Bridging Course and in this thesis refers as a synonym for research from sources as distinguished from ‘primary’ or empirical research.
various sources, and by studying them, to draw new conclusions or to present the material in the light of a new interest. Such expectations also conform to Emig’s (1977, p.122) suggestion that writing can act as an important mode of learning for ‘higher cognitive functions’ such as analysis and synthesis, and Flower’s (1994, p.77) suggestion that the ‘sacred words’ of academic writing are ‘interpret, analyze, synthesize’.

Much has also been written about the need to provide international students with such skills. As Ballard and Clanchy (1990, p.12) point out, while ‘analytical’ learning approaches (see Figure 1.1) are emphasised in Western higher education, these aspects of writing may not be so highly valued or promoted in other academic cultures and can therefore be particularly challenging for international students. In Western universities, ‘students are required not simply to memorize but to question and think critically about the knowledge that is presented to them’ (1990, p.12). This is not always the case in academic cultures in other countries, as suggested by student comments quoted in Ballard and Clanchy (1990) and similar comments made by AESSBC students, who have identified their own academic cultures with ‘reproductive’ approaches to learning, rather than ‘analytic’ or ‘speculative’ ones. In some cultures, the dominant form of educational discourse is largely based on the reproduction of classical texts, while analysis and interpretation are less commonly practised. Ballard and Clanchy’s diagram is incorporated into the AESSBC course book and used to convey to students the expectation for ‘simple’ originality, which
involves ‘reshaping material into a different pattern’ (Ballard and Clanchy 1990, p.12).

![Image of a table illustrating learning approaches and strategies]

**Figure 1.1: Learning Styles (Ballard and Clanchy 1990, p.12)**

However, while research papers can provide relevant and useful experience, they are difficult tasks in themselves and require effective instruction. In the early years of delivery of the AESSBC, the research paper assignment was supported by traditional methods of academic writing instruction, including staged process writing (and practice through a series of shorter writing tasks) and the provision of a research paper model. Students were also provided with workshops in the use of electronic catalogues, databases and search engines. Such instruction is still provided in the course, but is now integrated into the research paper portfolio, which was later developed in response to the difficulties of the research paper assignment, as described below.
Process writing was the cornerstone of instruction in the early years of the course, and still exerts a strong influence. Although there are many variants of the process model, these generally conform to the diagram shown in Figure 1.2. As Johns (1990, p.26) points out, some variant of process writing is generally found in academic writing classes:

In most classrooms, ESL teachers prepare students to write through invention and other prewriting activities, encourage several drafts of a paper, require paper revision at the macro-levels, generally through group work, and delay the student fixation with correction of sentence-level errors until the final editing stage.

A similar process is practised throughout the AESSBC through a series of tasks, beginning with short paragraphs and progressing to longer essays, which increase in complexity and the degree of secondary research required.

![Diagram of the Writing Process](Image)

Figure 1.2: Diagram of the Writing Process (Hyland 2003a, p.11)
Students are also provided with a model in the form of a corrected and modified student research paper, written in essay style and including features such as hierarchical structure and the use of rhetorical patterns, or particular forms of exposition (see Appendix 1). The model is intended to demonstrate hierarchical structure as the logical ordering of statements through relations of superordination and subordination, in which the thesis statement is superordinate to and supported by the topic sentences of each body paragraph, which are, in turn, superordinate to and supported by further points and examples within each paragraph. The content of the paper is also conventionally organised according to rhetorical patterns, such as classification, cause and effect and problem and solution. The proposed structure for student research papers is described in the Study Skills and Research Handbook as follows:

The structure of research papers can vary from discipline to discipline and there is no one standard model. The research paper model used in the AESSBC can be compared to a long essay. Like an essay, the research paper should have an introduction, a body and a conclusion. Unlike an essay, it is divided into sections under clear and informative headings, which help to orient the reader to the focus of each section. The headings in the example essay are as follows:

- Introduction
- Forms of Employment Discrimination
- Causes of Employment Discrimination
- Proposed Solutions to the Problem of Employment Discrimination
- Conclusion.

The text emphasises both hierarchical structure and rhetorical patterns, with each body section in the example research paper developing a different rhetorical pattern.

In the first year of delivery of the course, these conventional supports – process writing, writing practice through shorter tasks and the provision of the research
paper model – were considered to provide students with the necessary support to write their own papers.

Criteria-based assessment was and still is used to assess the research paper as an indication of research writing ability. (It is now supplemented by a research paper portfolio assessment, also based on criteria). Appendix 2 shows the current research paper assessment form, in which students are assessed against a range of criteria in each of the areas of ‘content’, ‘structure’, ‘language’ and the ‘use of sources’. Of these, the area of ‘content’ includes task completion (in terms of the investigation of a ‘specific problem’ in particular discipline areas), the ‘competent’ use of at least three secondary academic sources, the logic of the paper and the relevance of the sources used. The criteria listed under ‘structure’ assess hierarchical structure, as explained above, and the structure of paragraphs and sentences. Those under ‘language’ assess a range of linguistic competencies. Finally, those listed under ‘use of sources’ assess the integration of words and ideas from the sources used.

In fact, despite the support given, the research paper assignment proved to be an overwhelming task for some students in the early years of the course. Most of the students who enrol in the AESSBC have never written research papers, or at least not in English. For some students, the language requirements of the task are extremely demanding. Many of the undergraduate students, in particular, have little knowledge of their chosen discipline areas and also have difficulty developing the content of their papers. The requirement for the use of at least three secondary
sources brings the difficulties of selecting and developing a suitable problem within the context of existing research, finding suitable and compatible articles, developing a research paper that builds on or responds to these sources, and developing an argument or position that is sufficiently original. The open-ended nature of the task and the unlimited, though not always appropriate, resources available make this aspect of the assignment particularly challenging. Depending on the point at which they enter the program, students also need to complete the paper over either a 19 week or 9 week period, relatively short time periods that also demand considerable time-management skills. These difficulties led to the development of the supporting portfolio task (see Appendix 3), which was gradually developed to support students in the difficult task of researching and constructing their papers.

1.2 The AESSBC Research Writing Portfolio

The research paper portfolio consists of a series of entries, each designed to facilitate the construction of the paper over the duration of the course. These include various diagrams and explanations, summaries of articles (or other sources), plans or outlines, and the complete research paper itself. The initial portfolio entries are designed to help students to develop research questions, gather sources and develop ideas, while later entries are designed to help them to express their ideas in a well-organised composition. The various activities that the portfolio aims to support include the following:
• brainstorm problems or issues
• form research and focus questions
• develop own ideas in diagrams and written explanations
• gather relevant articles
• analyse, summarise and criticise articles
• synthesise own ideas and ideas from articles
• develop a logical series of claims with supporting evidence from articles
• develop a series of research paper drafts.

As they carry out these actions, students are expected to practise a range of skills including reading and writing, critical and creative thinking, organisation and time-management skills. The portfolio provides a visual means for interaction and feedback on a number of levels. It also functions as a showcase for student work, as an aid to development and as an assessment tool. Individual entries provide discrete speaking and writing assessments and the portfolio as a whole provides a useful assessment for the research writing component (see Appendix 4 for the portfolio evaluation form).

As well as facilitating workshops, the portfolio supports a collaborative approach to learning, based on research group meetings and teacher-student consultations, both of which enable dialogue and the provision of meaningful feedback (see Figure 1.3). Throughout the course and in the production of their research paper portfolios, students are expected to collaborate with each other and with AESSBC teachers in several ways. At the beginning of the course, students are placed in research groups
that are roughly organised according to discipline areas. Within these groups, students discuss tasks, research ideas, difficulties and progress. The visual nature of many of the portfolio entries is intended to facilitate this process of discussion and collaboration. Students use the diagrams and short texts they create to present their ideas in research group discussions and seminars. During the course, students give a number of presentations, including oral summaries, a progress report or preliminary research paper presentation, from which they receive further feedback from peers and teachers. At the beginning of the second term, ‘portfolio conferences’ provide the means for students to share with new students their understanding of the research writing process. A key feature of the research component (and the course in general) is also consultation between AESSBC teachers and students about individual research projects. The portfolios facilitate the provision of meaningful feedback in these consultations, while reducing the quantity of written feedback required in the early stages of the research process. Comprehensive written feedback is given on later drafts.
In fact, the design of the portfolio resulted from a range of factors and influences. The initial idea of a research paper portfolio followed Johns’ suggestion for ‘a research-based project using a process approach’ in which students had to include ‘the final paper and all of their materials leading to the final product (“the whole process”)’ (1997, p.140). However, the actual design resulted from a range of factors, including pragmatic and technological factors and the influence of several pedagogical approaches and underlying theoretical perspectives. In many ways, it exemplifies how ‘design practice is frequently influenced by factors such as personal preferences, pragmatic concerns, experience with “what works,” and familiarity’ (Hannafin et al 1997, p.103). The remainder of this section describes these factors and influences, while some of the problems resulting from the combination of pedagogical approaches are discussed in the final section.

Figure 1.3: AESSBC Research Paper Portfolio
A major pragmatic factor in the design of the portfolio was the modular structure of the AESSBC, which is divided into two 10 week modules, with entry points at the beginning of each module, requiring overall IELTS scores of 5.5 and 6.0 respectively (or equivalents). Therefore, two separate but articulated portfolios were developed to facilitate the research writing component of the course. Students who enrol at the beginning of the first module (the 20 week program) complete both portfolios, while students who enrol at the beginning of the second module (the 10 week program) complete only the module 2 portfolio.

The module 1 portfolio is largely designed to help students to develop initial ideas and conduct preliminary research. The specific entries are designed to help these students to explore key concepts and frame relevant questions in their discipline areas, to search for relevant articles and to begin working towards answers to the questions they have chosen. Students also summarise at least one text, write a ‘written explanation’ (structured as a kind of short research proposal) and give a presentation of their preliminary ideas, work in progress and problems they have encountered:

**Module 1 portfolio tasks**

Entry 1: Diagram of Key Concepts and Possible Problems (or research questions) in Discipline Area (using Inspiration software)

Entry 2: Diagram of Focus Questions Related to the Chosen Problem (or research question) (using Inspiration software)

Entry 3: Set of Inspiration Diagrams Analysing the Problem According to Focus Questions

Entry 4: Summary of a Text Related to the Problem (including Inspiration text analysis diagram)
It is not expected that many students will develop a clear idea of their research papers in the first module.

The module 2 portfolio is designed to accommodate both sets of students and to help all students to construct a research paper by the 9th week of the second module (in other words, a week before the end of the course). The first two entries are designed to help continuing students to further their research and new students to quickly develop ideas and research questions, and begin their research. The remaining entries are designed to help all students to summarise and critically review articles, and to plan and draft their research papers:

Entry 1: Concept map (using Inspiration)
Entry 2: Preliminary Outline (in Word or Inspiration)
Enteries 3 and 4: Summaries of texts related to the problem (including Text Analysis Diagram and original text with highlighting and margin notes)
Entry 5: Research paper outline (using Inspiration or Word templates)
Entry 6: Critical review of an article related to the problem (including original text with highlighting and margin notes)
Enter 7: Research paper (several drafts)
Entry 8: Final presentation (PowerPoint slides)
(see Appendix, section 2.2, for more details)

Over the course of both portfolios, there is therefore both repetition and a gradual progression from pre-writing to drafting.
As the above entry lists show, one of the most innovative aspects of the research paper portfolio is the use of Inspiration diagramming software. The introduction of the software was partly a response to the perceived limitations of word-processing, which tends to compound the language and writing difficulties faced by many international students. Evensen (1996) provides a useful review of research into the limitations of word-processing and the possibilities of other writing tools. Firstly, word-processed text does not provide a visual overview of the main concepts.

Referring to findings by Haas, Evensen writes:

> Academic writers using word processors experienced problems of overview and ‘navigation’ (moving about in the electronic text). This finding is clearly related to … the linear, bottom up approach that forms an essential part of the hidden curriculum of word-processing (1996, p.103).

Secondly, word-processors offer limited support for hierarchical organisation. While conventions such as headings, subheadings and numbered points can offer the reader a hierarchical view of the content and organisation of the text, word-processing does not provide the writer with the means to easily generate hierarchically organised content: ‘local and formal aspects of writing are well supported; most global and functional aspects (like functional relations between discourse section/paragraphs) are not’ (Evensen 1996, p.99). For non-native research writers, the bias of word-processing towards the production of sentence-level text, in combination with language difficulties, can result in major problems with the development and expression of ideas.

Therefore, Inspiration diagramming software was introduced to facilitate several aspects of the writing process. Inspiration enables users to produce a range of
diagrams and to transfer diagrams into outlines, and outlines into Word documents. As can be seen in figures 1.4-1.7 below, concept maps created in Inspiration (Figure 1.4) can be transformed into ‘right tree’ diagrams (Figure 1.5) in which ideas can be arranged in a linear order. Diagrams can be simply transformed into outlines, and back to diagrams, by changing between the ‘diagram’ and ‘outline’ views (Figure 1.6). Finally, text can be added to both diagrams and outlines in the form of notes (Figure 1.7), and the completed diagram can be transferred into a Word document. A range of Inspiration templates were created for the course and are used to guide the production of paragraphs, essays and research papers. Throughout the course, Inspiration is used to facilitate the instruction and practice of academic writing and to complement instruction in hierarchical structure, rhetorical patterns and process writing.

![Figure 1.4: Example of Student Concept Map in Inspiration Diagram View](image-url)
Figure 1.5: Example of Student Right Tree Diagram in Inspiration Diagram View

Figure 1.6: Example of Student Outline in Inspiration Outline View
The design of the portfolio was also influenced by several pedagogical approaches and underlying theoretical perspectives. These include the dominant process and genre approaches, which are associated with cognitive-constructivist and sociocultural perspectives, respectively. They also include an inquiry-based approach and an underlying pragmatic semiotic perspective, which is much less familiar to the field.

Several aspects of the design were influenced by cognitive approaches to writing and an underlying cognitive-constructivist perspective on learning. These include the continued emphasis on process writing and the use of diagramming software to
facilitate the writing process. The portfolios could be interpreted as promoting particular ‘cognitive processes’ such as generating and organising ideas and translating these into plans and drafts (Hayes and Flower 1980; Flower and Hayes 1981). The use of Inspiration to facilitate these processes was influenced by cognitive-constructivist approaches to the use of diagramming tools (Novak and Gowin 1984; Smith and Edwards 1997; Jonassen 1996; Hyerle 1996, 2000), in which different kinds of diagrams can be used to facilitate different cognitive processes. Hyerle (1996, 2000) presents a range of ‘visual tools’, or ‘basic maps for applying different, fundamental thinking processes’ (Hyerle 1996, p.2; see Figures 1.8-1.10). Hyerle divides ‘visual tools’ into three basic groups, which he refers to as brainstorming webs, graphic organisers and thinking process maps. An essential question for Hyerle (1996, p.3) is ‘how is the form of knowledge structured in different ways using the designs offered by different visual tools?’ and he characterises each group of visual tools both by form and function, in terms of supporting a range of different skills.

Brainstorming webs (see Figure 1.8), also referred to as semantic maps, mind maps, cluster maps and so on, are typically used to generate ideas. Their main function, according to Hyerle (1996, p.26), is ‘brainstorming for fostering individual and group creativity’ and in order to afford the spontaneous generation of ideas, they are

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2 The term ‘diagram’ is used in this thesis to refer to artifacts that can be variously referred to as mind maps, semantic webs, brainstorming webs, graphic organizers, concept maps and so on, depending on the shape and components of the diagram. The term ‘diagramming tools’ is used in this thesis to refer to diagrams that are used as tools for writing, while the term ‘diagramming software’ is used to refer to software applications that enable the creation and use of such diagrams in electronic media.
loosely structured. Such diagrams are typically either radial (with lines or nodes radiating outwards from a central node) or randomly networked.

Figure 1.8: Example of Brainstorming Web

Graphic organisers (see Figure 1.9), defined as ‘organizational tools that reflect different content-specific patterns of knowledge and conceptual structures’ (Hyerle 1996, p.52), come in a variety of forms that reflect particular thought relationships or patterns of organisation, such as cause and effect, comparison and contrast, and so on. For Hyerle, they foster ‘basic skills and deep content learning’ and function well as scaffolding devices for longer writing tasks’. Smith and Edwards (1997) also demonstrate the use of graphic organisers as ‘top-level structures’ that can facilitate the use of rhetorical patterns for both writing and text analysis. Within this approach, students use graphic organisers that correspond to different rhetorical patterns to generate and organise their ideas in writing and also to analyse texts.
In the final category, Hyerle presents a range of ‘thinking process maps’, including concept maps, that develop cognitive ability and critical thinking (2000). Concept maps resemble the radial or random structure of brainstorming webs, but the links between nodes are labelled in a way that explains the relationships between the concepts in these nodes (see Figure 1.10) and therefore enables the development of more systematic thinking.

Figure 1.10: Example of Concept Map
Other aspects of the portfolio design were influenced by genre approaches and an underlying sociocultural perspective on writing. These include the emphasis on collaboration, the use of portfolios to mediate this collaboration and the use of generic resources to scaffold the construction of complex texts. An initial influence on these aspects of the design was the University of Adelaide’s Integrated Bridging Program - Research (IBP-R), in which ‘feeder’ tasks, including a critical review of an article and a literature review, lead up to the major tasks of a writing a research proposal document and giving a seminar presentation of the research proposal. This approach conforms to Swales and Feak’s (1994) suggestion that writing summaries and critical reviews can form an essential part of students’ preparation for research papers. Therefore, in the research paper portfolio, the summary and critical review entries are designed as ‘feeder tasks’ for the final research paper.

Following a variant of the Australian genre school (Callaghan, Knapp and Noble 1993; Knapp and Watkins 2005), the course also treats the research paper as a multigeneric form of writing that involves the integration of a range of basic academic genres. The development of a series of portfolio entries as scaffolds for the research paper assignment was influenced by the idea that research papers are ‘multi-generic products’ that result from a ‘core set of generic processes’, such as describing, explaining, instructing, arguing and narrating (see Figure 1.11; Knapp and Watkins 2005, p.26) and that the ability to write research papers draws on a range of foundational skills, including the ability to write summaries and critical reviews (Swales and Feak 1994).
Finally, several aspects of the portfolio design were also influenced by an inquiry- or problem-based approach and an underlying pragmatic semiotic perspective. In fact, problem-based learning is presented in the AESSBC student information booklet as one of the main approaches of the course, as a whole:

Problem-based learning gives students the opportunity to practise posing critical questions and exploring solutions through the investigation of problems relevant to academic studies. In the Bridging Course, each theme or topic in the core-content units focuses on academic problems or questions, such as:

- Is global warming caused by natural processes or human activities?
- What are the possible consequences of global warming?

These problems are the focus for your assignments and discussion and help you to develop critical thinking skills.

The problem-based approach of the AESSBC was partly drawn from Deleuze’s insight that learning is an encounter with specific problems (Deleuze 1994, p.192), and an understanding of the academic utterances that learners encounter or produce as responses to these problems (Johnson 2001). To some extent, the design of the research paper portfolio was an extension of this integral approach of the course as a whole, in which research from sources is conceived as an encounter with problems and with texts as solutions to problems, just as the research paper itself is a solution to the problems that students choose to investigate.
Several practical models of problem-based or inquiry-based learning influenced the portfolio design. One of these was the ‘hypothetico-deductive problem-solving model’ of Barrows and Myers, ‘which centres around hypothesis generation and evaluation’ (Savery and Duffy 1995, p.143). As can be seen in Figure 1.12, an important aspect of the model is the development and revision of hypotheses, as
‘students’ conjectures regarding the problem’ (Savery and Duffy 1995, p.142). The iterative development of hypotheses is also closely connected to the synthesis of information.

<table>
<thead>
<tr>
<th>IDEAS (Hypotheses)</th>
<th>FACTS</th>
<th>LEARNING ISSUES</th>
<th>ACTION PLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students’ conjectures regarding the problem – may involve causation, effect, possible resolutions, etc.</td>
<td>A growing syntheses of information obtained through inquiry, important to the hypotheses generated</td>
<td>Students list of what they need to know or understand in order to complete the problem task</td>
<td>Things that need to be done in order to complete the problem task</td>
</tr>
</tbody>
</table>

**Figure 1.12: Adapted from Barrows and Myers’ Problem Based Learning Process (Savery and Duffy 1995, p.142)**

Another practical model adapted for the portfolio design was Jakes, Pennington and Knodle’s (2000) ‘structured approach to inquiry-based learning’ (see Figure 1.13). The authors define inquiry-based learning as ‘a process in which students formulate investigative questions, obtain factual information, and then build knowledge that ultimately reflects their answer to the original question’. One of the key features of the model is the critical question that determines the development either of a hypothesis or a new search strategy.
The influence of both models can be seen in the explanation of the process of research from sources and the accompanying diagram presented in the Module 1 section of the Study Skills and Research Handbook (see Figure 1.14). The explanation is as follows:

Although there are many different ways to do research, the following process is followed in the first term as a way to begin the development of a secondary research paper. The first step in the process is to choose a particular issue or problem to investigate and to write your problem in the form of a research question (such as what are the causes of discrimination in Chinese work places and what is the best way to solve this problem?) This research question can then be the focus of your research. The next step in the process is to develop more specific research questions, or focus questions, which analyse the problem further. The focus questions that were developed for the example essay are as follows:
- How many forms of discrimination are there in there?
- What are causes of discrimination in Chinese workplaces?
- What are the solutions to discrimination Chinese workplaces?

These research questions can help to guide your thinking and help you to develop and organise your ideas. The third step is to develop search terms that you can enter into an electronic database to find articles relevant to your research (secondary sources), such as those in the reference section at the back of the model research paper. This can be a difficult part of the process and it is necessary to experiment with different search terms. In some cases, where no search terms related to the problem result in relevant articles, it may be necessary to choose a new a problem (although this should be a last resort). When you have found a relevant article, the fourth step is to analyse or summarise the article. The fifth step is to begin writing by answering the focus questions you have written. Finally, during this process, you should try to form a hypothesis relating to your main problem, which is a tentative answer to your research question. If your further research proves that this hypothesis is correct, you can then use it as the thesis statement of your research paper. However, research is not usually so simple and there are a number of possibilities:

- The initial hypothesis will be confirmed
- The initial hypothesis will be adapted or modified
- The initial hypothesis will be rejected and another hypothesis will be needed

It is not expected that students will have found relevant texts or have a definite hypothesis by the end of the module. It is common some students do not have a clear research problem by this time because of difficulties in the research process.

Following Jakes, Pennington and Knodle’s (2000) model, the diagram in Figure 1.14 suggests a question-based search strategy, incorporating the formation, evaluation and modification of a ‘hypothesis’ as a provisional thesis statement for the research paper. The influence of the model can also be seen in the first and second entries of the module 1 portfolio, in which students are guided to develop an ‘essential’ question, defined as ‘a question that requires students to make a decision or plan a course of action’, and a series of focus questions (Jakes, Pennington and Knodle 2000, p.1), through which the essential question is further developed.
The portfolio design was also implicitly influenced by Peirce’s theory of inference and Dewey’s logic of inquiry. Following Peirce and Dewey, inquiry can be seen as a movement from uncertainty and doubt towards the “fixation of belief” or “warranted assertability”. This movement unfolds through semiosis, or the action of signs, and the interplay of three different kinds of inference: induction, deduction and abduction, or hypothesis. Peirce understands this interplay as ‘a process of applying signs to understand some phenomenon (induction), reasoning from sign to sign (deduction), and/or inventing signs to make sense of some new experience.”
(abduction)’ (Cunningham 1992, p.185). He explains these three kinds of inference as follows:

Deduction is the only necessary reasoning. It is the reasoning of mathematics. It starts from a hypothesis, the truth or falsity of which has nothing to do with the reasoning; and of course its conclusions are equally ideal.… Induction is the experimental testing of a theory. The justification of it is that, although the conclusion at any stage of the investigation may be more or less erroneous, yet further application of the same method must correct the error. The only thing induction accomplishes is to determine the value of a quantity. It sets out with a theory and measures the degree of concordance of that theory with fact. It can never originate any idea whatsoever. No more can deduction. All the ideas of science come to it by way of Abduction. Abduction consists in studying facts and devising a theory to explain them. Its only justification is that if we are ever to understand things at all, it must be in that way (CP 5.145, quoted in Cunningham 2007).³

As can be seen in the following figure, Peirce classified deduction as an analytic form of inference, while abduction (or hypothesis) and induction are synthetic forms. While abduction is the least known and understood form of inference, for Peirce, only abduction can lead to the creation of new ideas and therefore lies at the heart of creativity and originality.

![Diagram of Inference Classification](image)

**Figure 1.15: Classification of Inference (CP 2.624)**

³ Following convention, CP refers to sections in Peirce’s Collected Papers.
Dewey’s logic of inquiry builds on Peirce’s theory of inference. Dewey (1933, p.12) characterises inquiry, or reflective thinking, as ‘(1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring, to find material that will resolve the doubt, settle and dispose of the perplexity’. Dewey further (1933, p.107) outlines ‘five phases, or aspects, of reflective thought’ that occur between the initial state of doubt and the resolution:

In between, as states of thinking, are (1) suggestions, in which the mind leaps forward to a possible solution; (2) an intellectualization of the difficulty or perplexity that has been felt (directly experienced) into a problem to be solved; (3) the use of one suggestion after another as a leading idea, or hypothesis, to initiate and guide observation and other operations in collection of factual materials; (4) the mental elaboration of the idea or supposition as an idea or supposition (reasoning, in the sense in which reasoning is a part, not the whole, of inference); and (5) testing the hypotheses by overt or imaginative action.

Dewey’s use of the term ‘suggestions’ here corresponds to Peirce’s abduction, ‘reasoning’ is equivalent to deduction, and ‘testing hypotheses’ is equivalent to induction. (These insights into inquiry will be more fully elaborated in chapter 4).

The overall design of the research paper portfolio was an attempt to facilitate the interplay of inference, or the phases of inquiry, including the abductive development of new ideas, the deductive development of logical explanations (chains of premises and conclusions) and the inductive testing of and obtaining support for ideas through secondary research. A number of entries, particularly in the module 1 portfolio, are designed to support abductive processes of ‘following hunches and looking for clues, building scenarios and coming up with tentative explanations’ (Cunningham
The forming of hypotheses as tentative answers to essential questions is also conceived as an abductive process, just as the testing of hypotheses against the literature is inductive. Finally, a number of entries, particularly in the module 1 portfolio, are designed to support the deductive development of ideas. The production of outlines and plans is designed to help students to integrate their own ideas and propositions with supporting claims from the sources within a logical hierarchical structure. Further support for this deductive process is provided by a series of extracts from Allen’s (2004) work on critical thinking and writing, which demonstrates an ‘analytic reasoning’ approach to critical thinking and writing involving the development of logically connected claims (premises and conclusions).

1.3 Problems Resulting from the Lack of a Theoretical Framework

The successful delivery of the AESSBC over 6 years suggests that the research paper portfolio has largely helped students to accomplish the task of constructing a research paper. However, the lack of a clearly articulated theoretical framework for the portfolio has led to some problems in the teaching and learning environment it supports. In fact, the eclectic design of the portfolio has led to some confusion, since the various methods and techniques it incorporates, including the use of portfolios and diagramming software, can be interpreted and practised in different ways.

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4 This is evidenced by feedback from student evaluations, which has consistently been generally favourable, and informal feedback from teachers on the program.
According to Hannafin et al. (1997), such problems are widespread in constructivist learning environments. They write that ‘frequently, the foundations of given efforts are unclear, the methods inconsistent with presumed underlying assumptions, and the design methodologies are not well-articulated’ (Hannafin et al. 1997, p.103). The problem is not so much the practical design of the environments, but their lack of grounding in a clearly articulated theoretical framework:

Many approaches appear to work, but designers are unable to determine why they are effective or, more importantly, if similar methods are likely to prove effective in subsequent applications. Many designs reflect the evolved preferences of the designer with particular methods and technologies. Again, the approaches may prove successful, but cannot be readily replicated or generalized by others or reconciled with available research and theory (1997, p.103).

Therefore, the authors stress the importance of fully articulating theoretical perspectives and of consistently linking methods with clearly articulated foundations and assumptions (Hannafin et al. 1997, pp.103-4). In the case of the research paper portfolio, a number of problems have resulted from the combination of pedagogical approaches – and underlying theoretical perspectives – and the lack of a clearly articulated theoretical framework.

One problem relates to the combination of process and genre approaches and the different assumptions of the cognitive-constructivist and sociocultural perspectives that underlie them. Hyland (2003a, p.23) refers to the protracted debate between process and genre orientations, which ‘boils down to the relative merits of predominantly text-focused pedagogies, which emphasize the social nature of writing, and more writer-centered process methods, which stress its more cognitive
aspects’. Informal observations and communications have suggested that different teachers in the program have indeed emphasised either genre or process in their teaching (in addition to more traditional grammatical and skills-based approaches), and that this has led to some confusion in the teaching and learning environment.

A second problem is that the inquiry-based approach and the underlying pragmatic semiotic perspective that largely influenced the overall design of the portfolio are almost entirely unfamiliar in the practical field of EAP in which the AESSBC is taught. In fact, the combination of this implicit influence of the pragmatic semiotic perspective on the design and its unfamiliarity to teachers on the program has also led to some confusion. One broad area of confusion relates to design elements that are intended to facilitate the different kinds of inference that research writers need to make. As described in the previous section, a major goal of the design was to facilitate the interplay of inferences, including abductions or hypotheses. However, the interaction of deductive, inductive and abductive inferences is a foreign idea to the field. References are occasionally (and often erroneously) made to ‘deduction’ and ‘induction’ writing in EAP course books (such as Arnaudet and Barrett 1984), but ‘abduction’ is an entirely absent concept. The repeated use of the term ‘hypothesis’ in the Study Skills and Research Handbook (as in Figure 1.12 above) has also caused problems. This appears to be largely due to the difference between the standard definition of the term associated with empirical research in which a hypothesis is an idea or theory that is either validated or rejected through research and the broader pragmatic semiotic conception of hypotheses as abductions or
suggestions that are continually modified throughout the research process. In any case, both students and teachers have expressed confusion about the meaning of this term in the handbook.

Another problem has arisen in connection with the attempt to facilitate inference-making through the use of Allen’s (2004) ‘analytic reasoning’ approach. The way in which analytic reasoning, or the development of a structured series of claims, can engender deductive and inductive inferences and support the inquiry process was not adequately articulated in the design. The way in which Inspiration software could also be used in connection with Allen’s approach was also insufficiently explained.

Confusion has also resulted from the difficulty for teachers to reconcile conventional instruction in process writing and genre with the inquiry-based design of the portfolio. In the case of genre instruction, some teachers have emphasised the structures and moves associated with basic academic genres, rather than the function of generic forms in the process of inquiry. The clearest example of this has been in the instruction of summary writing in connection with the three portfolio entries that involve ‘summaries of texts related to the problem’. The summary outline templates that are provided to students as part of the portfolio design guide students to introduce their summaries in relation to their main research question, focus questions or hypotheses, with the implicit understanding that they need only summarise those parts of longer texts that are related to their investigation. This is consistent with the suggestion in Swales and Feak (1994), one of the texts used in the course, that in
writing summaries and critical reviews in preparation for research papers ‘we are free to concentrate on what we think is important or interesting about the source’ (1994, p.105). However, following the rationale that such genres are also performed as tasks in themselves, the examples and exercises provided by Swales and Feak train students to write conventional summaries of complete texts, as do most academic writing course books. The use of such examples and exercises in the course has tended to present summary writing as an end in itself, rather than as an instrumentality in the inquiry process (following Dewey 1938).

All of these problems have resulted from the lack of a clearly articulated theoretical framework. Therefore, the practical goal of this thesis is to develop a more grounded framework to inform both current delivery and future improvements to the design of the research paper portfolio. The three chapters that follow aim to fully articulate the cognitive-constructivist, sociocultural and pragmatic semiotic perspectives. The conclusion returns to the portfolio design to compare the perspectives and evaluate their potential as theoretical frameworks.
Chapter 2: A Cognitive-Constructivist Perspective on Writing and the Use of Writing Technologies

The so-called cognitive revolution of the 1970s and 1980s has had a great influence on both writing instruction and the use of educational technologies. The influence of cognitive theory in writing studies has led to process writing as the dominant pedagogical approach (Johns 1990, 1997). Although a number of particular cognitive approaches to writing and educational technologies have emerged, one problem-solving and knowledge-transforming paradigm has had particular influence. This cognitive-constructivist perspective has greatly influenced both cognitive process approaches to writing (such as Flower and Hayes 1980a, 1980b, 1981, 1984; Bereiter and Scardamalia 1987) and constructive approaches to diagramming tools (Novak and Gowin 1984; Smith and Edwards 1997; Jonassen 1996; Hyerle 1996, 2000). As a result of this shared influence, both approaches share many of the same conceptions, particularly concepts such as problem spaces, knowledge representation, cognitive processes and knowledge transformation. The cognitive-constructivist perspective also seems to provide a theoretical framework for the use of portfolios and diagramming software to complement process writing as a method of writing and writing instruction. This chapter evaluates its potential to inform the design of teaching and learning environments for research from sources.

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5 The term ‘cognitive-constructivist’ is borrowed from Duffy and Cunningham (1996) and Bonk and Cunningham (1998).
2.1 Human Problem-Solving

A seminal influence on this cognitive-constructivist perspective appears to be Newell and Simon’s (1972) human problem-solving model in cognitive psychology, which aims to provide a more adequate account of problem-solving than traditional models. Pea (1997, p.65) contrasts the human problem-solving model with the ‘standard problem-solving model’, introduced by John Dewey (1933) early in the century and revised and popularised by the mathematician George Polya (1957). According to Pea, one of the myths perpetuated by this model was that problem-solving unfolds in a linear sequence of stages (see Figure 2.1). In Newell and Simon’s model, the stages of problem-solving are not ‘linear stages in a top-down process, but comprise a more cyclic system in which each new set of constraints created by materials the problem-solver produces makes for new opportunities to be exploited in its next developments’ (Pea 1997, p.66). The relevance of the human problem-solving model for writing lies in the parallels between traditional models of problem-solving and stage descriptions of writing (see Figure 1.2). Newell and Simon employed the method of using oral protocols in order to analyse the way in which individual human subjects solve problems. In this method, the subject is asked to speak aloud while performing problem-solving tasks and the protocol is then analysed to reveal the operations that took place in the subject’s mind as he or she performed the task. What the method revealed to Newell and Simon is that problem-solving is a form of information processing that occurs in

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6 As demonstrated in Chapter 4, the attribution of this staged, linear model to Dewey is a misrepresentation of Dewey’s theory of inquiry, which is actually recursive and cyclical.
They write that ‘our theory of human thinking and problem solving postulates that the human operates as an information processing system’ (Newell and Simon 1972, p.19). As can be seen in Figure 2.2, the model contains two essential components, the information processing system and the task environment. The information processing system or IPS, is defined as ‘a system consisting of a memory containing symbol structures, a processor, effectors, and receptors’ (p.20); while the ‘task environment’ is ‘an environment coupled with a goal, problem, or task’ (p.56).

Newell and Simon explain the operation of the IPS as follows:

An initial process, here called the input translation, produces inside the problem solver an internal representation of the external environment, at the same time selecting a problem
space. The problem solving then proceeds in the framework of the internal representation thus produced – a representation that may render problem solutions obvious, obscure, or perhaps unattainable (Newell and Simon 1972, p.88).

The core of problem-solving, as they conceive it, is the way in which problem solvers are able to use the ‘structural information embedded in the task environment’ to solve the problem:

Human problem solving, we have argued, is to be understood by describing the task environment in which it takes place; the space the problem solver uses to represent the environment, the task, and the knowledge about it that he gradually accumulates; and the program the problem solver assembles for approaching the task. We have tried to characterize environments, problem spaces, and programs, showing how the problem solver’s program extracts some of the structural information that is embedded in the task environment in order to find a solution by means of a highly selective search through the problem space (Newell and Simon 1972, p.868).

An important feature of Newell and Simon’s model is the representation of the task environment and the problem in the mind of the problem-solver, which Newell and Simon denote by the concept of the *problem space*. They define the problem space as: ‘the internal representation of the task environment used by the subject’ (1972, p.56) or ‘the ‘space in which [the subject’s] problem solving activities take place’ (1972, p.59). They further define it as ‘the space (1) where problem solving takes place and (2) that contains not only the actual solution but possible solutions that the problem solver might consider’ (1972, p.809). Newell (1980, p.696) stresses that ‘the fundamental organizational unit of all human goal-oriented symbolic activity is the problem space’. He provides the following explanation of problem spaces and problems:

*Problem Space:* A problem space consists of a set of symbolic structures (the *states* of the space) and a set of *operators* over the space. Each operator takes a state as input and
produces a state as output, although there may be other inputs and outputs as well. The
operators may be partial (i.e., not defined for all states). Sequences of operators define
paths that thread their way through the sequences of states.

Problem: A problem in a problem space consists of a set of initial states, a set of goal
states, and a set of path constraints. The problem is to find a path through the space that
starts at any initial state, passes only along paths that satisfy the path constraints, and ends
at any goal state (Newell 1980, p.697).

The essential characteristic of the model is the postulation of a cyclical information
processing system, in which a range of methods suitable to the task environment are
continuously used to process inputs and realise goals, rather than a linear series of
stages.

Figure 2.2: Newell and Simon’s (1972, p. 89) Model of the Problem Solver
2.2 Writing as Problem-Solving

The basic elements of Newell and Simon’s model, including long-term memory, the task environment and a set of cognitive processes, were adapted by Flower and Hayes (1981; Hayes and Flower 1980) to produce their model of cognitive processes in writing. In fact, both authors have since revised their views on writing: Flower has adopted a sociocognitive approach to composition (as discussed in more detail below), while Hayes updated the cognitive processing model in 1996. Nonetheless, Flower and Hayes’ model of writing processes has greatly influenced the evolution of process writing as an instructional approach to writing as a complex, problem-solving activity. It has also been widely cited and reproduced in the literature, particularly in connection with the use of writing technologies (see, for example, Pea and Kurland 1987; Evensen 1996; Rossitto 2004).

In many ways, the cognitive process model is a reaction to previous approaches, including traditional rhetoric and stage descriptions of writing. According to Flower and Hayes (1981, p.367), ‘the problem with stage descriptions of writing is that they model the growth of the written product, not the inner process of the person producing it’. In addition, ‘the sharp distinctions stage models make between the operations of planning, writing, and revising may seriously distort how these activities work’ (p.367). Flower and Hayes clarify the distinction between the two

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7 The use of present tense to refer to Flower and Hayes' is in keeping with the stylistic conventions of this thesis and is not intended to indicate that the authors continue to hold the views they expressed in their early work.
models as follows:

In a stage model the major units of analysis are *stages* of completion which reflect the growth of a written product, and these stages are organized in a *linear* sequence or structure. In a process model, the major units of analysis are elementary mental *processes*, such as the process of generation of ideas (p.367).

Flower and Hayes emphasise that their process model is ‘recursive and allows for a complex intermixing of stages’ (Hayes and Flower 1980, p.29) in which ‘each of these mental acts may occur at any time in the composing process’ (p.367).

![Figure 2.3: Flower and Hayes’ Process Model (Hayes and Flower 1980, p.11)](image)

As shown in Figure 2.3, the Flower and Hayes model views writing as a ‘complex problem-solving activity comprised of a small set of basic mental processes’ (Pea and Kurland 1987, p.288). The model consists of three main components: the task environment, the writer’s long-term memory and the writing process. Flower and Hayes (1980a, p.31) explain the interaction of these components in the composing process as follows:
In order to write, people must perform a number of mental operations; they must Plan, Generate knowledge, Translate it into speech, and Edit what they’ve written. These operations can draw on information stored in long-term memory and they go on within a Task Environment that includes both the task environment and a growing text.

Along similar lines as Newell and Simon’s human problem-solving model, this model of the writing process replaces traditional process models based on a linear series of stages of writing with a dynamic system that centres on a set of cognitive processes.

The task environment of writing is a major constraint on the cognitive processes that are employed in writing as a form of problem-solving. Flower and Hayes define the task environment as including ‘everything outside the writer’s skin that influences the performance of the task’. They add that ‘it includes the writing assignment, that is, a description of the topic and the intended audience, and it may include information relevant to the writer’s motivation’ (Hayes and Flower 1980, p.12). The growing text itself is also part of the task environment:

Once writing has begun, the task environment also includes the text which the writer has produced so far. This text is a very important part of the task environment because the writer refers to it repeatedly during the process of composition (1980 p.12).

Therefore, the task environment is the growing context of writing, which both motivates and constrains the writer in action.

The other major constraint on the writing process is long-term memory. Flower and Hayes write that ‘the writer’s long-term memory, which can exist in the mind as well as in outside resources such as books, is a storehouse of knowledge about topic
and audience, as well as knowledge of writing plans and problem representations’ (1981, p.371). Long-term memory is the major source of the writer’s developing ideas:

The structure of knowledge for some topic becomes more conscious and assertive as we keep tapping memory for related ideas. That structure, or ‘schema,’ may even grow and change as a result of library research or the addition of our own fresh inferences (Flower and Hayes 1981, p.381).

In addition to Newell and Simon’s model, Flower and Hayes draw on schema theory to develop their conception of long-term memory and the way in which structures of knowledge can grow and change.

Schemata can be defined as knowledge structures containing abstract or generalised information about the world that are used in the processing and production of texts. Schema theory is often associated with the early work of Rumelhart. In an influential account, Rumelhart (1980, p.33) conceives of schemata as the ‘building blocks of cognition’, and explains them further as mental representations stored in long-term memory:

A schema, then, is a data structure for representing the generic concepts stored in memory. There are schemata for representing our knowledge about all concepts: those underlying objects, situations, events, sequences of events, actions and sequences of actions (Rumelhart 1980, p.34).

Rumelhart also discusses the role of schemata in problem-solving, which is dependent on the availability of relevant schemata in long-term memory. However,

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8 Rumelhart has since rejected schema theory in favour of parallel distributed processing models of cognition and, again, the use of the present tense to refer to refer to his early work is not intended to indicate that he continues to hold these views.
Rumelhart (1980, p.53) also explains that ‘when we encounter a situation in which currently available schemata do not prove adequate, there is the possibility of schema change and thus a modification of the very devices through which we experience the world’. Hence, schemas and the knowledge structures that build on them can grow and change.

The main focus of Hayes and Flower’s model is the identification of the cognitive writing processes that function as the main operators in the overall composing process. The three top-level processes they identify are planning, translating and reviewing, each of which functions in relation to different aspects of the task environment. The most important of these processes is planning, which plays a central role in the model. Here, again, the influence of Newell and Simon is evident. According to Suchman, Newell and Simon’s theory was seminal to what she describes as ‘the planning model’:

The planning model in cognitive science treats a plan as a sequence of actions designed to complete some preconceived end. The model posits that action is a form of problem solving, where the actor’s problem is to find a path from some initial state to a desired goal state, given certain conditions along the way (1987, p.28).

Flower defines planning as ‘the act of calling up mental representations’ for the purpose of ‘thinking about what you know and what you want to say’ (1985, p.55). The goal of planning is to ‘re-represent’ knowledge and make it more explicit by ‘exploring’ and ‘restructuring’ it. Planning is therefore the leading edge of writing itself, conceived as a ‘journey that restructures knowledge’ (1985, p.56). Flower suggests that as they plan, writers concentrate on two things: creating ‘a sense of their major goals and sub goals’ and forming ‘a sense of their gist and the general
structure of their ideas’ (1985, p.57). The gist of a piece of writing is ‘a summary statement of the essential things you want to say’ or a ‘top-level statement of the main points or the big idea’ which acts as a ‘guiding idea’ in the composing process.

Within the writing process, ‘the function of the planning process is to take information from the task environment and from long-term memory and to use it to set goals and to establish a writing plan to guide the production of a text that will meet those goals’ (Hayes and Flower 1980, p.12). A major aspect of planning is the act of building internal representations of the problem (or problem spaces, in Newell and Simon’s terminology). Planning is the ‘cognition of discovery’ or ‘the way writers initiate and guide themselves through the act of meaning making’, just as the rhetorical problem is ‘an elaborate construction which the writer creates in the act of composing’, an ‘image’, or an ‘inner, private representation’ (1980b, p.22). Planning is both ‘the purposeful act of representing current meaning to oneself’ (1984, p.124) and the act of creating new meanings. Flower and Hayes write that ‘much of the information people have about rhetorical problems exists in the form of stored problem representations’, such as genres, but many writing problems require writers to ‘build a unique representation’ (1980b, p.25, original italics), which is a major challenge for novice writers. They add that ‘at one end of the spectrum, writers are merely trying to express a network of ideas already formed and available in memory; at the other, writers are consciously attempting to probe for analogues and contradictions, to form new concepts, and perhaps even to restructure their old knowledge of the subject’ (p.25).
Flower and Hayes stress that writers often need to find the problem itself. As in all scientific and artistic endeavours, writers often need to ‘explore and reformulate the problem’ (1980b, p.25). Therefore, ‘problem-finding – the ability to envision, pose, formulate, or create a new problematic situation’ (p.31, original italics) is another essential aspect of planning. Flower and Hayes also stress the importance of teaching problem-finding: ‘if we can teach students to explore and define their own problems, even within the constraints of an assignment, we can help them to create inspiration instead of wait for it’ (1980b, p.32).

The process of planning is further broken down into a series of sub-processes. The first of these is generating, which functions to ‘retrieve information relevant to the writing task from long-term memory’ (Hayes and Flower 1980, p.14). Sometimes this information is ‘so well developed and organized in memory that the writer is essentially generating standard written English’; sometimes it consists of ‘only fragmentary, unconnected, even contradictory thoughts, like pieces of a poem that hasn’t yet taken shape’ (Flower and Hayes 1981, p.372). Therefore, the internal representation of the rhetorical problem is often much more ‘abstract’ than its eventual prose representation – ‘a whole network of ideas might be represented by a single word’ – and ‘could be held in as a visual or perceptual code, e.g., as a fleeting image the writer must then capture in words’ (p.372). In addition, ‘the information generated in planning may be represented in a variety of symbol systems other than language, such as imagery or kinetic sensations’ (p.373).
The second sub-process of planning is *organising*, which functions to ‘select the most useful of the materials retrieved by the generating process and to organize them into a writing plan’ (Hayes and Flower 1980, p.14). The process of organising helps the writer to ‘make meaning’ or ‘give a meaningful structure to his ideas’ (Flower and Hayes 1981, p.372). Flower and Hayes elaborate on the process as follows:

The process of organizing appears to play an important part in creative thinking and discovery since it is capable of grouping ideas and forming new concepts. More specifically, the organizing process allows the writer to identify categories, to search for subordinate ideas which develop a current topic, and to search for superordinate ideas which include or subsume the current topic. At another level the process of organizing also attends to more strictly textual decisions about the presentation and ordering of the text. That is, writers identify first or last topics, important ideas, and presentation patterns (p.372).

Generating and organising operate in tandem as generating retrieves often disorganised ideas from long-term memory and organising shapes them according to the needs at hand. Flower and Hayes stress the need to ‘move from a rich array of unorganized, perhaps even contradictory perceptions, memories and propositions to an integrated notion’ or to transform ‘incoherent thought and loosely related pockets of information into a highly conceptualized and precisely related knowledge network’ (Hayes and Flower 1980, p.14). Flower and Hayes explain the writer’s developing knowledge in terms of the development and modification of ‘knowledge maps’: ‘if we try to diagram the writer’s developing knowledge structure as a map, we find that the topography keeps changing’ (1980a, p.35). Therefore, the difficulty lies in the fact that ‘retrieving knowledge and creating an adequate conceptual structure of “what you think” can be a demanding task’ (1980, p.36), hence the need for organising.
The final sub-process of planning is goal-setting, which ‘identifies’ aspects of the writing tasks that should be performed by other functions, such as editing, and ‘stores’ them for later use (Flower and Hayes, p.14). Flower (1985) stresses that writing is an activity that is essentially concerned with the attainment of goals. It is ‘a goal-directed frame of mind’ (1985, p. 3) that ‘turns composing into a goal-directed journey – writing my way to where I want to be’ (1985, p.4). She writes:

A problem is a situation that occurs when you are at Point A and you want to be at Point B and you are not sure how to get there. To solve the problem you must figure out how to get from where you are to where you want to be – how to reach your goals (Flower 1985, p. 22).

The main purpose of goal-setting is to direct the writing process: ‘whether one’s goals are abstract or detailed, simple or sophisticated, they provide the “logic” that moves the composing process forward’ (Flower and Hayes 1981, p.379). Flower and Hayes add that ‘all those forces which might “guide” composing, such as the rhetorical situation, one’s knowledge, the genre, etc., are mediated through the goals, plans and criteria for evaluation of discourse actually set up by the writer’ (p.379). This involves ‘a goal-directed search for the unexpected that we often see in writers as they attempt to explore and consolidate their knowledge’ (p.379). Acknowledging the apparent paradox of writing as a goal-driven process and writing as process of discovery, they ask: ‘How, then, does the writing process manage to seem so unstructured, open-minded, and exploratory (“I don’t know what I mean until I see what I say”) and at the same time possess its own underlying coherence, direction, or purpose?’ (p.377). The answer is that writers create a ‘hierarchical network of goals’ that guides the writing process (1981, p.377). This network of goals is ‘created in
close interaction with ongoing exploration and the growing text’ (p.378).

In fact, for Flower and Hayes, ‘goal-directed thinking is intimately connected with discovery’ (p.378), or how writing functions in ‘fostering insight and developing new knowledge’ (p.381); since ‘in the act of writing, people regenerate or recreate their own goals in the light of what they learn (1981, p.381). Goal-setting is a recursive, hierarchical process, as are all the cognitive processes in writing. Flower and Hayes write:

Writers not only create a hierarchical network of guiding goals, but, as they compose, they continually return or ‘pop’ back up to their higher-level goals. And these higher-level goals give direction and coherence to their next move (1981, p.379).

Furthermore, goal-setting interacts with generating and organising within the planning process:

Most of the writer’s goals are generated, developed, and revised by the same processes that generate and organize new ideas. And this process goes on throughout composing. Just as goals lead a writer to generate ideas, those ideas lead to new, more complex goals which can then integrate content and purpose (Flower and Hayes 1981, p.373).

In the same way as ideas are either retrieved from memory or generated afresh, ‘some goals are stored in long-term memory but writers must also generate unique goals’ (Flower and Hayes 1981, p.381). Developing goals are the ‘creative bridge’ between exploring, consolidating the results, as writers ‘pop back up’ to higher level goals, and regenerating. Finally, ‘it is through setting these new goals that the fruits of discovery come back to inform the continuing process of writing’ (p.386). Therefore, goal-setting epitomises ‘the inventive power of the writer, who is able to explore ideas, to develop, act on, test, and regenerate his or her own goals’ (Flower
Flower and Hayes identify two other main processes that operate alongside planning within the writing process. The second sub-process is *translating*, which ‘acts under the guidance of the writing plan to produce language corresponding to information in the writer’s memory’ (Hayes and Flower 1980, p.12). Since the information in long-term memory is not stored in syntactic form but as ‘memory structures, perhaps complex networks of images’ (Hayes and Flower 1980, p.15), it must be translated into sentences; knowledge maps must be expressed within ‘the linguistic and discourse conventions of written prose’ (p.36). Flower and Hayes (1984) propose a ‘multiple representation thesis’ to describe how writers move between the ‘languages’ of thought and the language of formal prose’ (Flower and Hayes 1984, p.120) – ‘as writers compose they create multiple internal and external representations of meaning’ (1984, p.122). This ‘current meaning’ is ‘an entity formulated in the writer’s working memory as she composes’, not the ‘larger, permanent knowledge structure stored in long-term memory’ (p.122), which ‘speaks many languages’ (p.129). Protocol analysis reveals the ‘building blocks of invention – the code words and associations that lead to new ideas, the raw materials from which inferences are drawn, and the implicit and tentative structures writers later develop’ (p.123). Invention is ‘not a logical, fully explicit, or even necessarily verbal journey’, but rather ‘appears to work by imagery, analogy, and schema as well as by the more familiar modes of concept, verbal convention, and word association’ (1984, p.129). Flower and Hayes write that ‘at different points during writing people choose
simply to think, at others to jot notes, to write outlines, or to produce prose’ (1984, p.129). The generating process is expected to produce ‘many single words, detached phrases, and incomplete sentences’, the organising process is expected to produce ‘material that is systematically indented, alphabetized, or numbered’, while the translating process is expected to produce ‘many complete sentences’ (Hayes and Flower 1980, p.22). Therefore, at different points in the process, writers ‘draw on a mix of visual, lexical, linguistic, and rhetorical knowledge’ (Flower and Hayes 1984, p.129), ‘nonverbal or imagistic representations, abstract knowledge networks, text-based representations, and finally, formal text representation’ (1984, p.130). With particular relevance to the use of diagramming and outlining tools and technologies (see section 2.5 below), Flower and Hayes advocate the use of multiple representations in planning:

Multimodal plans are extremely helpful to the writer because they allow great flexibility in writing. They allow the writer to plan simultaneously at several levels, from primary goals to particular phrasing (1984, p.145).

These plans are translated into prose as ‘the meaning of an abstraction is increasingly refined and tested when it is instantiated in a more specific form’ (1984, p.154). As writers move flexibly backwards and forwards between these multiple representations (1984, p.157), they are able to bring all of their cognitive processes to the task.

The final cognitive process in writing is reviewing, ‘which functions to improve the quality of the text produced by the translating process’ (Hayes and Flower 1980, p.12). This is also broken down into the further sub-processes of reading, in which
produced text is re-read and editing, in which appropriate changes are made. Taken together, planning, translating and reviewing comprise all of the necessary processes in writing from defining the rhetorical problem to editing the completed text.

The highest-level operator in Flower and Hayes’ model is the monitor, which orchestrates the recursive operation of the other processes. Although Flower and Hayes view writing as a ‘marvellously complex activity that allows writers great freedom of choice at many levels’ (Hayes and Flower 1983, p.207), contrary to the prescriptively staged process that is often taught, this freedom is constrained in various ways by the task environment and by the amount of relevant information in long-term memory. Furthermore, referring to Newell and Simon (1972), Flower and Hayes point out that ‘humans are basically serial processors and not well adapted to handling a large number of simultaneous demands on attention’ (Flower and Hayes 1980a, p.40). This is why ‘a great part of the skill in writing is the ability to monitor and direct one’s own writing process’ (Flower and Hayes 1980a, p.39). Hence the need for a monitor function:

  The monitor functions as a writing strategist which determines when the writer moves from one process to the next. For example, it determines how long a writer will continue generating ideas before attempting to write prose (Flower and Hayes 1981, p.374).

Therefore, the various writing processes are able to operate hierarchically with the monitor orchestrating the process.

Flower and Hayes (1980a) portray writing as a complex juggling act of different constraints. The major constraints that writers need to juggle are identified as the
‘demand for integrated knowledge’, the ‘linguistic conventions of written texts’ and
‘the encompassing constraints of the rhetorical problem itself’ (Flower and Hayes
1980a, p.34). Juggling these constraints is the main problem that writers face and
this is what necessitates the orchestration of a range of mental processes or
strategies, and the need for planning. Flower and Hayes (1981, p.371) write that
‘part of the drama of writing is seeing how writers juggle and integrate the multiple
constraints of their knowledge, their plans, and their text into the production of each
new sentence’. Within the drama of writing, Flower and Hayes (1980a) emphasise
planning as the ‘hero’ of the piece (against the ‘villain’ of constraints), since
planning in writing is an activity that integrates knowledge of the world, knowledge
of linguistic conventions and finally analysis of the rhetorical problem.

Flower and Hayes’ process model of writing has greatly influenced the evolution of
process writing as an instructional approach to writing as a complex, problem-
-solving activity. Many of the processes identified in this model, such as planning
(especially generating and organising), translating and revising (reading and editing)
are routinely taught in academic writing classes, although there are differences in
specific process writing models in terms of the terminology used to describe
particular processes and the way these processes are grouped. Flower’s influential
textbook *Problem-Solving Strategies for Writing* (1985) provides a further detailed
list of strategies or *heuristics* that can help writers to solve problems and reach goals.
Flower stresses that ‘heuristics – that is, efficient strategies or discovery procedures
– are at the heart of problem-solving’ (1985, p.36). The possession of such
strategies, which are defined as ‘internal, optional thinking techniques for getting to a goal’ (1985, p.27), is what makes the difference between good and bad writers. Efficient writers have ‘a great deal of knowledge and a large repertory of powerful strategies for attacking their problems’ (1985, p.3). Much of Flower’s textbook is concerned with outlining a range of efficient strategies that can be used or taught. These are presented as nine steps, each with its own sub-strategies:

**PLANNING**
- Step 1: Explore the rhetorical problem
- Step 2: Make a Plan

**GENERATING IDEAS IN WORDS**
- Step 3: Generate New Ideas
- Step 4: Organize Your Ideas

**DESIGNING FOR A READER**
- Step 5: Know the Needs of Your Reader
- Step 6: Transform Writer-Based Prose into Reader-Based Prose

**REVISING FOR EFFECTIVENESS**
- Step 7: Review Your Paper and Your Purpose
- Step 8: Test and Edit Your Writing
- Step 9: Edit for Connections and Coherence (Flower 1985, p.43)

Although these strategies are presented in a sequence, Flower emphasises the recursiveness of the process, in which efficient writers monitor and orchestrate the use of particular strategies, as necessary.

**2.3 Writing as Knowledge Transforming**

The idea of different kinds of knowledge interacting in the writing process was further developed in Bereiter and Scardamalia’s (1987) ‘psychology of written composition’. Bereiter and Scardamalia’s model was also largely influenced by
Newell and Simon’s problem-solving paradigm, particularly the concept of the problem space. In addition, the approach emphasises the importance of reflection: ‘starting from the notion of composing as a form of problem solving, and making use of Newell’s generalization of the concept of problem spaces … we may construct a more plausible model of reflective processes in writing’ (Bereiter and Scardamalia 1987, p.302).

In fact, Bereiter and Scardamalia’s work centres on the distinction between two models of composition, which they term knowledge-telling and knowledge-transforming. These two models are contrasted in terms of ‘natural’ and ‘problematic’ abilities (Bereiter and Scardamalia 1987, p.4). Bereiter and Scardamalia explicitly contrast their approach with Chomsky’s stress on natural mental faculties and emphasise that cognitive science needs to encompass both ‘a psychology of the easy and psychology of the difficult’ (Bereiter and Scardamalia 1987, p.4). Knowledge-telling is described as a model which ‘makes writing a fairly natural task’, because it makes ‘maximum use of already existing cognitive structures’ (Bereiter and Scardamalia 1987, p.5). In other words, according to this model, writers just tell what they know without thinking about the problems involved in this, a strategy that is associated with younger or novice writers. Knowledge-transforming, on the other hand, ‘makes writing a task that keeps growing in complexity to match the expanding competence of the writer. Thus, as skill increases, old difficulties tend to be replaced by new ones of a higher order’ (Bereiter and Scardamalia 1987, p.5). This model of writing is associated with
expert writers.

Figure 2.4: Structure of the Knowledge Transforming Model (Bereiter and Scardamalia 1987, p.12)

Drawing on Newell and Simon’s (1972) concept of problem spaces, Bereiter and Scardamalia conceive of composition planning as taking place in two types of problem spaces. The first is the content problem space, which is ‘made up of knowledge states that may be broadly characterized as beliefs’ (Bereiter and Scardamalia 1987, p.302). This is further described as ‘the kind of space in which one works out opinions, makes moral decisions, generates inferences about matters of fact, formulates causal explanations and so on’ (p.302). The second type is the
rhetorical problem space, which ‘is specifically tied to text production’ (p.302). Of this space, the authors write: ‘the knowledge states to be found in this kind of space are mental representations of actual or intended text – representations that may be at various levels of abstraction from verbatim representation to representations of main ideas and global intentions’ (p.302). Therefore, different operations take place in each of these spaces: ‘in the content space, problems of belief and knowledge are worked out. In the rhetorical space, problems of achieving goals of the composition are dealt with’ (p.12). Bereiter and Scardamalia point out that this distinction between two types of problem space is common to most cognitive descriptions of the composing process. In fact, schema theorists have also identified similar kinds of schemata which interact in problem-solving. Evensen (1996, p.100) writes that ‘one of the major insights of cognitive psychology was a notion of knowledge (both declarative and procedural) not as lists or directories of facts, but as something which is globally organized into “frames”, “scripts” or “schemata”, i.e. experiential clusters of facts, relations and procedures’.

The two different kinds of problem space are central to the knowledge-transforming model, since they are what enables writers to reflect on their writing. In fact, it is the interaction of these spaces that enables knowledge to develop. Bereiter and Scardamalia (1987, p.12) write that ‘the distinctive capabilities of the knowledge-transforming model lie in formulating and solving problems and doing so in ways that allow a two-way interaction between continuously developing knowledge and continuously developing text’. They add that ‘knowledge transforming involves a
parallel activity in two problem spaces, a content space and a rhetorical space, with interaction between the two spaces so that results obtained in one space may be translated into problems to be solved in the other space’ (p.299). Therefore, ‘the crucial difference between knowledge telling and knowledge transforming … lies in the problem-formulating and problem-solving activities associated with the latter’ (p.299).

Another important aspect of Bereiter and Scardamalia’s knowledge-transforming model is its emphasis on reflection. This is viewed as ‘a dialectical process by which higher-order knowledge is created through the effort to reconcile lower order elements of knowledge’ (p.300). As can be seen in Figure 2.5, Bereiter and Scardamalia (1987, p.299) view mature writing as ‘a back-and-forth or reflective process’. The interaction between the two problem spaces is explained in more detail, as follows:

The key requirement for reflective thought in writing, according to this model, is the translation of problems encountered in the rhetorical space back into sub goals to be achieved in the content space. For instance, recognition that a key term will not be understood by many readers gets translated into a call for a definition; search within the content space for semantic specifications leads to a realization by the writer that he or she doesn’t actually have a clear concept associated with the term, and this realization sets off a major reanalysis of the point being made (Bereiter and Scardamalia 1987, p.303). Therefore, the knowledge-transforming process results in ‘the joint evolution of the composition and the writer’s understanding of what he or she is trying to say’ (p.304). Knowledge-transforming is therefore a reflective process that evolves through the act of composing.
2.4 Contribution of the Cognitive-Constructivist Perspective to Understandings of Writing

A number of authors, including those critical of cognitive perspectives, have acknowledged the contributions of the cognitive process approach to understandings of how people write. According to Pea and Kurland, writing in the 1980s:

A paradigm shift has occurred – from viewing writing as an unanalysed holistic process to the widespread recognition that writing is a complex skill comprising distinguishable component activities such as planning, translating, reviewing, and monitoring. The tacit has been made explicit. Recent studies of different cognitive activities involved in writing seek to identify its basic component processes and how they are orchestrated or managed during the activities of writing (Pea and Kurland 1987, p.287).

Sharples (1996, p.139) also notes that the conception of ‘the writer as a problem solver, coping with the need to satisfy rhetorical demands, retrieve appropriate material from memory, and juggle multiple constraints’ has helped to clarify the writing process. According to Bizzell, two influential conceptions are of writing as recursive and as
The most influential arguments propounded in the Flower-Hayes model are, first, that the writer can ‘access’ the task environment and long-term memory and switch from one writing sub-process to another at any time while composing; in other words, the composing process is typically recursive, not linear. For instance, the writer does not plan first and, that done, go on to write without ever reconsidering her plans. Second, although there is no singly natural order in which composing activities do or should occur, there is a sort of natural relationship among them such that some activities are, or should be, subordinated to other activities; in other words, the composing process is typically hierarchical (1992, p. 185).

Pea and Kurland also suggest two further insights of the cognitive model:

Several important empirical findings come from using this model as a tool for observing the progress of writing activities: (1) writing processes are hierarchically organized; (2) the guidance of writing processes emerges from goal directedness; and (3) the goals of writing are epistemically reactive; that is, they are continually regenerated through what is learned during the writing process (Pea and Kurland 1987, p.292).

Pea and Kurland explain the epistemically reactive nature of goals in writing in terms of the way evolving goals ‘etch out a path for the composing process’ (Pea and Kurland 1987, p.292). Although this conception underlies the Flower and Hayes model, it is perhaps most directly embodied in Bereiter and Scardamalia’s knowledge-transforming model. The significance of this conception, according to Evensen (1996, p.94) is that ‘the old idea from classical rhetoric (and its derived pedagogies) that we formulate what we have first generated and organized is partially wrong’ because ‘through the writing process we also gain new insight’. As Hyland acknowledges:

Process approaches have had a major impact on the ways writing is both understood and taught, transforming narrowly conceived product models and raising awareness of how complex writing actually is. Few teachers now see writing as an exercise in formal accuracy, and most set pre-writing activities, require multiple drafts, give extensive
feedback, encourage peer review, and delay surface correction (2003b, p.17).

Finally, process approaches have also contributed to the development of writing tools and technologies.

2.5 Cognitive-Constructivist Perspectives on Writing Tools and Technologies

The cognitive process approach has influenced research into the affordances and limitations of different writing tools and technologies. Flower and Hayes’ process model has been cited by a number of researchers in this regard (Pea and Kurland 1987; Evensen 1996; Rossitto 2004) as providing an understanding of the basic processes involved in writing. A central claim in this research is that different writing processes can be either enhanced or restricted by different kinds of composing media.

Pea and Kurland (1987) refer to the Flower-Hayes model extensively in their investigation into writing technologies. This is because the model clarifies the component activities of writing that can be supported by ‘cognitive technologies for writing’, which ‘help a writer to develop the cognitive activities that are integral to the writing process’ (1987, p.278). However, Pea and Kurland adapt the model by adding a ‘Resources’ box to the task environment component. They explain this addition, as follows:

There are RESOURCES and TOOLS for writing, such as: teachers; books; index cards, and other reference materials; writing materials; and computer-based writing tools. We have taken the liberty of adding this box … in order to acknowledge the important role
of such prior externalizations of thought for creating new writing (Pea and Kurland 1987, p.291).

While such an addition could have taken their research into a different direction, Pea and Kurland emphasise its cognitive import:

It should be clear that we regard as the major issues surrounding the development of cognitive writing technologies those that focus on the person writing, not the technology per se…. While some human factors research is needed to better understand what ideal screen layouts, keyboard configurations, or command structures people can most easily or effectively use, the most important issues centre on what the developing writer knows or understands about writing, not the technology’s intrinsic capabilities.

The focus for Pea and Kurland is not writing technologies themselves, but the cognitive processes these tools and technologies afford. They write that ‘a particularly high research priority is the detailed investigation of developmental processes within and between various components of writing skills, and the specific roles different writing technologies can play in directly facilitating these processes’ (1987, p.314).

Finally, it is important to reiterate that such criticisms are essentially concerned with the developmental factors and particularly with the needs of inexperienced writers. As Pea and Kurland (1987, p.280) point out:

handing the novice a word processor is not enough. Such tools are opaque to the components of the writing process that studies of the psychology of writing have revealed. Most current computer writing tools are designed for skilled writers; they are more like production tools for being a writer than for becoming one.

Pea and Kurland add that ‘cognitive tools should provide developmental writing environments for continual “becoming”’ (1987, p.280). The focus of research into ‘the composing medium’ or ‘cognitive technologies for writing’, therefore, is on the
development of tools and technologies that can foster the writing process.

Much research into this question has been done by Haas (1996), whose central argument is that ‘material tools can shape mental processes’ (1996, p. 224), and that ‘by supporting one kind of physical activity rather than another, technologies can affect writers’ thinking processes in very real ways’ (1996, p.115). Haas (1996, p.74) defines planning as ‘a cognitively complex, reflective activity that is critical to successful writing’. Her research found that while the planning notes of writers were often ‘diagrammatic and nonlinear’ (1996, p.77), ‘conventional word processors have few devices for the creation and manipulation of outlines, diagrams, or other kinds of structural notes that writers find useful’ (1996, p.99).

Within the planning process, Flower suggests the use of issue trees to generate and organise ideas (see Figure 2.6). Flower (1985, p.95) defines an issue tree as ‘a sketch like an upside-down tree that puts your ideas in a hierarchical order’ (1985, p.95). Issue trees enable both the organisation and generation of ideas:

First, they let you sketch or test out your ideas and relationships as you write. At the same time, they let you visualize the whole argument and see how all the parts fit together. Issue trees can also help you to generate new ideas. A traditional outline, written before you start the paper, only arranges the facts and ideas you already know. An issue tree highlights missing links in your argument and helps you to draw inferences and create new concepts (Flower 1985, p.95).

So, as well as allowing writers to visualise their ideas and the relationships between them, issue trees allow them to spot the ‘missing links’ in their schematic representations and to fill the gaps with the necessary concepts. Flower (p.101)
summarises the usefulness of an issue tree as follows:

1. It is a flexible tool for thinking that develops as your ideas develop.
2. It helps you to visualize, organize and support the ideas you have.
3. It signals when you must stop to look for relationships and create new unifying ideas.

Issue trees are presented not as fixed structures but dynamic ones that ‘keep changing, reflecting your developing set of ideas’ (p.97) and that are therefore able to guide the composing process as it unfolds.

![issue tree example](image.png)

**Figure 2.6: Examples of ‘Issue Trees’ (Flower 1985, p.95)**

As Johns (1997) points out, such tools are now commonly used in academic reading and writing classrooms. In a discussion of the influence of ‘psycho-cognitive views’ and specifically schema theory, Johns refers to the widespread use of ‘schema-development exercises’ (1997, p. 11). Referring to the problems of ESL students who often do not share the same schemas as textbook authors, Johns writes:

> In many cases, particularly in ESL and EFL classrooms, schemata are not shared by
student readers and expert native-speaker writers; thus literacy instructors prepare students for the academic texts they will read (or write) by providing schema-development exercises. We often see prereading exercises in textbooks, such as semantic mapping, that develop and interrelate text vocabulary…. In semantic mapping, students are given a key word, such as ‘balloon’, from the title of the reading. Then they brainstorm about other words that might be related to the key word, constructing a ‘map’ in which ‘balloon’ is at the centre.

Johns also refers to the influence of schema theory on writing and, in fact, semantic mapping in connection with ‘brainstorming’ and other planning activities in academic writing classrooms. In many academic writing course books, such as the widely used Oshima and Hogue (1999), the technique of using diagrams to brainstorm, or ‘clustering’, is presented as an alternative to the free-writing or listing methods of generating ideas.

In the field of education more generally, a range of diagrammatic tools have been developed to promote thinking, following Novak and Gowin’s pioneering work with concept maps in the 1980s (see Figure 2.7). More recently, a number of writers have promoted the use of these tools to generate and organise ideas in research writing (Phelps, Fisher and Ellis 2007; Fraser 2006) and to analyse and summarise texts (Smith and Edwards 1997).

Not surprisingly, the development of concept maps and other ‘thinking tools’ shares similar origins to the cognitive process approach to writing. Novak (Novak and Gowin 1984; Novak 1998) refers to Ausubel’s theory of meaningful learning as the inspiration for the development of concept maps. The essence of this theory is that learning takes place on the basis of prior knowledge. Novak and Gowin (1984, p.40) quote Ausubel’s (1968) maxim that ‘the most important single factor influencing
learning is what the learner already knows’. There are clear parallels between this maxim and the principle in schema theory that the fundamental goal of instruction is to build on the knowledge existing in the mind in the form of schemata. In fact, Novak and Gowin (1984, p.15) define a concept map as ‘a schematic device for representing a set of concept meanings embedded in a framework of propositions’. As schemas and problem spaces develop, so do knowledge structures:

If we agree that memory is organized as a semantic network, then learning can be thought of as a reorganization of semantic memory. Producing semantic networks reflects those changes in semantic memory, since the networks describe what a learner knows. So, the semantic nets learners generate before and after instruction should reflect growth in their knowledge structures (1996, p.96).

In promoting semantic networks as tools for problem-solving, Jonassen also refers directly to Newell and Simon’s concept of the problem space. He writes that:

Problem solving requires the mental representation of the problem and its context. That is, human problem solvers construct a mental representation (or mental model) of the problem, known as the problem space (2004, p.7).
Jonassen emphasises that ‘the key to problem solving is how the problem solver represents the problem space, that is, how solvers represent or frame the problem to themselves’ (2004, p.59). The similar conceptions of knowledge representation and knowledge transformation in the cognitive process approach to writing and semantic networking can be explained by their common origins in cognitive psychology.

The proponents of concept maps in education emphasise the ability of these tools to help teachers and students to clarify and communicate their ideas. Novak and Gowin
explain the pedagogical value of concept maps, as follows:

Concept maps work to make clear to both students and teachers the small number of key ideas they must focus on for any specific learning task. A map can also provide a kind of visual roadmap showing some of the pathways we may take to connect meanings of concepts in propositions (1984, p.15).

Jonassen (1996), who refers to concept maps as ‘semantic networking tools’, clarifies their advantages further:

Semantic nets are spatial representations of ideas and their interrelationships. They enable learners to interrelate the ideas they are studying in multidimensional networks of concepts, to label the relationships between those concepts, and to describe the nature of the relationships among all of the ideas in the network (Jonassen 1996, p.93).

For Jonassen (1996, p.94), their purpose is to ‘represent the organization of someone’s ideas or the underlying organization of ideas in a content domain’.

Drawing on Ausubel’s learning theory and connectionism, Novak (1998) emphasises the ability of concept maps to promote meaningful learning (see Figure 2.8). The construction of concept maps helps learners to develop new ideas and relate them to what they already know:

Concept maps grow as concept labels are linked to one another to form propositions. New concepts can be acquired by concept formation or by concept assimilation, where the meanings for new concept labels are acquired when these labels are associated into propositions containing already known concepts (Novak 1998, p.40).

Novak stresses that ‘it is into our idiosyncratic knowledge frameworks that new knowledge must be assimilated’ (Novak 1998, p.52) and that ‘in the course of meaningful learning, new information is linked with concepts in cognitive structure’ (Novak 1998, p.59). Jonassen also promotes the use of semantic networks to engage ‘learners in an analysis of their own knowledge structures, which helps them to
integrate knowledge with what they already know’ (1996, p.95).

Jonassen emphasises the ability of semantic networks to mediate between different kinds of knowledge. He states that ‘semantic networks represent an intermediate type of knowledge, structural knowledge, which aids the articulations of declarative and procedural knowledge’ (1996, p.95). Jonassen defines declarative knowledge as knowledge that ‘represents awareness of some object, event, or idea (knowing that)’ (p.95). Declarative knowledge ‘enables learners to come to know, or define, ideas (verbal information or awareness), and forms the basis for thinking about and using those ideas’ (p.95). Procedural knowledge is defined as ‘the knowledge of how to solve problems, form plans, and make decisions and arguments’ (p.95). In fact, Smith and Edwards (1997), who advocate the use of concept mapping for reading and writing, draw a similar distinction between ‘content schemata’ and ‘rhetorical
schemata’. Content schemata are networks of ideas about the world, while rhetorical schemata are networks of ideas about ways of producing texts.

Jonassen postulates structural knowledge as ‘the knowledge of how the ideas within a domain are integrated and interrelated’ (p.95). It mediates between declarative and procedural knowledge and is ‘essential to problem solving and procedural knowledge acquisition’ (p.96). This is because ‘solving problems first and foremost requires understanding the domain concepts involved in the problem’ (2004, p.61). Semantic networks enable the representation of structural knowledge by representing the networks in memory. In fact, Jonassen (1996, p.96) equates structural knowledge with ‘cognitive structure, the pattern of relationships among concepts in memory’ or ‘the organization of the relationships among concepts in long-term memory’. Since semantic networks promote structural knowledge, they also promote understanding of the domain concepts and therefore enable learners to frame problems.

As introduced in the previous chapter, a range of visual tools has also been promoted as facilitating different kinds of thinking (see Figures 1.8-1.10). Following Flower and Hayes’ (1984) multiple representation thesis, these tools can support a range of cognitive processes in writing. Loosely structured tools such as ‘mind maps’ or ‘brainstorming webs’ correspond to generating processes in writing by representing ‘internal, mental, flexible, often quickly changing, and highly generative patterns’ (Hyerle 1996, p.10). Structured tools like graphic organisers facilitate organising and
can also enable students to identify the organisational patterns in the texts they read. Concept maps, which are able to represent complex relations of ideas through nodes and labelled links, enable the structuring and transformation of knowledge. The use of the full range of available tools enables multiple representations and therefore supports all of the processes in writing. Hyerle writes:

> With visual tools, students begin to visually integrate their own holistic forms with the tightly wound structures of information and thus interpret text. They begin to identify and then integrate their forms with the text as they naturally link information. Visual brainstorming webs, task-specific organizers, and thinking-process maps then provide a bridge between their own forms and the structures that are embodied in the text but hidden in the guise of linear strings of words (Hyerle 1996, p.15)

Taken together, cognitive-constructivist approaches to writing and to visual tools suggest the ways in which technologies such as Inspiration diagramming software can facilitate the entire writing process (see Figures 1.4-1.7).

### 2.6 Criticism of Cognitive-Constructivist Perspectives

Despite the acknowledgement of its contributions, the cognitive-constructivist perspective has been criticised on several grounds that are particularly relevant for research from sources. The major criticism is the neglect of the social context of writing, a perception of writing as the individual control of cognitive processes, essentially a private affair between the writer and his or her available strategies, rather than as an interactive, social practice. This criticism ultimately derives from a philosophical criticism of both the basic assumptions of cognitivism and the contradictions in its perspective on thinking, knowing and learning.
Perhaps the most basic assumption of cognitivism is that the mind is a complex organised unit. This assumption can be traced back to the analogy in the Cartesian theory of mind between mental mechanisms and physical mechanisms. This analogy has been most thoroughly demystified by Ryle (1963, p.28) who characterises Cartesianism as ‘the dogma of the ghost in the machine’. Mentalism is also rejected by Dewey, who writes that ‘it is heresy to conceive meanings to be private, a property of ghostly psychic existences’ (Dewey 1926, p.189). He also writes that ‘personally, I doubt whether there exists anything that may be called thought as a strictly \textit{psychical} existence’ (Dewey 1938, p.17, original emphasis) and adds that if there was such a ‘mental’ existence, it would be ‘irrelevant to the theory of inquiry’. In fact, both Dewey and Ryle reject attempts to hypostatise the mind as an entity in itself.

In his classic criticism, Ryle refers to this mentalistic, intellectualist approach to mind as the ‘para-mechanical hypothesis’, which he explains as follows: ‘As the human body is a complex organized unit, so the human mind must be another complex organized unit, though one made of a different sort of stuff and with a different sort of structure’ (Ryle 1963, p.20). A number of more recent writers, including Toulmin (1999) and Dennett (1993), have taken up this criticism. Toulmin provides the following account of the para-mechanical hypothesis:

\begin{quote}
Descartes (1968) framed his theory of knowledge to match his particular view of theoretical physics (or \textit{natural philosophy}, as it was then known) – a view of physics that was narrowly material, causal, and mechanical. Its counterpart was a view of human psychology (\textit{mental philosophy}) that was immaterial, logical, and calculative. For any human person, to \textit{be} is to \textit{think} and to think is to \textit{calculate}. During the 17th century, as a
\end{quote}
result, the new mechanical philosophers worked out an account of the physiological basis of mental life in general, and individual knowledge in particular, that banished the Mind inescapably into depths of Body (1999, p.61).

Toulmin also uses the metaphor of the ‘Mind as Theatre in the Head’ to describe Descartes’ model, as does Dennett, whose criticism of the idea that ‘somewhere, conveniently hidden in the obscure “centre” of the mind/brain, there is a Cartesian Theatre, a place where “it all comes together” and consciousness happens’ (1993, p.39), is strongly influenced by Ryle. Dennett writes that ‘once Descartes’ ghostly res cogitans is discarded, there is no longer a role for a centralized gateway, or indeed for any functional centre to the brain’ and that ‘there need be no time and place where “it all comes together” for the benefit of a single, unified discriminator; the discriminations can be accomplished in a distributed, asynchronous, multilevel fashion’ (1993, p.297). Furthermore, in Dennett’s view, just as there is no central ghost in the machine, nor are there any ghostly lieutenants, as cognitivism would have it: ‘the very idea that there are important theoretical divisions between such presumed subsystems as “long-term memory” and “reasoning” (or “planning”) is more an artefact of the divide-and-conquer strategy than anything found in nature’ (1993, p.39). The Flower-Hayes model with its mechanism of processes and subprocesses, all orchestrated by the monitor is a ‘complex organized unit’ that can be criticised along similar lines. This applies equally to Hayes and Flower’s use of protocol analysis to obtain a window on the hidden processes of writers and reveal the specific processes that efficient writers use:

Analysing a protocol is like following the tracks of a porpoise, which occasionally reveals itself by breaking the surface of the sea. Its brief surfacings are like the glimpses that the protocol affords us of the underlying mental process. Between surfacings, the mental process, like the porpoise, runs deep and silent. Our task is to infer the course of the
process from these brief traces (Hayes and Flower 1980, p.10).

The cognitive processes that surface and dive like a dolphin during protocol analysis of writers’ thought processes are reminiscent of the ‘hidden operations, impulses and agencies’, which Ryle (1963, p.25) flatly dismisses.

Similar criticisms have also been raised against the analogy between thinking humans and information processing systems or computers. Duffy and Cunningham (1996) refer to the Mind as Computer (MAC) metaphor that permeates conceptions such as ‘input and output’, ‘knowledge storing’ and ‘information processing’. In criticising such conceptions, Duffy and Cunningham refer directly to Newell and Simon’s problem-solving paradigm. They write that: ‘MAC assumes that the mind is an instantiation of a Turing machine, a symbol manipulation device’ (1996, p.176).

The assumptions of this view are fully explained as follows:

In this view, every cognitive process is algorithmic in the same sense that computer processes are algorithmic; that is, the mind works by processing symbols according to rules. These symbols are entirely abstract and independent of any given individual’s experience of them; i.e., the operation of the mind is completely independent of the person in whom it is contained.... Learning is a process of information acquisition, processing according to innate or acquired rules, and storage for future use (1996, p.176).

The mind as computer metaphor also permeates constructivist approaches to concept-mapping. Jonassen (1996, p.115) cautions that ‘semantic networks can be too readily thought to reify the structures of the mind, implying that our semantic stores of information can be cognitively mapped out and literally searched, just as a computer searches its memory stores’. Hyerle, however, (1996, p.xiv) refers to human minds as ‘data-generating, storing, and retrieval systems’. Novak’s approach
to concept-mapping is criticised by Schuh and Cunningham (2004, p.326):

Novak (1998) states he moves away from the information-processing framework in his latest work on conceptual maps, yet this move seems contradicted by the metaphor that is inherent throughout his writing. While he espoused a constructivist view, he continues to speak of the mind as a container to be filled…. A structural metaphor where information is transferred from one component to another remains, despite his protestations to the contrary.

Of course, the fundamental problem with the mind as computer metaphor is that people are not computers; human thought is not data processing.

One of the consequences of mentalistic approaches is the reduction of language and thought to universal, invariant processes. As Potter (2000, p.33) suggests, Cartesian reductionism is ‘epitomized in Chomsky’s discussion of competence and performance in linguistics’ in which ‘it is the (underlying) competence that is taken to be the proper topic for study, while the (surface) performance is treated as impossibly messy and anyway rather secondary’. Potter adds that ‘cognitivism has been organized around a metaphorical structure of this kind for at least three decades’ (2000, p.33). Chomsky’s ‘Cartesian linguistics’ is a mentalistic approach to language focused on the innate potential of the human mind to understand and produce language. Since he conceives of ‘linguistic competence’ as an innate faculty of mind common to all human beings, Chomsky reduces the study of language to investigations of competence, rather than performance. He writes that:

Linguistic theory is concerned primarily with an ideal speaker-listener, in a completely homogeneous speech community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of the language in actual performance (Chomsky 1965, p.3).
Potter (2000) gives an account of the exclusion of practices in psychology that is highly relevant for the study of language learning and writing. He writes that ‘by making cognitive processes and entities primary, and coupling that with experimental methods, it leads researchers away from the sorts of practices which people are taking part in with each other and to another realm entirely’ (2000, p.33). According to Potter, cognitivism inverts the social reality in which activity comes first and interpretation of reality and cognition derive from this: ‘activity (and in cognitivism this is still typically assumed to be the same as behaviour) is treated as something secondary; it is treated as the output of the system’ (p.33).

Although there are differences between Chomsky’s innatist approach to language and the problem-solving paradigm that has influenced cognitive approaches to writing (Bereiter and Scardamalia 1987; Simon and Kaplan 1989), similar reductionist tendencies can be seen. According to Bizzell (1992, p.94), Flower and Hayes’ approach to problem-solving focuses on ‘invariant’ thought processes:

Flower and Hayes see composing as a kind of problem-solving activity; what interests them are the ‘invariant’ thought processes called into play whenever one is confronted with a writing task. In other words, they assume that although each writing task will have its own environment of purposes and constraints, the mental activity involved in juggling these constraints while moving to accomplish one’s purposes does not change from task to task. This problem-solving thought process is the cognitive process of writing (1992, p.94).

Hyland (2003b, p.18) notes that ‘process approaches are what Bizzell (1992) calls “inner-directed,” where language use is the outcome of individual capacities and writing processes which are “so fundamental as to be universal”’. 
Another criticism of cognitivist perspectives is that they have retained an objectivist epistemology in which the world is mirrored in knowledge stored in the mind. Berlin claims that the cognitive perspective on writing has retained the positivistic epistemology of traditional rhetoric and that ‘for cognitive rhetoric, the structures of the mind are in perfect harmony with the structures of the material world, the minds of the audience, and the units of language’ (1988, p.480). He writes that ‘although the heuristics used in problem solving are not themselves rational, the discoveries made through them always conform to the mensurable nature of reality, displaying “an underlying hierarchical organization” that reflects the rationality of the world’. He adds that, ‘language is regarded as a system of rational signs that is compatible with the mind and the external world, enabling the “translating” or “transforming” of the non-verbal intellectual operations into the verbal. There is thus a beneficent correspondence between the structures of the mind, the structures of the world, the structures of the minds of the audience, and the structures of language’ (1988, p.483).

Cunningham describes this view of knowledge as ‘a set of epistemological assumptions that characterize knowledge as an abstract entity that is independent of the learner and that mirrors things in the external world’ (1992, p.167). He adds that cognitive science posits an ‘isomorphism’ between such constructs as ‘schema or semantic structures or problem spaces or connectionist networks’ and ‘the “real world”, an ontological inevitability and some natural unit’ (1992, p.167). Again with specific reference to Newell and Simon’s problem-solving paradigm, Duffy and
Cunningham write that:

Meaning is mapped onto these symbols via our experiences in the world. Our understanding of the world is formed from a process of interacting with, discovering reality ‘out there’ and transferring that understanding into the mind, forming internal representations that determine our subsequent interactions with the environment. Symbols (or concepts) derive their meaning from their capacity to match (to a greater or lesser extent) aspects of our reality. Any individual’s internal representation will certainly depart from reality, but it does seem necessary to assume that, in principle, there must exist a conceptual framework, which is entirely general and neutral, a single correct, completely objective way of representing the world (1996, p.176).

Similar criticisms can be raised against constructivist approaches to concept mapping, such as Hyerle’s statement that the ‘patterning capacity of the human brain is really much closer to the undulating, networked forms of matter we see in the interrelated, physical world’ (1996, p.11) and his reference to the ‘constructive linkages between the “inside” holistic mind and body and the “outside” world’ (Hyerle 1996, p.12).

One of the problems with this underlying objectivist epistemology, particularly in constructivist approaches to concept mapping, is that it appears to conflict with other emphases on the subjective, idiosyncratic thinking of learners. Novak (1998, p.52) states that ‘it is into our idiosyncratic knowledge frameworks that new knowledge must be assimilated’, while Hyerle (1996, p.2) describes visual tools as providing ‘new windows into the mindscapes of [his] students idiosyncratic thinking patterns’. Hyerle refers to knowledge as hidden in the recesses of the mind. He claims that with visual tools, students can ‘externalize and safely show their interrelated thinking patterns’, revealing ‘what was once internal, invisible, inaccessible’ (1996,
p.2). Not only do visual tools ‘generate and unveil mental models of interrelationships developed by learners, along with the unique patterning capacity of each learner’s mind’ (Hyerle 1996, p.10), but ‘we even use maps to rediscover information, ideas, and experiences lost in the recesses of our minds’ and ‘find our way to new information, much like an evolving treasure map of the mind’ (Hyerle 1996, p.11). Similarly, Atkinson notes that the process approach to writing sees the learner ‘almost wholly individualistically, “the” writing process as an abstract, internal process, and writing as a discovery-type activity, wherein what was being discovered was often at least partly “the self”‘ (2003a, p.4).

Another problem with objectivist epistemology is that it ignores the social aspects of writing. One of the focal points of Bizzell’s (1992) landmark criticism of the Flower-Hayes model is its neglect of the ‘social processes whereby language-learning and thinking capacities are shaped and used in particular communities’ (1992, p.77). Bizzell writes that the Flower and Hayes model ‘does not tell us how to proceed through the composing process’, but only that in proceeding, ‘there are certain sub-processes we must include if we want to compose successfully’ (1992, p.83). It presents ‘a description of how the writing process goes on as if it were capable of answering questions about why the writer makes certain choices in certain situations’ (p.83). She adds that ‘if we are going to see students as problem-solvers, we must also see them as problem-solvers situated in discourse communities that guide problem definition and the range of alternative solutions’ (1992, p.84). However, the cognitivist approach ‘treats problem-solving as an unfiltered encounter
with the underlying structure of reality’ that ignores the ‘necessary link between problem definition and interpretative communities’ (1992, p.93). Bizzell explains that to ‘define a problem is to interact with the material world according to the conventions of a particular discourse community; these conventions are the only source for categories of similar problems, operational definitions, and alternative solutions, and a conclusion can only be evaluated as “well supported” in terms of a particular community’s standards’ (Bizzell 1992, p.94). The consequence of the social construction of problem spaces is that ‘we cannot look at reality in an unfiltered way – “reality” only makes sense when organized by the interpretive conventions of a discourse community’ (Bizzell 1992, p.94). As Deely explains:

> There is no atomic structure to the world as such that words can be made to correspond to it point-by-point. Nor is there any structure at all to which words correspond point-by-point except the structure of discourse itself, which is hardly fixed, and which needs no such prejacent structure in order to be what it is and to signify as it does (1990, p.18).

The neglect of the role of language and discourse in shaping reality in cognitivist approaches is particularly problematic for research from sources, which is inherently linked to dialogue and discourse.

In fact, the neglect of the social aspects of writing is the major criticism that has been raised against mentalist and cognitivist perspectives. As Dewey writes, this is essentially a ‘failure to recognize that [the] world of inner experience is dependent upon an extension of language which is a social product and operation’ (Dewey 1926, p.189). Referring to process writing, Hyland writes that its ‘rich amalgam of methods collect around a discovery-oriented, ego-centred core which lacks a well-formulated theory of how language works in human interaction’ (Hyland 2003a,
p.18). He highlights a range of ‘problems posed by an approach uninformed by an explicit theory of how language works or the ways that social context affects linguistic outcomes’ (2003b, p.20). These problems, which include the lack of exposure to the features of specific genres, are the result of the reductionism inherent in the process approach: ‘because writing is a means of connecting people with each other in ways that carry particular social meanings, it cannot be only a set of cognitive abilities’ (Hyland 2003b, p.27). Atkinson (2003a, p.4) characterises the Flower and Hayes model as ‘an approach which neglected the whole domain of social conventionality – the highly complex, socially constructed, but taken-for-granted patterning of communication by which all human social groups enact efficient solidarity-maintaining social action’. Similar criticisms have also been made about the constructivist approach to learning. Kankunnen (2001, p.291), for example, writes that ‘Novakian concept mapping theory is based on individual constructivism, but we should never forget the importance of social interaction in learning’.

Attempts at developing a socio-cognitive theory of writing have not been entirely successful. Flower (1989, 1994), who has made the ‘most extended efforts to articulate a comprehensive sociocognitive theory’ (Cosgrove 1998, p.296), views literate action as a ‘socially situated problem-solving process’ (Flower 1994, p. 2). She advocates a ‘constructive, social cognitive pedagogy’ in which students ‘engage in a range of discourse practices (including finding and defining problems, arguing and proposing, explaining and applying reading in an attempt to solve problems or
take action)’ (p.29). In fact, Flower explicitly acknowledges the ‘logical fallibility’ of making a distinction between the ‘cognitive’ and ‘social aspects’ of literacy (p.30), but justifies this stance as enabling her to explore the tensions between the ‘elements that cluster around the poles of this cognitive social continuum’ (p.31). Despite this justification, Cosgrove argues that ‘Flower’s metaphor characterizing “writing as an ‘interaction’ between context and cognition” still creates a separation of the individual from the social sphere that is “not viable”’ (Cosgrove 1998, p.296, citing Brandt 1992, p.325).

Such criticisms raise questions about the potential of the cognitive-constructivist perspective to provide an adequate theoretical framework for the design of research writing programs. Although it gives a complex account of writing as problem-solving, it does not give an adequate account of how writers develop problems, generate new ideas and make decisions in disciplinary contexts. The next chapter investigates whether the sociocultural perspective can provide a more adequate account.
Chapter 3: A Sociocultural Perspective on Writing and Writing Technologies

In recent years, sociocultural perspectives on writing instruction and the use of educational technologies have emerged as a major rival to cognitive-constructivist perspectives. Sociocultural perspectives have had a major influence on genre-based approaches to writing instruction and on the use of portfolios as instructional tools (Johns 1997). They have also had a major influence on the development of teaching and learning environments that make use of educational technologies (Cobb 1994; Duffy and Cunningham 1996; Bonk and Cunningham 1998). This chapter critically evaluates the potential of sociocultural perspectives to inform the design of teaching and learning environments for research writing.

Unlike the cognitive-constructivist perspective, the sociocultural paradigm presented in this chapter is a complex construct that brings together a range of disciplines and perspectives. Prior (2006, p.54) writes that ‘sociocultural theory has multiple, tangled histories that produce a complex interdisciplinary territory and diverse terminology’ and Englert, Mariage and Dunsmore (2006, p.218) describe the paradigm as ‘a carrier of multiple complementary perspectives that are under constant construction in a dynamic tension’. The complexity of the paradigm is largely due to the way it has evolved. According to Prior (2006, p.56), ‘sociocultural theory has emerged out of three intensely interacting traditions: Marxism, pragmatics, and phenomenology’. As a result, it combines a ‘phenomenological
emphasis on making order in situated activity’ with a ‘cultural-historical and pragmatic emphasis on the production of mediational means, artifacts, and people as a way of understanding how culture comes to be embodied in practice’ (p.64). Other concepts that have influenced the broad sociocultural perspective presented in this chapter are Wittgenstein’s forms of life (Wittgenstein 1958; Swales 1990; Miller 1994) and language games (Wittgenstein 1958; Goodwin and Goodwin 1995) and Gibson’s concepts of affordances (Gibson 1979; Pea 1997; Kirschner, Martens and Strijbos 2004).

However, the main influence is the cultural-historical tradition in which the central figures are Vygotsky and Bakhtin (Wertsch 1991; Prior 2006, 2009). This sociocultural perspective focuses on mediated activity and collaborative social action. It ‘seeks to understand how culturally and historically situated meanings are constructed, reconstructed and transformed through social mediation’ (Englert, Mariage and Dunsmore 2006, p.208). In contrast to cognitivist perspectives, ‘rather than viewing knowledge as existing inside the heads of individual participants or in the external world, sociocultural theory views meaning as being negotiated at the intersection of individuals, culture and activity’ (Englert,Mariage and Dunsmore 2006, p.208). Insofar as it deals with cognition, it views cognition as situated in social practices and distributed across a range of interactive entities, meaning-making as mediated by signs, tools and social interaction, and genres as social processes involved in the construction of multi-generic texts. Prior writes that, from a sociocultural perspective:

Writing involves dialogic processes of invention. Texts, as artifacts-in-activity, and the
inscription of linguistic signs in some medium, are parts of streams of mediated, distributed and multimodal activity (2006, p. 58).

Within this perspective, the use of educational tools and technologies such as portfolios and diagramming software can be seen as multimodal means of meaning-making that can facilitate the social construction of texts.

3.1 Key Concepts from Vygotsky

The main influence on the sociocultural perspective presented in this chapter is Vygotsky (1978). In fact, Vygotsky’s concepts have influenced a number of fields relevant to the design of teaching and learning environments for research writing. These include writing studies (Bazerman 1998), genre theory (Johns 2003, Hyland 2003b), the study of writing technology (Hass 1996), constructivism (John-Steiner and Mahn 1996) and constructivist learning environments (Cobb 1994; Duffy and Cunningham 1996; Bonk and Cunningham 1998). These concepts include the idea of mediation, the zone of proximate development (ZPD) and the related concept of scaffolding, and the idea of internalisation.

The concept of mediated activity relates to the way in which human action is mediated by the use of signs and tools. According to Barab, Evans and Baek (2004, p. 200), the central notion of Cultural Historical Activity Theory is ‘the triadic relationship between the object of cognition, the active subject, and the tool or instrument that mediates the interaction’. The three components of mediated activity
(see Figure 3.1) are explained by Barab, Evans and Baek as follows:

the subject refers to the individual or individuals whose agency is selected as the analytical point of view ... the object refers to the goals to which the activity is directed. Mediating tools include artifacts, signs, language, symbols, and social others. Language, including nonword items like signs, is the most critical psychological tool through which people can communicate, interact, experience, and construct reality (2004, p.201).

Vygotsky further divides the tool component into two broad categories: ‘material tools, such as hammers or pencils, and psychological tools, such as signs and symbols’ (Barab, Evans and Baek 2004, p.201).

![Figure 3.1: The Basic Schematic of Mediated Activity as Developed by Vygotsky (Barab, Evans and Baek (2004, p.201)](image)

In fact, the concept of mediated activity rejects the Cartesian focus on the individual in favour of a complex ecology of agents, tools and artifacts. According to Wertsch, ‘the relationship between action and mediational means is so fundamental that it is more appropriate, when referring to the agent involved, to speak of “individual(s)-acting-with-mediational-means”’ (1991, p.12). He adds that ‘even when mental action is carried out by individuals in isolation, it is inherently social in certain respects and it is almost always carried out with the help of tools such as computers,
language or number systems’ (p.15). More recently, Prior writes that ‘mediated activity involves externalization (speech, writing, the manipulation and construction of objects and devices) and co-action (with other people, artifacts, and elements of the social-material environment) as well as internalization (perception, learning)” (2006, p.55).

The concept of internalisation refers to the way in which activities and practices learned on the social plane become internalised as part of the socialisation of individuals into particular societies and communities of practice. Through the internalisation of social practices, socialisation and individuation occur simultaneously. Bazerman (1997, p.305) writes that ‘socialization can be seen as a series of concrete tool/concept/artifact/mediation integrations into personal relations organized within activities’. However, Prior points out that ‘people are not only socialized (brought into alignment with others) as they appropriate cultural resources but also individuated as their particular appropriations historically accumulate to form a particular individual’ (2006, p.55).

Internalisation also plays a central role in learner development and the way in which new materials, practices and tasks are acquired. It is the process by which ‘each new set of cognitive practices is learned through social interaction, moving by internalization from the interpersonal plane to the intrapersonal’ (Bazerman 2009, p.42). Each new task is ‘first learned as a separate task to be mastered as an absorbing activity in itself, but as it becomes less of a focal challenge, it may interact
with other tasks and practices’ (Bazerman 2009, p.42). Eventually, ‘a new functional system of knowledge and thought has developed within which parts take on new significance’, in which the learned material becomes ‘more than the sum of its parts’, but is ‘rather added up, reorganized, and reintegrated at a different level’ and ‘seen in a different light’ (Bazerman 2009, p.42). The result is internalisation: ‘eventually, what was performed on the social plane of assisted performance is enacted on the intramental (individual) plane by the novice as the discourse and collaborative actions are turned inward to direct and assist the writer’s own performance’ (Englert, Mariage and Dunsmore 2006, p.209).

The concept of the zone of proximal development (ZPD) concerns the way in which the development of learners is scaffolded by the guidance of mentors and peers. Vygotsky defines the ZPD as ‘the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance with more capable peers’ (Vygotsky 1978, p.86). Bazerman (1997, p.305) gives an expanded definition of the ZPD as ‘the area that is beyond one’s full comprehension and mastery, but that one is still able to fruitfully engage with, with the support of some tools, concepts, and prompts from others’. In a later article, he clarifies the connection with internalisation, since it is in the ZPD that ‘the learner becomes familiar with the orientations, language, and practices in the domain, which at some point become familiar enough and internalized enough that they can be integrated into perception, thought, and activity, as well as the reformulation of capacities
already developed’ (Bazerman 2009, p.46). The ZPD is also closely associated with the metaphor of scaffolding, which as Dennen (2004, p.815) points out, was first used by Wood, Bruner and Ross (1976). Hyland (2003a, p.21) suggests that Vygotsky’s influence in education is due to his realisation that ‘learning evolves from verbal interaction and task negotiation with a more knowledgeable person, and the teacher has a central role in “scaffolding” this development’.

3.2 Bakhtin, Dialogue and Intertextuality

After Vygotsky, the most influential theorist in sociocultural theory is Bakhtin, whose concepts such as dialogism and intertextuality have also greatly influenced genre theory. For Bakhtin, ‘the fundamental unit of analysis is the “utterance”, rather than the word or the sentence’ (Freedman and Medway 1994, p. 6). On the one hand, Bakhtin viewed utterances as the unique products of individuals in particular contexts:

Speech can exist in reality only in the form of concrete utterances of individual speaking people, speech subjects. Speech is always cast in the form of an utterance belonging to a particular speaking subject (Bakhtin 1986, quoted in Wertsch 1991, p.50).

On the other hand, utterances are ‘socially defined, in terms of [their] relationship to other speakers’ (preceding and succeeding) utterances’ (Freedman and Medway 1994a, p.6). Individual utterances are always made in implicit or explicit dialogue with the utterances of others. As Englert, Mariage and Dunsmore write, ‘each utterance, oral or written, is influenced and shaped by prior conversations and utterances in which
speakers (writers) and listeners (readers) have taken part, as well as by the responses and utterances that are anticipated will follow’ (2006, p.216). Wertsch stresses not only the multiplicity of voices in speech, but also the tensions between past, present and future utterances:

Ultimately, an utterance reflects not only the voice producing it but also the voices to which it is addressed. In the formulation of an utterance a voice responds in some way to previous utterances and anticipates the responses of the other, succeeding ones; when it is understood, an utterance comes into contact with “the counter word” of those who hear it (1991, p.53).

As well as ‘ventriloquation’, or ‘the process whereby one voice speaks through another voice or voice type in a social language’ (Wertsch 1991, p.59), all utterances resonate with the ongoing sociohistoric contexts in which they are made. The dialogic character of utterances is just as evident in written texts as it is in speech. Englert, Mariage and Dunsmore write that:

writing is an inherently social and multivoiced activity, with text construction being distributed and negotiated among writers and readers. Dialogic and symbolic interactions fill the writer’s page with words (2006, p.216).

Prior points out that ‘written texts may be quite literally multi-voiced, the product of heterogeneous processes in which multiple texts and authors come to intermingle in a single text, even when it appears to have a single author’ (2001, p.68). Bazerman (2004) stresses the need for both readers and writers to ‘envision the intertextual world’ (p.63), in which ‘any text is a mosaic of quotations’ (p.54). He writes that:

enhanced agency as readers comes with noting how texts create social dramas of reference and sit in relation to the resources of prior and ambient text. Enhanced agency as writers grows with our ability to place our utterances in relation to other texts, draw on their resources, represent those texts from our perspective, and assemble new social dramas of textual utterances within which we act through our words. How we use other texts frames social organization, relation, and action within the world of textual
Promoting the ability to engage with the prior and ambient intertextual world is an important aspect of writing instruction, since ‘active engagement with texts and developing articulate responses and thoughts in relation to those texts [are] significant parts of the development of students’ educated and informed consciousness’ (p.60). Students need to envisage the texts they write within the ongoing sociohistoric context of intertextuality, since ‘developing a highly articulated picture of the ambient relevant texts can help the writer to define and even redefine the rhetorical situation, position the new text within larger organizations of textual utterances and activities, and bring deeper and richer resources to bear on the current task’ (p.61). In fact, for Bazerman, the ability to engage with the intertextual world is an essential quality of writing itself:

As linguistic creatures, humans are inevitably caught up in the social drama of unfolding webs of utterances, to which we add only our next turn. It is worth serious attention how we place that next turn, how we draw on the history of utterances before us, and how we draw ourselves close to or distance ourselves from those utterances. On such questions rests what we are able to do (2004, p.63).

Although such abilities are arguably essential to all writing, they are particularly vital within the metagene of research from sources.

Bakhtin’s concepts of dialogism and intertextuality have also influenced genre theory, as has his concept of speech genres. As Hyland suggests, as well as providing a dialogic, intertextual context for genre theory, Bakhtin’s work also helped to shape its focus on the typical texts that writers encounter:

One important assumption made by genre adherents is that writing is *dialogic* … both
because it presupposes and responds to an active audience, and because it involves a plurality of voices through links to other texts. Writing involves drawing on the texts we typically encounter and are familiar with (Hyland 2003b, p.23).

Bakhtin used the term ‘speech genres’ to refer to such typical texts, which range from greetings to political speeches and academic lectures. As Freedman and Medway write, ‘all our utterances … have definite and relatively stable typical forms of construction’ and ‘we speak only in definite speech genres’ (Freedman and Medway 1994a, p.6). In genre theory, Bakhtin’s concept of speech genres has been extended to the study of written genres, including the academic genres that research writers engage with and produce.

3.3 Other Influential Sociocultural Perspectives

Several other perspectives associated with the cultural-historical tradition have also influenced sociocultural approaches to writing, particularly activity theory, and the concepts of situated learning and distributed cognition. One of the most influential of these perspectives is activity theory (Engestrom 1999; Barab, Evans and Baek 2004), which overcomes several shortcomings of Vygotsky’s work. Barab, Evans and Baek (2004, p.201) suggest that Vygotsky’s two ‘critical shortcomings’ were his failure to fully articulate the concept of activity and his overemphasis on ‘the cognizing individual or individuals as the unit of analysis’. Engestrom’s activity theory expands Vygotsky’s basic model of mediated activity to include social components (see Figure 3.2). As Barab, Evans and Baek (2004, p.204) point out, instead of the cognising individual, Engestrom takes the ‘collective activity system’
as the unit of analysis, which provides an ‘organizing structure for analysing the mediational roles of tools and artifacts within a cultural-historical context’. For Engestrom, ‘mediation by tools and signs is not merely a psychological idea’ but ‘an idea that breaks down the Cartesian walls that isolate the individual mind from the culture and the society’ (1999, p.29).

Barab, Evans and Baek provide a useful explanation of the components of Engestrom’s model. Engestrom preserves elements of Vygotsky’s (1978) original model, since ‘the most basic relations entail a subject (individual or group) oriented to transform some object (outward goal, concrete purpose, or objectified motive) using a culturally-historically constructed tool (material or psychological)’ (2004, p.203). What distinguishes activity theory, however, is the addition of social components:

- the subject relates to the community via rules (norms and conventions of behaviour)
while the community relates to the object via division of labour (organization or processes related to the goal) and to the subject via rules.... It is the bottom part of the triangle (rule, community, division of labour) that acknowledges the contextualized nature of activity.

Rather than confining mediated activity to individual tool use, activity theory views learning as a ‘collaborative mediated action between individuals and objects of environment mediated by cultural tools and others’ (p.201). The unit of analysis is no longer limited to individuals but socially situated and distributed across a network of interactive agents.

Another approach that has evolved in connection with Vygotskian theory is situated learning (Lave and Wenger 1991; Henning 2004). This approach develops Vygotsky’s concept of the ZPD into a socially-oriented conception of apprenticeship or ‘legitimate peripheral participation’ in which learners learn by participating in social practices ‘through centripetal participation in the learning curriculum of the ambient community’ (Lave and Wenger 1991, p.100). To a certain extent, situated learning can be understood as a critique of cognitivism. Situated learning ‘rather than asking what kinds of cognitive processes and conceptual structures are involved’ asks ‘what kinds of social engagements provide the proper context for learning to take place’ (Lave and Wenger 1991, p.4). Within this approach, ‘meaning, understanding, and learning are all defined relative to actional contexts, not to self-contained structures’ contrary to ‘classical intellectualist theory’, in which ‘it is the individual mind that acquires mastery over processes of reasoning and description, by internalizing and manipulating structures’ (1991, p.15). Rather than assuming that ‘participation is schematized and that what is transported by the
effective learner is an expanded repertoire of participation schemata’ (1991, p.20), it is suggested that ‘participation is not schematized in any way, and that what the effective learner learns is how to actually do practices’ (1991, p.20). As Henning writes:

There are particular ways of knowing, or ways of learning, that emerge from specific (situated) social and cultural contexts. These situated sites of learning and knowing are imbued with a particular set of artifacts, forms of talk, cultural history, and social relations that shape, in fundamental ways, the conduct of learning (2004, p.143).

Henning (2004, p.165) stresses that ‘the apparent structure of people’s actions is an emergent product of their actions that takes place in a particular time and with particular people and is not the result of some sort of abstract computational process performed on symbolic representations that takes place apart from the lived world’.

Another influential sociocultural concept with roots in Vygotskian theory is distributed cognition. Paavola provides a useful introduction to the term:

Distributed cognition is an approach within cognitive sciences which emphasizes that human cognition is not confined to individuals and within individuals’ minds but is distributed in essential ways to surrounding physical, social, and cultural environments and to long-term temporal processes. It emphasizes social and situational aspects of cognition rather than mental constructions within the human mind (2006, p.7).

Pea (1997) suggests that the central claim of distributed cognition is that intelligence is distributed across minds, technologies and artifacts. Along with other proponents of this view, Pea opposes ‘conceptions of learning and reasoning that invoke “intelligence” as a property of the minds of individuals’ (1997, p.47). He writes that:

Knowledge is commonly socially constructed, through collaborative efforts toward shared objectives or by dialogues and challenges brought about by differences in persons’ perspectives. Intelligence may also be distributed for use in designed artifacts as diverse
as physical tools, representations such as diagrams, and computer-user interfaces to complex tasks (Pea 1997, p.48).

For Pea, distributed intelligence refers to ‘not only designed structures such as tools, control instruments, and symbolic representations like graphs, diagrams, text, plans, and pictures, but people in social relations, as well as features and landmarks in the physical environment’ (1997, p.48). In fact, for Pea, distributed intelligence underlies all intelligent human activity:

Anyone who has closely observed the practices of cognition is struck by the fact that the ‘mind’ rarely works alone. The intelligences revealed through these practices are distributed – across minds, persons, and the symbolic and physical environments, both natural and artificial (1997, p.49).

From this point of view, activities such as writing are not the work of solitary individuals, but intelligences that are distributed across writers and their peers, teachers or supervisors, as well as across texts, writing technologies, electronic databases and other tools and artifacts. For Pea, distributed intelligence refocuses education and training towards enhancing the meaningful activity that occurs in such contexts: ‘We should reorient the educational emphasis from individual, tool-free cognition to facilitating individuals’ responsive and novel uses of resources for creative and intelligent activity alone and in collaboration’ (Pea 1997, p.81).

Another account of distributed cognition, often cited alongside Pea, is Perkins’ (1997) metaphor of the person-plus. Perkins illustrates this idea with the simple example of a student with a good set of notes:

Most theories of learning would say that what the student has learned lies in his or her head. Whatever is in the notebook that is not also in the student’s head is not part of what the student has learned’ (1997, p.89).
For Perkins, however, the unit of analysis is ‘not the student without resources in his or her surround – the person-solo – but the person plus surround, or person-plus for short, in this case the student plus the notebook’ (1997, p.89). Here, as in Pea’s account, intelligence is distributed beyond the individual, since ‘this person-plus system has learned something, and part of what the system has learned resides in the notebook rather than in the mind of the student’ (1997, p.89). As a result, the concepts of person and mind are extended beyond the individual: ‘person-plus situations have emergent characteristics that substantially change the information-processing capacities of the system’ (1997, p.94). The person-plus, unlike the person-solo, is ecologically situated and multiple: ‘perhaps the person proper is better conceived not as the common core but the set of interactions and dependencies; not as the intersection but the movement of involvements; not as the pure and enduring nucleus but the sum and swarm of participations’ (1997, p.107).

With particular relevance to research writing, Perkins adds that ‘the distributed thinking and learning of the person-plus perhaps most comes to the fore in situations of authentic and extended inquiry’ (1997, p.93) and ‘genuine contexts of inquiry typically involve massive distribution of thinking and learning between the person and the surround’ (1997, p.105).

Bruner (1990) provides a useful summary of the Pea-Perkins perspective. He writes:

As Roy Pea, David Perkins, and others now put it, a ‘person’s’ knowledge is not just in one’s own head, in ‘person solo’, but in the notes that one has put into accessible notebooks, in the books with underlined passages on one’s shelves, in the handbooks one has learned how to consult, in the information sources one has hitched up to the computer, in the friends one can call up to get a reference or a ‘steer’, and so on almost
endlessly. All of these, as Perkins points out, are parts of the knowledge flow of which one has become a part. And that flow even includes those highly conventionalized forms of rhetoric that we use for justifying and explaining what we are doing, each tailored to and ‘scaffolded’ by the occasion of use. Coming to know anything, in this sense, is both *situated* and (to use the Pea-Perkins term) *distributed* (1990, p.106).

Bruner emphasises the sociohistorical dimension of this coming to know, in contrast to the spatial and temporal isolation of the ghost in the machine:

Selvies are not isolated nuclei of consciousness locked in the head, but are ‘distributed’ interpersonally. Nor do selves arise rootlessly in response only to the present; they take meaning as well from the historical circumstances that give shape to the culture of which they are an expression (1990, p.138).

In other words, ‘human beings do not terminate at their own skins, they are expressions of their culture’ (Bruner 1990, p.12). As Wertsch puts it (1991, p.14), the sociocultural perspective views mind as ‘something that “extends beyond the skin” in at least two senses: it is often socially distributed and it is connected to the notion of mediation’.

According to Pea, the concept of distributed intelligence demystifies the idea of individual primacy over social and technological factors. Referring to the boxes in the problem-solving model (see Figure 2.1), Pea writes that ‘as we begin to ask, “what is distributed in distributed intelligence?” the boxes begin to crumble, and more complex formations of activity emerge’ (1997, p.67). Pea identifies two emergent patterns. The first is that ‘different whole-component processes of the problem-solving model (e.g., problem finding or problem representation) may be distributed in the environment, tools or other persons’ (1997, p.67). The second is that ‘parts of a whole-component process may be distributed as social constructions
or as a result of processes of human-tool symbiosis (e.g., an outlining program and I work together to plan for text composition)’ (1997, p.67). For example, not only is “Planning a problem solution” ... often mediated by external representations such as written language in lists or charts, or in diagrams serving as qualitative models of the problem situation’, but also, in some cases, ‘applying the tool to the task is the needed action and planning becomes unnecessary’ (Pea 1997, p.68).

A major influence on such ideas is Hutchins’ (1995) famous study of the ‘cognitive ecology’ of navigation. The study demonstrates the ways in which ‘cognition is a fundamentally cultural process’ (1995, p.374) and the ways in which technologies can transform action. Much of Hutchins’ book describes the use of various kinds of navigational technology and he provides numerous examples of the interchangeable use of different navigational tools to solve problems, such as the use of either mental arithmetic, pen and paper, a calculator or a nautical slide rule to calculate distance-rate-time ratios (1995, p.147). A central point is that many actions can be carried out either ‘internally’ or ‘externally’, by a variety of methods. Hutchins writes that ‘every argument showing why a particular tool is easy to use is also an argument showing why both internal and external tools are part of the very same cognitive ecology’ (1995, p.114). Along similar lines is Perkins’ equivalent access hypothesis. In his example of the student with a notebook, Perkins writes that ‘if, for example, the student can access ideas in that notebook ... fairly easily, having organized it so well, what does it matter whether the ideas lie inside or outside the student’s cranium’ (1997, p.90). The only important factor is whether a particular tool or
method gets the job done easily: ‘the litmus to be applied is function – a matter of
the access characteristics of the information – not locus – a matter of which side of
one’s skull hosts the information’ (1997, p.90).

A further aspect of Hutchins’ account of distributed cognition is the way in which
technology transforms activity. With particular relevance to cognitive approaches to
technology, Hutchins writes that ‘it has now become commonplace to speak of
technology, especially information processing technology, as an amplifier of
cognitive abilities’ (1995, p.130). On the contrary, his own observations show that
‘rather than amplify the cognitive abilities of the task performers or act as intelligent
agents in interaction with them, these tools transform the task the person has to do
by representing it in a domain where the answer or the path to the solution is
apparent’ (1995, p.130). In other words, tools and artifacts ‘transform the nature of
the work that can be done with them and change the cognitive requirements of doing
that work’ (1995, p.161), generally making complex actions easier. Artifacts
function in a similar way. In the case of many navigational artifacts, which often
also function as tools, the structure of these artifacts is such that ‘the required
computations can be achieved by simpler cognitive processes in interaction with
these artifacts than by the method they replace’ (1995, p.160). However, the use of
tools and artifacts is not always easy and one of the consequences of ignoring the
role of technologies and artifacts is that ‘if we ascribe to individual minds in
isolation the properties of systems that are actually composed of individuals
manipulating systems of cultural artifacts, then we have attributed to individual
minds a process that they do not necessarily have, and we have failed to ask about the properties they actually must have in order to manipulate the artifacts’ (1995, p.173).

Another influence on sociocultural theory that is often mentioned in connection with distributed cognition is Gibson’s concept of affordances (1979). Gibson explains the concept as follows: ‘the affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill’ (1979, p.127). He also adds the following qualification:

An important fact about the affordances of the environment is that they are in a sense objective, real, and physical, unlike values and meanings, which are supposed to be subjective, phenomenal, and mental. But, actually, an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behaviour. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer (1979, p.129).

Pea (1997) interprets the concept of affordance within educational environments, defining it as ‘the perceived and actual properties of a thing, primarily those functional properties that determine just how the thing could possibly be used’ (Pea 1997, p.51). He explains its importance for the theory of distributed intelligence as follows:

For many of the hoped for goals of education, we presuppose the success of the social constructability of affordances — that one can get a learner to attend to the pertinent properties of the environment, or the designed object, or the inscriptive notations, such that the learner can join in to contribute to distributed intelligence in activity. For a given activity, and the various means for its achievement, there can be considerable variation in the ease with which one can show a learner how to exploit those means to form a system
of distributed intelligence for achieving that task. This will vary with the learner’s background experiences, the obviousness of the mapping between the learners’ desire or goal, and the assimilation of the artifact as means towards it (1997, p.52).

Educational affordances need to be socially constructed in a way that enables learners to assimilate the distributed intelligence that underlies the use of technologies and artifacts. As Pea writes, ‘thoughtful, innovative technological resources that afford great opportunities for higher order kinds of thinking and learning in a domain do not in themselves necessarily provide cognitive scaffolding’ (1997, p.103). In this regard, Norman (1999, p.2) stresses the need to distinguish between ‘real affordances’, ‘perceived affordances’ and ‘cultural conventions’. He writes:

Affordances reflect the possible relationships between actors and objects; they are properties of the world. Conventions, on the other hand, are arbitrary, artificial and learned. Once learned, they help us master the intricacies of daily life, whether they be conventions for courtesy, for writing style, or for operating a word processor (1999, p.6).

Not only do learners require training in the use of particular technologies in order to perceive their affordances, but they also need to be familiar with the cultural conventions that might inform their use in particular contexts.

A related perspective that has also had some influence is Goodwin’s work on ‘professional vision’, or the ability of practitioners to see meaningful events in situated practices. For Goodwin (1994; Goodwin and Goodwin 1995), ‘the ability to see a meaningful event is not a transparent, psychological process but instead a socially situated activity accomplished through the deployment of a range of historically constituted discursive practices’ (Goodwin 1994, p.606). He stresses that
‘such vision is not a purely mental process but instead is accomplished through the competent deployment of situated practices in a relevant setting’ (1994, p.626).

Goodwin and Goodwin show that professional vision is not based on ‘isolated, individual acts of perception but instead functions much like moves in the socially situated forms of life that Wittgenstein … calls language games’ (1995, p.69).

Activities like writing always occur in social contexts and these contexts largely determine the meanings that are made.

Another important insight from Goodwin’s work is the importance of the visibility of artifacts. This aspect of his work is emphasised by Henning (2004, p.145), who characterises situated learning as ‘a perspective on learning that views learning as social at its base, that involves a dialectical production of individual and group entities, and is mediated in its particulars by semiotic resources that are diverse in their structure, are physical and not mental, and meant for display’. In fact, the visibility of artifacts is essential, since professional vision relies on ‘devices for seeing’ that include ‘texts, diagrams, formulas, models and an infinite variety of other artifacts that are used to produce representations of the world at hand in everyday practice’ (Henning 2004, p.159). Henning points out the differences between this approach and the cognitive approach: ‘the locus of interest in the field of study of cognition has shifted dramatically in recent years from internal structure and mental representations that must be inferred through protocols and tests to representational practice as a material activity that leaves material traces in sound and artifact creation’ (2004, p.162). Goodwin and Goodwin explain the difference,
as follows:

Much research into the organization of linguistic and other cognitive processes has made inferences about the information-processing strategies being used by actors. Characteristically, these processes are conceptualized as occurring inside the mind, and thus are inaccessible to direct observation. By looking at how tools in a working environment are deployed to answer a query, we can investigate the articulation of relevant information, and the representations that encode that information, as accessible, visible phenomena (Goodwin and Goodwin 1995, p.77).

In fact, the importance of tools and artifacts in the Goodwins’ work shows that the social factors in communities of practice are inextricably linked to the technologies on which many human endeavours, including writing, rely. Henning writes that:

The key point in studying the artifacts … produced in specific activity systems by members of a community of practice is to reveal the interpretive processes used by members to make sense of what is going on. When learning is seen from a participation metaphor … the movement into full participation depends fundamentally on being able to read the representations that are socially produced for common display. The situated interpretive practices that are used are learned practices. As Charles Goodwin … has pointed out, these interpretive practices operate in similar ways across many settings for learning (Henning 2004, p.165).

As Goodwin writes, ‘insofar as these practices are lodged within specific communities, they must be learned’ (1994, p.626).
3.4 Sociocultural Approaches to Writing Instruction and Schools of Genre

Theory

The sociocultural perspective on writing has led to the development of particular pedagogical approaches to writing instruction. Englert, Mariage and Dunsmore (2006, p.209) identify three pedagogical principles of sociocultural theory as ‘(1) sociocognitive apprenticeships in writing; (2) procedural facilitators and tools; and (3) participation in communities of practice’. The first principle is to establish ‘cognitive apprenticeships that support novices in the participation of a discipline, including the acquisition of the discourse, tools and actions’ (2006, p.209). In contrast to the emphasis on the role of the writer in cognitive process approaches, sociocultural approaches tend to emphasise the role of the teacher in using ‘multiple semiotic systems to orchestrate the composition process to support writers’ (2006, p.209). The second principle is the use of signs and tools as procedural facilitators for learning. Englert, Mariage and Dunsmore (2006, p.209) write that ‘compatible with Vygotsky’s thinking, procedural facilitators offer semiotic tools that enable teachers to make visible the character of the particular text forms, the strategies and procedures that underlie the text’s construction and revision, and the discourse structures and language practices that permit writers to realize their writing goals’. They add that ‘tools include a variety of mental, linguistic, and physical devices used to enhance writers’ performance, including notational systems, writing symbols, instruments, diagrams, graphic organizers, text structures, mnemonics, writing implements, procedures, rules of thumb, grammar and spell checkers, and
any tool used in the transformation and construction process’ (p.211). Such tools ‘support cognitive performance by helping writers to organize mental reasoning by offloading aspects of thought or functions onto the tool, and by making elements for the activity more visible, accessible and attainable’ (p.211). The effective use of semiotic resources is essential to writing instruction: ‘effective teachers create spaces to make available to students the full range of semiotic tools and discourses in constructing written texts’ (p.209). The third principle is the movement from scaffolded apprenticeship to full participation in communities of practice. Englert, Mariage and Dunsmore continue that:

Sociocultural theorists emphasize the importance of the provision of coparticipation and guided practice as a prominent feature in activity settings where expertise is distributed, practiced and shaped in order to produce a common product or artifact. What begins as a teacher-centred discourse in authentic writing activity is succeeded by an interactive and collaborative discourse in which mental activity is distributed and shared between the teacher and student participants (2006, p.209).

Such pedagogical principles have greatly influenced more specific approaches to writing instruction, including the various approaches to genre, particularly, as we shall see, in the North American School.

In fact, aspects of the sociocultural perspective have had a major influence on two of the three commonly recognised schools of genre. These schools are the EAP or ESP school associated with the work of Swales; the Australian school associated with Halliday’s functional systemic linguistics; and the North American or New Rhetoric school (Johns 2003; Hyland 2003b). The Australian and North American schools have both been greatly influenced by sociocultural theory, although in quite different
ways. The EAP and Australian schools have had the greatest influence on writing instruction in this country; the North American school less so (Hyland 2003b, p.22). In fact, the differences between these schools, and the various perspectives within them, highlight some of the tensions within sociocultural theory itself.

Research writing instruction in Australia has been greatly influenced by the field of English for Academic Purposes and so-called EAP approaches to genre, particularly that of Swales (1990; Swales and Feak 1994). The focus of this approach is on socialisation into the academic community, with a ‘primary focus on academic discourse genres and the range and nature of academic writing tasks’ (Silva 1990, p.17). A key concept in EAP approaches to genre is the discourse community.

Swales explains discourse communities and their connection to genre, as follows:

Discourse communities are sociorhetorical networks that form in order to work towards sets of common goals. One of the characteristics that established members of these discourse communities possess is familiarity with the particular genres that are used in the communicative furtherance of these goals. In consequence, genres are the properties of discourse communities; that is to say, genres belong to discourse communities, not individuals, other kinds of grouping or to wider speech communities (Swales 1990, p.9).

Within this context, Swales gives the following definition of genres:

A genre comprises a class of communicative events, the members of which share some set of communicative purposes. These purposes are recognized by the expert members of the parent discourse community, and thereby constitute the rationale for the genre. This rationale shapes the schematic structure of the discourse and influences and constrains choice of style and content (Swales 1990, p.83).

In fact, a key premise of the EAP approach is the existence of particular generic forms or schemas that are associated with particular discourse communities. Swales writes that:
The acquisition of genre skills depends on previous knowledge of the world, giving rise to content schemata, knowledge of prior text, giving rise to formal schemata, and experience with appropriate tasks. Thus the teaching of genre essentially involves the development of acquisition-promoting text-task activities (1990, p.9).

Referring to the more individualistic concept of schema in cognitive approaches, Johns (1997) emphasises the need to expand ‘the concept of schemata to include not only the reader’s and writer’s prior knowledge of text content and form but of the situations and the communities for which texts from a genre serve identified purposes’ (Johns 1997, p.16). However, the notion of discourse communities has been criticised for assuming greater conventionality of practice than actually exists. As Prior points out, discourse communities are ‘complex spaces shot through with multiple discourses, practices, and identities’ (2003, p.2).

A more fundamental problem with the EAP genre approach for research from sources is the fluidity of genres in this metagenre. The EAP approach tends to assume the existence of well-defined communities of practice and generic conventions. Throughout their treatment of research papers, Swales and Feak (1994) make the assumption that students will be using the conventional IMRD format (Introduction, Methods, Results, and Discussion), which is typically used in the metagenre of empirical research, but not in the metagenre of research from sources (see Carter 2007). In fact, as Larson (1982) argues, there is no standard model of the kind of ill-defined research paper that is commonly produced in this metagenre. Larson writes that ‘the so-called “research paper”, as a generic, cross-disciplinary term, has no conceptual or substantive identity’ (Larson 1982, p.813), since it can vary considerably from one context to another and that ‘by saying that we teach the
“research paper” – that is, by acting as if there is a generic concept defensibly entitled the “research paper” – we mislead students about the activities of both research and writing’. Such comments suggest the need for instruction in research from sources to focus on more elemental aspects of the construction of research papers in this metagenre.

The Australian or Sydney School of genre, which has also influenced the fields of EAP and research writing instruction, offers such an elemental approach. As Johns (2003, p.201) writes, the school has focused on ‘identifying and analysing ... common, “elemental” genres’, which overlap with many of the ‘methods of exposition’ or rhetorical patterns of traditional rhetoric. Rather than the description of generic schemas associated with particular discourse communities, it stresses the ‘purposeful, interactive, and sequential character of different genres and the ways language is systematically linked to context through patterns of lexico-grammatical and rhetorical features’ (Hyland 2003b, p.22).

In addition to Halliday’s systemic functional linguistics, the Australian school was influenced by Vygotsky’s concept of the Zone of Proximal Development (ZPD), as well as the notion of scaffolding (see Hyland 2003a, 2003b and Johns 2003). Hyland writes that the goal of the approach is to ‘explore ways of scaffolding students’ learning and using knowledge of language to guide them towards a conscious understanding of target genres and the way language creates meanings in context’ (2003b, p.21). Hyland acknowledges that ‘the theoretical underpinning of this
approach is provided by Vygotsky’s … emphasis on the interactive collaboration between teacher and student, with the teacher taking an authoritative role to “scaffold” or support learners as they move towards their potential level of performance’ (Hyland 2003b, p.26). As shown in Figure 3.3, the provision and gradual reduction of scaffolding facilitates the learner’s passage through the ZPD towards his or her full potential:

![Diagram showing scaffolding and learner progress](image)

**Figure 3.3: Teacher-Learner Collaboration (Hyland 2006, p.92)**

As shown in Figure 3.4, students are guided in the comprehension and construction of particular genres through a ‘genre-based cycle of teaching and learning’, that ‘supports, or “scaffolds”, the learner through an interactive process of analysis, discussion, and joint and individual construction of texts’ (Johns 2003, p.203).

However, one criticism that has been made about the Sydney school is a tendency towards prescription. Johns notes a number of possibilities for misuse of this approach, including the possibility that ‘novice or untrained teachers might portray
genre descriptions ... as rigid text templates rather than as ways to begin the discussion of how texts, language, form, and social forces interact, thus returning to the “traditional” theories that were common more than 30 years ago’ (Johns 2003, p.204) and the possibility that the importance of process will be forgotten altogether.

In reaction to the prescriptive nature of the teaching learning cycle of the Sydney School, Callaghan, Knapp and Noble (1993, p.192) propose ‘a more flexible concept that views genre not as an end product, but as the process that produces text types – a dynamic interaction of social participants and appropriate generic resources’. They explain the advantages of the approach as follows:

This approach enables the teaching-learning of language to be a dynamic social process that encourages the development of creative and independent writers. Rather than thinking of genres as things to be replicated, such as reports, procedures and discussions, they become processes to be thought through, for example, describing, explaining and

Although Knapp and Watkins (2005, p.26) identify a ‘core set of generic processes’, such as describing, explaining, instructing, arguing and narrating, they use the gerundive form (e.g., describing) to emphasise that generic processes are ‘social processes’ that are commonly used in a range of ‘text types’. They also point out that various generic processes are often combined in ‘multi-generic products’, such as research papers (see Figure 1.11).

The North American genre school, which is also strongly influenced by sociocultural theory, complements this approach by exploring the relation between social processes, texts and the activity and genre systems that give rise to them. Hyland (2003b, p.22) writes that ‘New Rhetoric, with its emphasis on the socially constructed nature of genre, has helped to unpack some of the complex relations between text and context and the ways one reshapes the other’. As Bazerman (2009, p.41) writes, Vygotsky’s influence also permeates this approach: ‘the connection between Vygotskian sociocognitive theory and genre theory has been implicit in almost all the work from the North American Genre theory perspective’. However, rather than the ZPD and the notion of scaffolding, the approach builds more on other Vygotskian concepts such as mediated activity. The New Rhetoric school views writing as ‘situated in concrete interactions that are simultaneously improvised locally and mediated by prefabricated, historically provided tools and practices’ (Prior 2006, p.55, original italics). It is a complex social and multimodal activity that is mediated by signs, tools and artifacts on various levels.
In addition to mediated activity and the concept of activity systems, the North American school draws on other theoretical influences such as Wittgenstein’s concept of ‘forms of life’. A seminal article that attempts to situate genre within broader contexts of social action is Miller (1994). Miller writes that ‘genres are provided interpretive context by form-of-life patterns and are constituted by intermediate forms or strategies, analogous to the dialogic episode’ (1994, p.35). As can be seen in Figure 3.5, Miller proposes that genres can be located on a hierarchy of meaning that bridges human nature at the social end of the spectrum and individual experience at the other:

- human nature
- culture
- form of life
- genre
- episode or strategy
- speech act
- locution
- language
- experience

**Figure 3.5: Miller’s (1994, p.35) Hierarchy of Meaning**

Other proponents of the school have built on Miller’s conception and connected it with the idea of activity systems. Bazerman (1994, p.1) writes that genres are ‘forms of life, ways of being, frames for social action’ as well as environments for teaching and learning. Russell stresses that genres are ways of action, rather than textual forms:

Genres can be defined, following Miller … as typified ways of purposefully interacting in and among some activity system(s). Genres are not merely texts that share some formal features; they are shared expectations among some group(s) or people. Genres are ways of recognizing and predicting how certain tools (including vocalization and inscriptions), in certain typified – typical, recurring – conditions, may be used to help participants act
Rather than discourse communities providing a stable context for such activities, it is the re-enactment of genres that perpetuate discursive practices:

As ‘forms of life’, genres and the activity systems they operationalize (temporarily) are regularized or stabilized through routinized tool-use within and among (sub) groups. The context is an ongoing accomplishment, not a container for actions and texts. The behaviour of individual writers/subjects is constantly re-created through the specific actions of people together (1997, p.513).

Although forms of life provide an interpretative context for genres, it is the ongoing accomplishments of individual writers in concretely situated activity systems that shape this context.

Another key concept in the North American School is Bazerman’s (1994) notion of genre systems. Bazerman variously defines genre systems as ‘interrelated genres that interact with each other in specific settings’ (1994, p.97); as ‘the sequence of texts that have led up to and formed the current rhetorical situation’ (Bazerman 2004, p.61) and as ‘the entire range of relevant documents that can be brought to bear or used as a resource for a current document’ (2004, p.63). He uses the genre system around written assignments to describe the interaction of interrelated genres:

Handouts in college classes describing written assignments are typically followed by questions and answers about the constraints of assignments, advisable procedures and the appropriateness of various ideas for projected papers. Then if all goes according to plan student papers, following the generic constraints established by the handout, are handed in. Then teacher marginalia is returned, concluding in some evaluation encapsulated in a grade (1994, p.98).

In a later account, he expands on the description to include the ‘course syllabi and assignment sheets, assigned course readings, books cited in class lectures, and prior
papers [that] have led up to the paper that is to be handed in tomorrow’ (Bazerman 2004, p.63). Prior gives an even more comprehensive account of genre systems:

A classroom includes the genres produced by the teacher (lecture, discussion, e-mail responses to students, blackboard notes, the syllabus, written assignments, responses written on or to students texts, course descriptions, grades), the genres produced by the students (notes on class interactions, marking and notes on readings, e-mail questions or contacts with the instructor and/or other students, drafts of papers, final papers, etc.) [and] disciplinary genres (articles, books websites) (2006, p.62).

Hyland (2006, p.56) provides a diagrammatic account of the academic assignment genre system (see Figure 3.6). The important point is that rather than being isolated texts, genres such as the academic assignment include ‘the full interaction, the full event … the set of social relations as it has been enacted’ (Bazerman 1994, p.99).

![Figure 3.6: The Genres Involved in Writing an Academic Assignment (Hyland 2006, p.56)](image)

Within the sociocultural perspective of the North American School, the concept of genre systems is closely connected with activity systems and the dialogic nature of written activity. According to Prior (2006, p.62) genres ‘coalesce into systems, with typified and dialogic chains (e.g., the teacher’s assignment prompts the student to write a text, which occasions the teacher’s response and a grade entered on a
computer sheet sent to the registrar for inclusion in the official transcript)’ and ‘as
the chain of genres grows, it implicates multiple activity systems’ (Prior 2006, p.62).
Hyland also relates the way in which ‘genres are loosely arrayed in a network as
each interacts with, draws on, and responds to another in a particular setting’ to
Bakhtin’s concept of intertextuality and ‘the fact that every utterance reacts to other
utterances in that domain’ (2006, p.56).

Finally, the North American school also emphasises the non-linguistic aspects of
writing activity. It sees writing as an activity that ‘happens in moments that are
richly equipped with tools (material and semiotic) and populated with others (past,
present, and future)’ (Prior 1998, p.xi) and ‘involves signs-in-use (linguistic or non-
linguistic) that are concrete, historical, and dialogic, signs formed out of the
materials at hand and in relation to historical chains of sign use (Prior 2006, p.55).

Bazerman writes:

> By identifying how representations realized within speech acts are interactive with and
accountable to other representations within the generic system and states of affairs that
extend beyond discourse but drawn into the discourse at various junctures in the system
of generic activity, we can see how our discursive activity is bound to the symbolic and
non-symbolic environment (Bazerman 1994, p.99).

As a result of this attention to the material as well as semiotic tools, to the non-
symbolic as well as the symbolic environment, the North American school connects
with sociocultural perspectives on writing technologies.
3.5 Sociocultural Perspectives on Writing Technologies

Sociocultural theory has also influenced perspectives on writing technologies, such as that of Haas (1996), who develops an approach that is largely influenced by Vygotsky’s concept of mediated activity. Haas criticises the treatment of technology in cognitive approaches to writing, particularly the Flower-Hayes model: ‘the model treats technology as transparent: Material tools and artifacts only enter into the model in the most tangential of ways’ (Haas 1996, p.38). In particular, she criticises the cognitive process model for its neglect of the tools and artifacts that enable or constrain the process of composing:

there seems to be little cognizance that writers live and work in a material space, creating material artifacts using material technologies. The notion that these material constraints might impinge in some way on the process of composing, which these theorists seek to examine, is not acknowledged (Haas 1996, p.39).

As an alternative to other approaches, including cognitive theories of writing, Haas proposes that technology studies should be based on the notion of embodiment. She writes that ‘a computer is best understood – as is any technology – as a complex of objects, actions, people, motives, and uses’ (1996, p.32), that is ‘tied to the practical action of the human life world in which it is embedded’ (1996, p.xii). This is because ‘cultural tools and cognitive activity constitute one another in a symbiotic relationship, and this symbiotic relationship is based in the embodied actions of human beings’ (Haas 1996, p.xiii). For Haas, this approach avoids the pitfalls of overemphasising either cultural practices or the individual: ‘the notion of embodiment can provide a necessary corrective to accounts of writing that
emphasize the cultural at the expense of the cognitive, or that focus on writing as
only an act of mind’ (Haas 1996, p.xv).

Haas emphasises the centrality of both tools and the symbolic system of language
for writing. She writes that ‘through writing, the physical, time-and-space world of
tools and artifacts is joined to the symbolic world of language’ (Haas 1996, p.3) and
that ‘writing is a technology; that is, it is a set of materially embodied symbolic tools
that humans use for the goal-directed accomplishment of work’ (Haas 1996, p.6).

The importance of Vygotsky’s concept of mediated activity, for Haas, is that it
embraces both material and psychological tools:

Vygotsky’s interest in the mediational power of psychological tools allowed him to
explore how human development, defined as both individual cognitive growth and
cultural change occurs. I have extended Vygotsky’s notion of mediational means to
include diverse writing technologies, including computers. As we have seen, computers
(like writing generally) are at once material tools and psychological systems; writing
technologies are physical objects, created and existing in space and time, whose
materiality structures and constrains the human activities associated with them. At the
same time, writing and its technologies are powerful symbolic systems. Vygotsky’s
theory of mediational means helps to explain the powerful transformative effects of
writing, which is at once material and symbolic (Haas 1996, p.225).

In her treatment of writing technologies, Haas focuses on the relationship between
the three components of cognition, culture and material technologies. She writes that
‘an understanding of this act of writing – or any other – requires that we address it in
all its cognitive, cultural and material complexity’ (1996, p.27) and that ‘writing is at
once individual, an act of mind; cultural, an historically based practice; and
material, inherently dependent on physical, space and time artifacts’ (p.26). On one
plane, this complexity concerns ‘the relationship between cultural systems, including

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but not limited to writing, and individual thinking or consciousness’ (p.13) and ‘how culture and cognition mutually construct one another’ (p.13). On another plane, it concerns the relationship between mind and material technologies: while writing is in many ways ‘a solitary work of the mind’, it is ‘at the same time, each step along the way – from cruising the Internet for information to polishing final prose … dependent in complex and vital ways on material technologies’ (p.27).

The overall dynamic concerns all three components and it is necessary ‘to understand how material technologies both constrain and enable acts of mind, on the one hand, and how cultures produce, adapt and are affected by material technologies, on the other hand’ (Haas 1996, p.27). For Haas, this dynamic is neatly encapsulated in the concept of mediated activity:

> Technology is the place where culture and cognition meet — technologies are cultural artifacts imbued with history, as well as tools used by individuals for their own motives and purposes. For better or worse, writers do not reinvent the tools of literacy; they come with a history and a whole set of cultural ways of thinking inherent in them. These tools are at once the products of cultural histories and the shapers of those histories. At the same time, individuals use technologies, sometimes in loneliness and isolation, to accomplish their own cognitive work and to enrich their own mental lives (p.229).

In approaching technology as cultural practice, Haas states that ‘psychological tools are neither organic nor individual, but rather social’ and that ‘human beings do not invent or create psychological tools or sign systems; they appropriate them from the surrounding cultural milieu’ (1996, p.138). She also makes the point that ‘today’s literacy technologies are neither inevitable nor self-determining’ and questions the myths of ‘technological transparency and self-determination’ (1996, p.137). Haas points out that the theoretical perspectives that guide the use of technologies play an
important role in the way these technologies will be used:

Cultural artifacts, including writing tools, are the products both of the uses to which they have been put and of the beliefs that guide those uses. Put another way, theories of use are inherent in any tool. In fact, the way in which at each “stage” of a contemporary writing technology’s development, theories of use and practice shape how it was, and is, developed (1996, p.229).

Haas writes that ‘putting technology, in the broadest sense, at the centre of a research agenda for literacy studies would allow a “way into” questions of culture and cognition, allowing a more complete understanding of how historically and culturally rich technologies – in Vygotsky’s term – mediate the mental lives of individuals’ (1996, p.230). In this way, her perspective connects with the insights of the North American school of genre on writing technologies. In Prior’s words, ‘understanding what interests, constraints, and affordances have been built into our increasingly intelligent writing technologies calls for careful analysis of design practices’ (Prior 2006, p.64).

3.6 Criticisms of Sociocultural Theory

In the context of this thesis, a number of criticisms can be made of sociocultural perspectives on writing that highlight the tensions within the perspective itself. As mentioned from the outset of this chapter and demonstrated in the variety of viewpoints it contains, the sociocultural perspective is itself a complex paradigm with many branches. Many of the criticisms that can be made of some of these branches are less valid for others.
One of the basic tensions in the sociocultural perspectives, as a whole, already addressed in this chapter, is the relation between form and process. As mentioned above, a common criticism of certain sociocultural approaches, such as the Sydney School of genre instruction, is the tendency towards prescriptive, product-focused pedagogy (Johns 1997, 2003; Hyland 2003; Englert, Mariage and Dunsmore 2006). Englert, Mariage and Dunsmore stress that ‘teachers who focus on the role of discourse and mediators as tools for communication and social action produce better outcomes than teachers who simply focus on the mechanical application of the structures and strategies, with little emphasis on their utilitarian role as part of a symbol or communication system’ (2006, p.212). The use of diagramming software is open to the same variation in treatment. For example, the ‘templates’ available in Inspiration software provide graphic organisation for basic genres such as ‘cause and effect’, ‘classification’ and so on, and can serve as an effective means to guide learners towards different ways of generating and structuring ideas. On the other hand, the prescriptive use of such tools can stifle creativity.

In addition to this basic tension, there are more fundamental problems with sociocultural perspectives on writing. One of these is the persistence of cognitivist assumptions. In fact, the cognitive perspective has clearly influenced some of the writers and concepts presented in this chapter. For example, despite her appeals to the importance of cultural factors, Haas (1996) still tends to emphasise the notion of mental processes in her own treatment of writing technologies. In particular, Haas focuses on the way in which technology shapes mental processes, which repeats
Vygotsky’s emphasis on the cognising individual. Haas writes that ‘for Vygotsky, semiotic signs or psychological tools are the mediational means by which higher psychological functions develop – and therefore the means by which the unique human quality of consciousness is brought into being’ (1996, p.14). Her explanation for the limitations of word-processing, is that ‘through their physical interactions with material tools and texts of literacy, writers’ thinking is shaped by culturally-made technologies’ (Haas 1996, p.133). In fact, a central question for Haas is ‘how is it that material tools can shape mental processes?’ (Haas 1996, p.224).

Another sociocultural conception that is influenced by cognitive theory is distributed cognition. According to Button (2008, p.94), “distributed cognition” is re-describing the socio-cultural world in the terms of the theory of cognitive science, and in this respect the everyday descriptions of things is being replaced by descriptions that draw on a particular theory of mind, a computational model of mind in which mind is rendered in terms of computational processes’. A clear example of this is Hutchins’ (1995, p.49) use of the term ‘computation’ to refer to ‘the propagation of representational states’. This view of computation appears to depart from Newell and Simon’s (1972) conception of the individual mind as an information processor, since it concerns ‘the creation, transformation and propagation of representational states across representational media in larger computational systems’, rather than ‘computations that are going on inside individuals’ (Hutchins 1995, p.49). Hutchins stresses that his view of computation is as ‘applicable to events that involve the interaction of humans with artifacts and with
other humans as it is to events that are entirely internal to persons’ (1995, p.118). The social nature of these ‘computations’ is evident in the fact that ‘although some of the representations are internal, they are still all cultural in the sense that they are the residua of a process enacted by a community of practice rather than idiosyncratic inventions of their individual users’ (1995, p.130). Nonetheless, the use of the term ‘computation’ in Hutchins’ account of distributed cognition tends to preserve the mind as computer metaphor. For Button (2008, p.96), ‘the problematics associated with cognitive science and the objections that are levelled against it apply equally to “distributed cognition” as they do to cognitive science in general’.

Certain branches of sociocultural theory also resemble cognitivism in emphasising the accumulation of cognitive structures. Sfard (1998, p.5) argues that the ‘acquisition metaphor’ in which ‘concepts are to be understood as basic units of knowledge that can be accumulated, gradually refined, and combined to form ever richer cognitive structures’ is just as apparent in sociocultural perspectives as in cognitive-constructivist perspectives. She writes that ‘the idea of learning as gaining possession over some commodity has persisted in a wide spectrum of frameworks, from moderate to radical constructivism and then to interactionism and sociocultural theories’ (p.6). Sfard points out that research into the ‘mechanisms of concept development’ moved from analysis of active construction by the learner to analysis of ‘the ways in which concepts are transferred from a sociocultural plane to an individual plane and internalized by the learner’, finally envisaging learning as ‘a never-ending, self-regulating process of emergence in a continuing interaction with
peers, teachers, and texts’ (p.6). Therefore, ‘theories that speak about reception of knowledge and those that view learning as internalization of socially established concepts belong to the same category’. In fact, the participation metaphor, which Sfard associates with situated learning perspectives, has also been criticised. This metaphor ‘tells how newcomers become “oldcomers” by participating in cultural practices, but does not, however, say anything about how to go beyond best practices, or how new knowledge is created’ (Lipponen, Hakkarainen and Paavola 2004, p.34).

Another problem or tension in sociocultural theory is the influence of structuralist views of language that neglect the roles of both interpretation and multiple symbol systems in meaning-making. The structuralist view of language is generally associated with Saussure’s semiology, or theory of signs, which centres on the division of the linguistic sign into the signifier and the signified. Saussure understands linguistic signs as units which connect acoustic (or graphic) images with mental concepts: ‘The linguistic sign unites, not a thing and a name, but a concept and a sound image’ (Saussure 1964, p.66). In order to clarify that both elements belong to the sign itself, Saussure invents a new terminology: ‘I propose to retain the word sign [signe] to designate the whole and to replace concept and sound image respectively by signified [signifié] and signifier [signifiant]’ (Saussure 1964, p.67). Saussure emphasised that both elements of the sign were the result of social conventions and that the meanings of signs are determined by the discourse communities in which they evolve.
Although Saussure’s semiology is widely viewed as a revolutionary paradigm shift that led to modern linguistics, Voloshinov (1973) associates it with one of two dominant trends of linguistic thought that were current in Saussure’s day.

Voloshinov presents these trends as two opposing solutions to ‘the problem of the identification and the delimitation of language as a specific object of study’ (1973, p.48). The first trend, *individual subjectivism*, sought the basis of language in ‘the individual creative act of speech’ (p.48). The second trend, *abstract objectivism*, to which Saussure belongs, sought the ‘organizing centre’ of language in ‘the linguistic system as a system of the phonetic, grammatical, and lexical forms’ (p.52).

Voloshinov traces the roots of abstract objectivism to ‘the rationalism of the 17th and 18th centuries’ and ‘Cartesian grounds’ (p.57). He points out that the notion of the linguistic system (*langue*) is not new but originates in the rationalist ideas of ‘the conventionality, the arbitrariness of language’, of ‘autonomous, rational, fixed form’ (p.57) and of ‘the inner logic of the system of signs itself’ (p. 58). For Voloshinov, the main problem with the perspective is that ‘representatives of abstract objectivism constantly stress – and it is one of their basic principles – that the system of language is an objective fact external to and independent of any individual consciousness’ (1973, p.65), which is always involved in the interpretation of signs.

More recently, several other writers have criticised social and sociocultural perspectives for undervaluing the role of individual meaning-making. Witte points out ‘the theoretical inadequacy of approaches to writing that are based on Saussurian ideas’ (1992, p.238). He writes that ‘what allows texts to mean cannot be altogether
explained by their connection to verbal structures (e.g., words) per se’, rather, ‘what allows a text to mean for an individual user is its link, mediated vis-à-vis any shared symbol system, to an underlying and necessarily internalized semantic network’ (Witte 1992, p.256). Witte writes:

> It is both possible and necessary to entertain concurrently, not as contraries but as complements, the idea that thought can occur independently of language in the linguistic sense and the idea that language can serve as an instrument of thought. Only by entertaining both hypotheses can a theoretical perspective on writing as writing is practiced and used be managed (1992, p.262).

In fact, for Witte, failing to recognise the interdependence of thought and language diminishes the role of subjectivity:

> Writing can be both a process of translating ideas or thoughts into visible language and a process of discovering meaning through language. To ignore the former and to recognize only the latter (i.e., to maintain that all thought is language and, hence, social) leads, it seems to me, to the denial of such constructs as creativity, originality, change, or even ‘new’ knowledge; and it leads, mutatis mutandis, to the denial of ‘the self’ (1992, p.262).

According to Witte, ‘critiques of Flower and Hayes “cognitive process theory”’, such as Bizzell’s, repeat the Saussurian mistake of stipulating ‘the prior existence of language to thought’ (1992, p.272) and of privileging language over thought.

Along similar lines, Witte (1992) and Prior (2001, 2009) have criticised both discourse-community and sociocultural perspectives for misinterpreting Vygotsky’s theory and over-emphasising external speech through conceptions such as dialogue, utterance and voice. According to Witte (1992, p.261), discourse community approaches misappropriate Vygotsky’s notion of ‘inner speech’, which is synonymous with thinking in ‘pure meanings’. Prior (2001, 2009) raises similar
criticisms against the neglect of ‘inner speech’, or the multimodal flow of semiotic activity, in Bakhtin’s conceptions of utterance and voice. Prior acknowledges that ‘Baktinian and other sociohistoric perspectives on discourse – perspectives grounded in dialogic and situated notions of voice, utterance and genre – offer a radical alternative to structuralist notions of languages as systems of words, rules, and worlds’ (Prior 2001, p.57). However, he suggests that Voloshinov’s understanding of ‘inner speech’ is one that adheres more closely to Vygotsky’s original idea:

The outwardly actualized utterance is an island arising from the boundless sea of inner speech, the dimensions and forms of the island are determined by the particular situation of the utterance and its audience ... every outer ideological sign, of whatever kind, is engulfed in and washed over by inner signs – by the consciousness. The outer sign originates from this sea of inner signs and continues to abide there, since its life is a process of renewal as something to be understood, experienced, and assimilated, i.e., its life consists in its being engaged ever anew into the inner context (Voloshinov 1973, quoted in Prior 2009, p.19).

For Prior, ‘writing is a stream within the broader flows of semiotic activity’ and ‘every text, every utterance, is multimodal as it must involve a mix of inner and outer semiotics’ (Prior 2009, p.24). Such a view of writing conforms to Vygotsky’s actual perspective on ‘human development and consciousness’, which was ‘very attuned to the semiotic transformations that link the inner semiotics of thought, perception, motivation and feeling to the outer semiotics of action (talk, writing, drawing, object production and manipulation, movement, stance)’ (Prior 2009, p.25). In fact, Prior argues that the underlying influence of Saussurian semiology and structuralist linguistics is a major problem for sociocultural theory. He argues that ‘DCs, CoPs, activity systems, Discourses, contact zones, whatever terms we turn to will continue to slip toward that underlying structuralist matrix unless we
very consciously wrest them away and carefully stake out alternative theoretical grounds’ (Prior 2003, p.20).

A related criticism is that some sociocultural perspectives on writing tend to neglect the full range of semiotic modes that writing involves. By contrast, Witte’s (1992) ‘constructivist semiotic of writing’ emphasises the many symbol systems through which writing actually occurs (p.246), pointing out that ‘texts, regardless of the particular symbols through which they are expressed or through which writers discover their meaning, are woven out of materials of multiple symbol systems’ (p.269). Referring to Bakhtinian perspectives on discourse, Prior writes that ‘one deep flaw in the notion of voice’ is ‘the way it continues to privilege language at the expense of the full semiotic toolkit’ (2001, p.78). Similarly, Russell (1997, p.506) writes that ‘by focussing on dialog and voices, by limiting the unit of analysis to oral and written utterance and discourse, dialogism brackets off a wide range of nonconversational actions and the material tools through which they are carried out’. Therefore, Prior (2009, p.29) argues for ‘a semiotic perspective on genre systems, considering such systems as fundamentally constituted in the varied activities and artifacts involved in trajectories of mediated activity’. The concept of multimodality has been developed in social semiotic approaches associated with the work of Kress. In an article that contrasts cognitive-constructivist and social semiotic approaches to concept maps, for example, Preston (2007, p.13) writes that ‘the basic assumption of multimodal literacy is that meanings are made, distributed, received, interpreted and remade in interpretation, through many representational and communicative modes –
not just through language – whether as speech or writing’. However, this body of work has yet to connect with mainstream approaches to writing instruction. Furthermore, unlike the work of Peirce and Dewey, Kress’s semiotics is not essentially concerned with inquiry.

Although they give a dynamic account of writing as mediated activity, few sociocultural perspectives provide an understanding of the use of semiotic resources in inquiry as such. Although there are clear parallels between the cultural-historical tradition and Deweyan pragmatism, both of which influenced the development of sociocultural theory (Prior 2006), a major difference is Dewey’s focus on inquiry (Glassman 2001). While Vygotsky may have turned his interests towards inquiry in his later writings (Prawat 2002), it is generally not a major focus of sociocultural perspectives on writing.

Such criticisms raise questions about the potential of the sociocultural perspective, or at least certain variants of it, to provide an adequate theoretical framework for the design of research writing programs. The next chapter investigates whether the pragmatic semiotic perspective can provide a more adequate account of the use of sociocultural resources in research from sources as a mode of inquiry.
Chapter 4: A Pragmatic Semiotic Perspective on Research Writing

The pragmatic semiotic perspective presented in this chapter is based on the work of Peirce, Dewey and Deleuze. Although this work is relatively unknown to the fields that inform the design of teaching and learning environments for research writing, it has had a growing influence on education, more broadly, in recent years. It has also begun to influence the design of teaching and learning environments, including the use of portfolios and diagramming software. This chapter evaluates its potential to inform the design of teaching and learning environments for research from sources.

4.1 Pierce’s Triadic Semiotics and Semiosis

The starting point for any understanding of the perspective is Peirce’s triadic theory of signs. Peirce is famous for thinking in thirds and there are a number of important triadic relations in his semiotic theory. In contrast to Saussure’s semiology (see Chapter 3), Peirce defines the sign (see Figure 4.1) as consisting of three essential elements:

I define a *Sign* as anything which on the one hand is so determined by an object and on the other hand so determines an idea in a person’s mind, that this latter determination, which I term the *Interpretant* of the sign, is thereby mediatelty determined by that object. A sign, therefore, has a triadic relation to its object and to its Interpretant (Peirce *CP* 8.343). ¹

What must be emphasised is the fundamental difference between this triadic relation

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¹ Following convention, *CP* refers to sections in Peirce’s *Collected Papers*. 
of sign elements and the dyadic or dualistic relation between signifier and signified in structuralist linguistics. Peirce writes:

A Sign, or Representamen, is a First which stands in a genuine triadic relation to a Second, called its object, as to be capable of determining a Third, called its Interpretant, to assume the same triadic relation to its Object in which it stands to the same object. The triadic relation is genuine, that is its three members are bound together by it in a way that does not consist in any complexus of dyadic relations (CP 2.274).

The key to understanding semiosis, or the action of signs, is understanding the triadic relations between these elements.

![Figure 4.1: Peirce’s Tripartite Sign](image)

Firstly, it is necessary to understand the way in which the interpretant determines the relation between the sign and its object. As Ponzio points out, the interpretant is a vital aspect of Peirce’s semiotics:

In Peirce the relation between the sign and its object is necessarily mediated by the relation between sign and interpretant. Without an interpretant there is no sign. This means that the sign which functions as interpretant is not accessory and secondary, but shapes the sign interpreted. For Peirce the signified is the interpretant (Ponzio 1997, p.335).

Witte stresses that it is the interpretant that distinguishes Peirce’s triadic semiotics from Saussure’s dyadic semiology:
Peirce’s ‘interpretant’ – a component that is not present in, anticipated by, or derivable from Saussure’s mentalist semiology – represents a critical difference between the two theorists. Whereas for Saussure the critical elements of semiology are signification and value with regard to a stable dyadic sign relation, for Peirce the crucial element is the constructive process – which, following Morris … can be called ‘semiosis’ (Witte 1992, p.279).

For Peirce, signs are always read according to the meanings that are habitually attached to them by individuals; ‘the sign is related to its object only in consequence of mental association, and depends on habit’ (Peirce CP 3.360, cited in Rosenblatt 1993, p.381). Furthermore, interpretants are themselves also signs; networks of interpretation proliferate in potentially endless chains of semiosis, as shown in Figure 4.2. Since networks of sign relations continually connect with one another, ‘there is no conceivable universe of discourse in which the thing may not figure, having in each its own characteristic meaning’ (Dewey 1926, p.305). This is why semiotic worlds are less worlds of things than worlds of interpretations that stem from multiple universes of discourse.

![Figure 4.2: Unlimited Semiosis (Witte 1992 p.282)](image)

In fact, the dialogic nature of semiosis is particularly relevant for research from sources, which is largely constructed through intertextuality and interpretation. This
dialogic aspect is fully explicated by Ponzio (1997, 2005), for whom ‘Peirce evidenced the dialogic nature of the sign and semiosis’ (Ponzio 2005, p.157) in a way that resonates with Bakhtin’s dialogic perspective. Ponzio interprets the term ‘dialogic’ analytically as ‘dia-logic’ (2005, p.157), by which he means that the action of signs itself, ‘the logic of semiosis as a whole’, always involves an interpretative response. In the case of complex signs, such as written texts, ‘the specific logic of the text is dia-logic, an intertextual dialectic’ since ‘the text’s meaning always lies along the boundaries of another text’ (Ponzio 1997, p.341).

Secondly, it is necessary to understand the nature of the object, which does not correspond to the nature of the thing. As Cunningham points out, ‘a sign is only an incomplete representation of the object’, since ‘only certain aspects of the object are represented, and it is these aspects that come to define the interpretant, the “effect” or outcome of the sign process’ (Cunningham 1992, p.172). The interpretant defines the object or objects, since ‘the content of the respective objects exists only in so far as it is represented in a certain interpretant’ (Hoffman and Roth 2004, p.198). In Dewey’s words, ‘an object is more than a thing; it is a thing having a definite significance’ (1933, p.20). Dewey and Deely provide two useful examples of the way in which objects are defined by interpretants. Dewey writes:

To the learned man, the range of meanings possessed by ordinary meanings is much widened. A stone is not merely a stone; it is a stone of a given mineralogical type, from a particular geological stratum, etc (1933, p.20).

Deely provides the following example, along similar lines:

Let us consider the case of a fossil bone. This bone may or may not be known to exist. If not, let us suppose it yet belongs to a class of bones well established among those expert in the
Pleistocene. One day the bone is uncovered, but by a gardener, not a palaeontologist. Since the bone is in an advanced state of fossilization, let us suppose that our gardener does not even recognize it as a bone, let alone as a fossil bone. For that, a more developed interpretant is required, one proportioned more exactly to what the bone relates to in the living past (Deely 1990, p.48).

As Deely points out, ‘objects always involve a “relation to an observer”, so to speak, or, more exactly, to an organism experiencing’ (1990, p.55). Therefore, in Peircean semiotics, the terms “object” or “objective structure” refer, in contrast to the various usual usages, to the becoming of things through and in experience’ (1990, p.55). This conception is very different from both the objectivism found in cognitive approaches (see Chapter 2), in which reality is somehow represented to the mind, and the ‘abstract objectivism’ of Saussurian semiology (Voloshinov 1973), in which the meaning of the both signs and concepts is determined through social convention (see Chapter 3).

Another important difference between the two semiotic theories is that while Saussure focused on the linguistic sign, Peirce developed a complex taxonomy of signs based on the trichotomy of symbols, indexes and icons. For Peirce, symbols are signs that refer to an object ‘by virtue of a law, usually an association of general ideas’; indexes are signs that refer to an object ‘by virtue of being really affected by that object’; and icons refer to an object ‘in so far as [they are] like that thing’ (Peirce 1955, p.102). Hoffmann and Roth note that ‘we make distinctions and specify objects by using symbolic signs (including concepts)’ and ‘we identify relations and structure our observations and experiences using iconic signs (including pictures, diagrams, etc.)’ (Hoffman and Roth 2007, p.104). Within the broad category of icons, which also includes images and metaphors, Peirce identifies
diagrams as icons of relations that represent their objects through ‘a skeleton-like sketch’ (Stjernfelt 2000, p.358). Diagrams do not resemble the things they stand for, rather relations between parts of the object are represented by analogous relations between parts of the sign. Therefore, diagrams differ from other icons in that there is no actual resemblance, since ‘it is only in respect to the relations of their parts that their likeness consists’ (Peirce 1955, p.107). Guattari cites the following examples:

To explain what he means by a diagram, Pierce gives the example of a temperature curve, or, at a more complex level, a system of algebraic equations. The signs function in place of the objects they relate to, independently of any effects of signification that may exist alongside them (1984, p.171).

The importance of the independence of the diagram from specific significations is emphasised by Peirce, as follows: ‘The skeletonization or diagrammatization of the problem serves more purposes than one; but its principal purpose is to strip the significant relations of all disguise’ (Peirce 1955, p.138).

Although the most intuitive examples of diagrams would be concept maps and other visual tools, any sentence or text can act as a diagram (Stjernfelt 2000; Hoffman 2007). In fact, ‘[Peirce] believed that all thought is sign process and hence it is capable of being presented diagrammatically’ (Merrell 1995, p.51, cited in Semetsky 2006, p.30). This may seem counter-intuitive, but is easily evidenced by the fact that a single branch in a concept map (consisting of two nodes joined by a linking phrase) can be easily translated into a sentence with the removal of the lines and the addition of words fulfilling an analogous grammatical function. In Dewey’s terms, different diagrammatic forms are ‘isomorphic’ and, like ‘maps of different projection systems’, can be translated into one another (1938, p.410). This is why it
is possible for writing to unfold through modes that extend from ‘imagery, to metaphors and schemas, to abstract conceptual propositions to prose’ (Flower and Hayes 1984, p. 129). All of these modes are able to act together because they are all diagrammatic and therefore reciprocally isomorphic.

Since it does concern the variety of signs in existence, Peirce’s semiotics is fully adequate for describing the multiple symbol systems that occur in writing and research. In addition, the action of signs in inquiry is the central focus of much of this theory.

4.2 Semiosis and the Ecology of Writing

For Peirce, as for Dewey and Deleuze, all thought and action are pervaded by signs. Deely (1990) writes that ‘the whole of human experience, without exception, is an interpretative structure mediated and sustained by signs’ (Deely 1990, p.5) or ‘a network of sign relations’ (Deely 1990, p.13). He emphasises ‘the dependence of experience throughout on the action of signs’ (Deely 1990, p.51). Cunningham stresses ‘the action of signs in all domains of life’ (2007, p.5), referring to ‘the building of structures of experience via signs’ (1992, p.172). Beyond the dichotomy of individual and social perspectives, semiosis is ‘a trichotomy where the subject stands at the centre of a web of relationships comprising precisely an objective world’ (Deely 1990, p.59). On the one hand, ‘semiosis is in the action of signs, in the process whereby an individual constructs, selects and connects with a particular
slice through the rhizome of potential signs and sign aspects’ (Cunningham 1998, p.830). On the other hand, sign action ‘spreads throughout a network of interpretants’ (1998, p.829), depending on the subject’s experience, including participation in communities of practice and discourse. It is important to emphasise that ‘semiosis is the action of signs, not of a person’ (p. 829). Or in Dewey’s words, ‘the having of ideas is not so much something we do, as it is something that happens to us’ (1933, p.20, my italics). This does not mean that there is no individual agency in the construction of experiences and meanings, but that experiences and meanings result from transactions with the environment.

Deely (1990) and Cunningham (1987, 1992, 1998, 2007) combine a Peircean conception of semiosis with von Uexkull’s concept of Umwelten to develop a dynamic, ecological understanding of thought and learning. Deely explains the concept of Umwelt as follows:

The environment selectively reconstituted and organized according to the specific needs and interests of the individual organism constitutes an Umwelt. The Umwelt thus depends upon and corresponds to an Innenwelt, or cognitive map, developed within each individual. The Innenwelt enables the individual to find its way in the environment and insert itself into a network of communication, interest, and livelihood sharable specifically with the several other individuals of its own kind (1990, p.60).

Largely because of language, human Umwelten are unique, diverse and multiple, combining experiences across many levels (for example, cultural, disciplinary and individual levels) and determining interconnected but unique ways of seeing the world. For Deely and Cunningham, the concept of Umwelten provides an ecological context for the exploration and application of Peircean semiotics. Ultimately,
Umwelten, or different ways of seeing the world, are constructed through semiosis. There are parallels between this semiotic ecological perspective and Dewey’s philosophy, which is essentially concerned with the transactions of organisms, including humans, and the environment. For Dewey, conceptions such as reality and mind have no meaning apart from these relations. Just as human subjectivities develop through transactions with the environment, external ‘reality only “reveals” itself as a result of the activities – the “doings” – of the organism’ (Biesta and Burbules 2003, p.10). Within these transactions, ‘what is constructed – over and over again – is the dynamic balance of organism and environment, which manifests itself both in specific changes in the environment and specific changes in the patterns of action of the organism’ (2003, p.11). As we transact with the environment ‘we develop patterns of possible action, which Dewey called habits’ (p.11). This conception of habits as ‘a complex set of predispositions to act’ (2003, p.37), largely follows Peirce, who wrote that:

The genuine synthetic consciousness, or the sense of the process of learning, which is the preeminent ingredient and quintessence of reason has its physiological basis quite evidently in the most characteristic property of the nervous system, the power of taking habits (Peirce, quoted in Garrison and Neiman 2007, p.22).

Biesta and Burbules describe this ‘organism-environment transaction as a process of continuous readjustment’ (2003, p.32). They add that the objective world of the ‘experimental transaction of organism-environment not only leads to more specific habits but also results in a more “differentiated, more meaningful world” which is “infused with meaning” (p.37). This is ‘how the world becomes meaningful, that is, how objects emerge from the field of transaction’ (p.38).
Dewey’s concept of transaction is by definition beyond dualisms since it refers to the reciprocal action between self and environment or self and others. The term ‘transaction’ was coined by Dewey and Bentley (1949), because ‘the term “interaction” had become tied to the Cartesian dualistic paradigm that treats human beings and nature, subject and object, knower and known, as separate entities’ (Rosenblatt 1993, p.380). By contrast, transaction designates ‘a relationship in which each element, instead of being fixed and predefined, conditions and is conditioned by the other’ (p.380). Within this relationship, Dewey conceives mind as ‘primarily an action, not an entity’, which is ‘intrinsically tied to ... personal experience’ (Crick 2003, p.268). Semetsky writes that Dewey’s concept of transaction ‘points to the occurrence of potential transformations’ on both sides ‘and considers human activities including “behavings ... [and] ... knowings ... as activities not of [man] alone ... but as processes of the full situation of organism-environment”’ (2006, p.67).

The concept of transaction highlights the differences between the semiotic pragmatic perspective and the cognitive-constructivist and sociocultural perspectives. In fact, the three perspectives can be contrasted in terms of Dewey and Bentley’s three forms of action:

*Self-action:* where things are viewed as acting under their own powers.

*Inter-action:* where thing is balanced against thing in causal interconnection.

*Trans-action:* where systems of description and naming are employed to deal with aspects and phases of action, without attribution to ‘elements’ or other presumptively detachable or independent ‘entities,’ ‘essences,’ or ‘realities,’ and without isolation of presumptively

From this point of view, the cognitive-constructivist perspective tends to focus on the self-action of individuals; the sociocultural perspective tends to emphasise interaction between social agents and affordances; while the pragmatic semiotic perspective stresses the transactions of organisms-in-environments. Garrison (2001) points out the differences between Dewey’s transactional theory and activity theory. He writes that contrasting activity theory and Dewey’s perspective highlights ‘the difference between mediated “inter-action” versus functionally coordinated “trans-action”’. Garrison argues that ‘theories of inter-action such as Vygotsky’s and Leont’ev’s begin with two different entities, environment (situation or context) and organism (actor or agent), and then struggle with the problem of putting them back together via activity’ (p.290). By contrast, Dewey’s perspective on action and learning is one in which ‘what is environment, situation, or context and what is organism, subject, or agent evolve over time’ (Garrison 2001, p.291). Barab, Evans and Baek (2004, p.209) add that ‘central to the notion of transaction is the interdependency and interconnection of components that only remain separate in name or in researcher’s minds, for in their materiality they are transformed continuously in relation to other components’.

The transactional ecology of writing can be considered either from the point of view of environmental affordances or from the point of view of the writer’s Innenwelt, providing that the indivisibility of the writer-in-the-writing-environment is retained. Susi and Ziemke (2005) point out the correspondences and differences between
Gibson’s concept of affordance and von Uexkull’s concept of Umwelt. The concept of affordances views transactions from the point of view of environmental affordances, while the concept of Umwelt views them from the point of view of the organism. The ecology of writing can be provisionally viewed from either perspective. Deleuze and Guattari’s concepts of affects and assemblages can also provide insights into this transactional relationship. DeLanda (2002, p.6) points out that ‘the term “affect” is closely related to the term “affordance” introduced by James Gibson within the context of a theory of ecological interaction’. Deleuze and Guattari explain the concept of affect, which they draw from Spinoza, as follows:

[Affect] is an ability to affect and be affected. It is a prepersonal intensity corresponding to the passage from one experiential state to another and implying an augmentation or diminution in that body’s capacity to act (Deleuze and Guattari 1988, p. xvi).

According to Deleuze, the important question for Spinoza is ‘What can a body do, of what affects is it capable?’ (in Deleuze and Parnet 1987, p 60). The concept of assemblages refers to the multiple elements that individuals interact with in complex ecologies. Affects are ‘dependent on, but not reducible to, the assemblage components’ properties’ (DeLanda 2002, p.6) that can either increase or diminish individual capacities. The ability to carry out research from sources can be understood as ‘the capacity of individual entities to enter as components into heterogeneous assemblages’ (DeLanda 2002, p.5). Bains (2001, p.150) writes that ‘a being is defined by the relations and assemblages it can enter into – tell me what relations you can enter into, and I will tell you who you are’. Human cognition or thinking is just one component of the research assemblage that cannot be separated from its transactions with other components. Nor can these components be
subordinated to cognition. This does not mean that there is no individual agency, but rather human agents, including writers, are situated in a field of action that includes the environment, values, tools, language ... other persons, and “the self as the tool of tools, \textit{the} means in all use of means”’ (Semetsky 2006, p.67, citing Garrison, 1999, p.303). The writing self is an event: an instance of connections in assemblages of individual and collective elements. Writers evolve according to the affordances they encounter and the affects they experience.

Finally, there are also resonances between these concepts and Deleuze’s concepts of becomings and rhizomes. The concept of becoming concerns the way in which different entities mutually evolve in unpredictable ways: ‘a process in which any given multiplicity “changes its nature as it expands its connections”’ (Deleuze and Guattari 1988, p.8, cited in Semetsky (2006, p.3). Deleuze writes:

\begin{quote}
To become is never to imitate, nor to ‘do like’, nor to conform to a model. .... There is no terminus from which you set out, none which you arrive at or which you ought to arrive at. Nor are there two terms which are exchanged. The question ‘What are you becoming?’ is particularly stupid. For as someone becomes, what he is becoming changes as much as he does himself. Becomings are not phenomena of imitation or assimilation, but of a double capture, or non-parallel evolution, of nuptials between two reigns (Deleuze and Parnet, 1987, p.2).
\end{quote}

Unlike interactions between pre-determined entities, becomings are characteristically unpredictable and unfold along rhizome-like trajectories.

Deleuze and Guattari’s concept of rhizome (1988, Ch.1) is taken from biology, in which it refers to the random root structure of tubers and grasses. The metaphor of rhizome provides an image of the various ways in which networks of signs can
interact with one another. Semetsky writes that ‘as a symbol for unlimited growth through the multitude of its own transformation, rhizome is contrasted with a tree, the latter symbolizing the linear and sequential, arborescent reasoning rooted in finite knowledge’ (2007, p.198). She adds that ‘rhizome does not represent, but only maps our ways, paths, and movements’ (2007, p.200). Deleuze and Guattari suggest a number of ‘principles’ of rhizome, which are usefully summarised by Duffy and Cunningham:

- Every point can and must be connected with every other point, raising the possibility of an infinite juxtaposition.
- There are no fixed points or positions, only connections (relationships).
- The structure is dynamic, constantly changing, such that if a portion of the rhizome is broken off at any point it could be reconnected at another point, leaving the original potential for juxtaposition in place.
- There is no hierarchy or genealogy contained as where some points are inevitably superordinate or prior to others.
- The rhizome whole has no outside or inside but is rather an open network that can be connected with something else in all its dimensions (1996, p.177).

Deleuze and Guattari stress the absence of hierarchy in rhizomatic thinking:

A rhizome is not amenable to any structural or generative model. It is a stranger to any idea of genetic axis or deep structure ... the rhizome is altogether different, a map and not a tracing (Deleuze and Guattari 1988, p.12).

Semiosis, the action of signs, is neither constrained by universal grammatical structures or invariant cognitive processes, nor by structural linguistic systems. However, Deleuze and Guattari do not ignore the hierarchical structures and other logical forms that striate thought and writing and give it shape. They write that ‘what interests us in operations of smoothing and striation are precisely the operations or combinations; how the forces at work within space continually striate it, and how in
the course of its striation it develops other forces and emits new smooth spaces’ (1988, p.500). In all writings, ‘there are lines of articulation or segmentarity, strata and territories; but also lines of flight, movements of deterritorialization and destratification’ (Deleuze and Guattari 1988, p.3).

Cunningham has proposed the further concept of ‘mind as rhizome’ (Duffy and Cunningham 1996; Cunningham 1998; Schuh and Cunningham 2004) in contrast to the ‘mind as computer’ metaphor that has influenced cognitive perspectives (see Chapter 2). The metaphor ‘moves the mind out of the head and deliberately blurs or obliterates such common distinctions as environment/individual, inside/outside, and self/other’ (Duffy and Cunningham 1996, p.177). It also ‘rejects the inevitability of such notions as hierarchy, order, node, kernel or structure’ (Cunningham 1998, p.829). Rather, ‘semiosis is in the action of signs, in the process whereby an individual constructs, selects and connects with a particular slice through the rhizome of potential signs and sign aspects’ (Cunningham 1998, p.830). Within the pragmatic semiotic perspective, interconnected concepts such as semiosis, transactions, Umwelten, affordances, assemblages, affects, becomings and rhizomes collectively map the action of signs in human experience.

4.3 The Fixation of Belief and the Logic of Inquiry

Since it pervades all thought and action, semiosis also underpins all purposive acts of inquiry, from everyday problem-solving to academic research. The resolution of
doubt and the fixation of belief, or the process through which doubt moves towards certainty, is a major aspect of Peirce’s semiotics. As Cunningham points out (2007, p.3), Peirce spoke of semiosis in general as ‘a movement toward “fixing” a belief’.

In his paper ‘The Fixation of Belief’, Peirce outlines four methods by which doubt can be resolved and belief fixed – tenacity, authority, the a priori method and experiment – which are usefully summarised by Cunningham, Baratta and Esping (2005). Tenacity is not really a method at all, but rather ‘the failure to change belief in the face of doubt’ (2005, p.56), which may be a valid response in certain circumstances. Therefore, the remaining methods are another triad in Peirce’s semiotic theory.

The first genuine method, authority, is ‘the method of fixing belief by taking the advice of others’ (2005, p.57), which is clearly an integral part of research from sources. Although Peirce took a dim view of the authoritarian influences of his time, in the age of the Internet, the use (and critical evaluation) of other opinions is becoming increasingly important. Cunningham, Schreiber and Moss (2005, p.181) write that ‘resolving doubt by considering the opinions of others will remain an important cognitive activity and may even grow exponentially as the amounts and domains of knowledge and skill pertinent to our lives grows apace’ and that ‘what we need are pedagogies that take the method of authority into account, not avoid it’.

In the case of research from sources, as discussed in Chapter 1, what is needed are methods of integrating the opinions of others into original, or at least ‘simple’ original texts, in Ballard and Clanchy’s (1990) terms.
The second method of fixing belief described by Peirce is the a priori method. In this method, we ‘resolve a doubtful situation by integrating it within our prior structure of beliefs’ (Cunningham, Baratta and Esping 2005, p.60). Cunningham et al associate the a priori method with concepts such as ‘perspective, schema, mental model, cognitive structure’ (p.60). Cunningham, Schreiber and Moss (2005, p.182) explain the method as follows:

If I have a general set of structures that I use to make sense of the world, then much of my action in the world is based on predictions from those structures. When I confront a doubtful situation, my first activity will be to generate a context compatible with my current structures within which this doubtful event makes sense. Only when I fail at this resolution might I change my basic structures.

According to the authors, this method also relates to Ausubel’s maxim that ‘the most important single factor influencing learning is what the learner already knows’ (2005, p.182) and Cunningham et al also suggest that constructivist models of learning and cognition ‘embody the spirit of the a priori method of resolving doubt’ (Cunningham, Schreiber and Moss 2005, p.182). Clearly, the cognitive-constructivist paradigm described in Chapter 2 largely corresponds to the a priori method.

The third method of inquiry, experiment, is the method that Peirce prefers. Cunningham (2007, p.4) describes experimentation as ‘collecting observations, generating potential hypotheses to account for the surprising experience, and reaching a conclusion based upon the interplay of inferential processes’. However, this method is not restricted to experimentation in the strict sense of primary research conducted in the sciences, but relates to all modes of inquiry.
A final triadic relation in Peirce’s semiotics is the interaction of three different kinds of inference that play a central role in all acts of inquiry. These are *induction*, or the application of signs to experience; *deduction*, or the process of reasoning from sign to sign; and *abduction* or the invention of signs to make sense of new experience (Cunningham 1992). While induction and deduction are traditionally discussed as forms of inference (also in rhetoric and critical thinking course books, such as Brooks and Warren 1972 and Allen 2004), until recently, abduction has not been widely recognised as a form of reasoning. This is unfortunate because, not only is ‘the resolution of doubt primarily an abductive process’ (Cunningham, Baratta and Esping 2005, p.55), but for Peirce, abduction is the only the kind of inference that is involved in the creation of new ideas.

In fact, numerous definitions of abduction have been put forward by Peirce (at various stages in the development of his ideas) and others. One of the most useful accounts provided by Peirce is the following:

> A mass of facts is before us. We go through them. We examine them. We find them a confused snarl, an impenetrable jungle. We are unable to hold them in our minds. We endeavour to set them down upon paper; but they seem so multiplex intricate that we can neither satisfy ourselves that what we have set down represents the facts, nor can we get any clear ideas of what it is that we have set down. But suddenly, while we are poring over our digest of the facts and are endeavouring to set them down into order, it occurs to us that if we were to assume something to be true that we do not know to be true, these facts would arrange themselves luminously. That is abduction (*CP* 8.209).

The following definition of abduction by Paavola also suggests some of the ways in which abduction occurs:

> The gist of abduction is those things which constrain and guide the search for new,
tentative ideas and hypotheses. Abduction is a weak form of inference where clue-
like signs, tentative restrictions, and the search for overarching patterns are used as
aids when new ideas are searched for (Paavola 2006, p.6).

As a weak form of inference, abduction has a logical structure. Peirce explains this
structure, and its relation to the other two forms of inference (deduction and
induction) in his famous bean bag example:

**DEDUCTION**

Rule - All the beans from this bag are white.
Case - These beans are from this bag.
(Therefore) Result - These beans are white.

**INDUCTION**

Case - These beans are from this bag.
Result - These beans are white.
(Therefore) Rule - All the beans from this bag are white.

**HYPOTHESIS (ABDUCTION)**

Rule - All the beans from this bag are white.
Result - These beans are white.
(Therefore) Case - These beans are from this bag.
(CP 2.623, 1878)

In general terms, the logical structure of abduction can be stated as follows:

The surprising fact, C is observed;
but if A were true, C would be a matter of course,

hence, there is reason to suspect that A is true.
(Paavola 2004b, p.252)

Although these logical definitions of abduction do not explain how abduction
occurs, recent work has explored the role of abductive inference in inquiry and the
construction of knowledge (see section 4.5 below).
The cyclic interaction of the three different kinds of inference is fundamental to semiosis and therefore to all kinds of inquiry. Cunningham explains the cycle of inference, as follows:

Semiosis is a process of applying signs to understand some phenomenon (induction), reasoning from sign to sign (deduction), and/or inventing signs to make sense of some new experience (abduction). These modes of inference are cyclic, characterizing the development of Umwelten throughout life: Signs are invented to account for experience; these signs are linked to existing sign structures and then used to define the Umwelt for that organism. But the world is not infinitely malleable to our sign structures, and the abductive will again be instigated (Cunningham 1992, p.185).

In fact, this cyclical process, which is both iterative and recursive, is central to all kinds of research. Researchers reason to the best explanations through abduction, check these against the brute force of the world through induction and develop arguments through deduction.

Dewey’s theory of inquiry greatly elaborates on this inferential process first explored by Pierce. Building on Peircean logic and semiotics, Dewey’s theory of inquiry, encapsulated in How We Think (1933) and Logic: The Theory of Inquiry (1938), provides a detailed explanation of the fixation of belief through an experimental process of ‘observation, inference and reasoning’ (Dewey 1938, p.163). In his earlier work, Dewey uses the term ‘reflective thinking’, which he defines as ‘the kind of thinking that consists in turning a subject over in the mind and giving it serious and consecutive consideration’ (1933, p.3). In his later work, Dewey prefers the term ‘inquiry’ over ‘reflective thinking’ because the latter could be taken for some kind of mental faculty that is prior to inquiry (such as cognitivist
conceptions of ‘reflection’), and he rejects psychological approaches to inquiry as irrelevant (1938, p.21). Dewey defines inquiry as ‘directed or controlled transformation of an indeterminate situation into a determinately unified one’ (1938, p.116). Although his concept of transaction has been applied to reading and writing studies (as reviewed in section 4.4 below), the great potential of his theory of inquiry for research writing has yet to be fully realised.

Dewey’s theory of inquiry thoroughly explicates experimentation as the fixation of belief. In his experimental or instrumental approach, inquiry involves the use of instrumental means to assemble and transform material resources. Contrary to cognitivist accounts of problem-solving, Deweyan inquiry is never separated from the environment in which it occurs. Central to his conception of inquiry is an experimental method of reshaping materials with instrumental means towards the ends of inquiry. He writes that ‘all controlled inquiry and all institution of grounded assertion necessarily contains a practical factor; an activity of doing and making which reshapes antecedent existential material which sets out the problem of inquiry’ (1938, p.160). According to Dewey, ‘thinking is no different in kind from the use of natural materials and energies, say fire and tools, to refine, re-order, and shape other natural materials, say ore’ (1926, p.67). Furthermore, his experimental approach is as applicable to secondary research as it is to primary research, and can help to explain the way in which experimentation operates in research from sources.

Several remarks by Dewey help to clarify the relevance of his experimental method
for research from sources. Firstly, all of the elements and operations of inquiry are equally integral to the writer’s experience, since ‘in a proper conception of experience, inference, reasoning and conceptual structures are as experiential as is observation’ (1938, p.38) and ‘symbols have the same logical status as existential data’ (1938, p.395). Secondly, just as the subject matter presented in court-hearings (witness testimonies and written records), which Dewey discusses, is ‘capable of direct observation and has existential reference’ (1938, p.121), so is the subject matter of secondary research (articles, books and other sources). Furthermore, the basic process of secondary research is no different from that of primary research:

The processes involved in the work of analysing and reordering accepted material cannot, it seems to me, be any different from those involved in any strictly existential inquiry. Thorough familiarity with material, sagacity in discrimination, acuteness in detection of leads or clews, persistence and thoroughness in following them through, cherishing and developing suggestions that arise, are required in one as in the other (Dewey 1938, p.485).

In fact, such experimentation is essential for Dewey: ‘the conditions for complete mental activity do not exist unless adequate provision is made for carrying on activities that actually modify physical conditions, and books, pictures, and even objects, that are passively observed but not manipulated do not furnish the required provision’ (1933, p.188). Since the material used in research from sources is existential and capable of observation and since the basic processes involved in reshaping this material are basically the same, Peirce and Dewey’s experimental method is just as relevant for secondary research as it is for primary research.

As prefigured in Chapter 1, Dewey views all inquiry as progressive and necessarily
occurring over time, but proceeding through contingent phases, rather than a rigid series of steps. In his explanation of the process of inquiry, he prefers the terms ‘phases’ or ‘aspects’, rather than ‘steps’ or ‘stages’ (although he does sometimes use these terms). Following Peirce, the heart of Deweyan inquiry is the occurrence of real doubt, followed by a search for resolution. Dewey’s reflective thinking involves ‘(1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring, to find material that will resolve the doubt, settle and dispose of the perplexity’ (1933, p.12). However, he develops this basic process in much more detail. In his two key books on inquiry, Dewey (1933, 1938) provides detailed explanations of the process and it is useful to re-quote these in full. He outlines ‘five phases, or aspects, of reflective thought’ that occur between the initial state of doubt and the resolution:

In between, as states of thinking, are (1) suggestions, in which the mind leaps forward to a possible solution; (2) an intellectualization of the difficulty or perplexity that has been felt (directly experienced) into a problem to be solved; (3) the use of one suggestion after another as a leading idea, or hypothesis, to initiate and guide observation and other operations in collection of factual materials; (4) the mental elaboration of the idea or supposition as an idea or supposition (reasoning, in the sense in which reasoning is a part, not the whole, of inference); and (5) testing the hypothesis by overt or imaginative action (1933, p.107).

Dewey further elaborates as follows:

When the problematic situation is such as to require extensive inquiries to effect its resolution, a series of interactions intervenes. Some observed facts point to an idea that stands for a possible solution. This idea evokes more observations. Some of the newly observed facts link up with those previously observed and are such as to rule out other observed things with respect to their evidential function. The new order of facts suggests a modified idea (hypothesis) which occasions new observations.

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2 This is in stark contrast to the ‘standard model of problem-solving’, which Dewey is said to have influenced (see Pea 1997 and Chapter 2 above).
whose result again determines a new order of facts, and so on until the existing order is both unified and complete. In the course of this serial process, the ideas that represent possible solutions are tested or ‘proved’ (1938, p.113).

Resolving doubt in this way brings the inquiry to an end in two senses of the word: ‘the resolution of an indeterminate situation is the end, in the sense in which “end” means *end-in-view* and in the sense in which it means *close*’ (Dewey 1938, p.158).

Dewey’s theory of inquiry greatly extends Peirce’s inferential cycle in the fixation of belief. As with Peirce, ‘thinking begins in what may fairly enough be called a forked-road situation, a situation that is ambiguous, that presents a dilemma, that proposes alternatives’ (1933, p.14). In the phases of inquiry that follow, a series of abductive, inductive and deductive inferences combine in various ways to expedite the ends of inquiry. Dewey uses the term ‘suggestion’, which seems to be largely synonymous with ‘abduction’, to denote the first phase, involving ‘the formation of some tentative plan or project, the entertaining of some theory that will account for the peculiarities in question, the consideration of some solution to the problem’ (Dewey 1933, p.15). Significantly, Dewey views suggestion as a spontaneous occurrence, rather than an intellectual one:

> The first suggestion occurs spontaneously; it comes to mind automatically; it *springs* up; it ‘pops,’ as we have said, ‘into the mind’; it flashes upon us. There is no direct control of this occurrence; the idea just comes or it does not come; that is all that can be said. There is nothing *intellectual* about its occurrence. The intellectual element consists in what we do with it, how we use it, *after* its sudden occurrence as an idea (Dewey 1933, p.109, original italics).

For Dewey, ‘suggestion’, or ‘abduction’, is not a psychological process, but a kind of intuition that is dependent on the experimental process of inquiry. However,
Dewey does not elaborate on the role of suggestion, nor on the ways in which suggestions occur, as more recent explanations of abduction have done (see section 4.5 below).

While the second and third phases – conceiving of the problem and forming a hypothesis – involve abductive inference to the extent that they involve the formation of new ideas, these phases also involve deduction and induction. Dewey (1938, p.108) writes that defining the problem ‘represents the partial transformation by inquiry of a problematic situation into a determinate situation’ (Dewey 1938, p.107), which is so important because ‘the way in which the problem is conceived decides what specific suggestions are entertained and which are dismissed; what data are selected and which rejected; it is the criterion for relevancy and irrelevancy of hypotheses and conceptual structures’. However, the conceptualisation of problems (in the form of research questions, for example) itself involves both reasoning and testing the statement of the problem against the research materials. Similarly, the formation of hypotheses also involves all three kinds of inference, since hypotheses are developed both ‘in relation to other conceptual structures’ and through experimentation with evidential materials which can also indicate necessary changes to the hypothesis (Dewey 1938, p.112).

While the fourth and fifth stages can be related to deduction and induction respectively, they should not be seen as distinct, but rather as interdependent phases of the same flexible and recursive process of inquiry. Dewey equates deduction with
reasoning in the narrower sense of the development of a series of ideas. Deduction ‘brings out and emphasizes consecutive relationships’ and ‘helps supply intervening or intermediate terms which link together into a consistent whole elements that at first seemingly conflict with each other, some leading the mind to one inference, some to another’ (1933, p.112). Without deductive reasoning, there is no effective inquiry, since ‘only when the succession [of ideas] is so controlled that it is an orderly sequence leading up to a conclusion that contains the intellectual force of the preceding ideas, do we have reflective thought’ (1933, p.47). Such deductive reasoning is connected to the fifth inductive stage involving ‘some kind of testing by overt action to give experimental corroboration, or verification, of the conjectural idea’ (1933, p.113-114). Dewey writes that ‘since the required control can be obtained only through the intermediation of abstract interrelated conceptions, inductive existential determinations are conducted with constant reference to institution and application of conceptions deductively interrelated to one another, while conceptions are chosen and ordered with reference to ultimate existential application’ (1938, p.484). Therefore, deduction and induction can be seen as ‘cooperative phases of the same ultimate operations’ in which there are ‘continued to-and-fro movements between the set of existential propositions about data and the non-existential propositions about related conceptions’ (1938, p.427). The processes involved in both phases are also similar. According to Dewey, ‘the distinction between induction and deduction does not lie then in processes of inquiry but in the direction which the processes take – according as the objective is determination of relevant existential data or relevant and effective interrelated conceptions’ (1938,
p.484). Induction involves selective discrimination of particulars (1938, p.424), as well as ‘experimental operations of transformation of given objects of perception, and institution of new orders of data’ (p.426); while ‘the most “deductive” thought in actual occurrence is a series of trials, observations and selections’ (1926, p.117). This can be seen in research from sources, in which both induction and deduction operate in selecting and reorganising material and using this to support hypotheses.

It is important to stress that although Dewey understands inquiry as a process that necessarily unfolds in phases, the process cannot be reduced to the neat series of steps in the standard linear problem-solving model. It is true that Dewey views inquiry as ‘progressive determination of a problem and its possible solution’ in which ‘ideas differ in grade according to the stage of inquiry reached’ – within this process, ideas begin as suggestions that are taken up according to their ‘functional fitness’ and ‘capacity as a means of resolving the given situation’ (1938, p.110). However, Dewey stresses that these five phases or functions of reflective reasoning ‘do not follow one another in a set order’. Rather, ‘each step in genuine thinking does something to perfect the formation of a suggestion and promote its change into a leading idea or directive hypothesis’ (1933, p.115). Furthermore, the process is not one linear process, but a recursive transaction that depends on the contingencies of its unfolding:

In practice, two [phases] may telescope, some of them may be passed over hurriedly, and the burden of reaching a conclusion may fall mainly on a single phase, which will then require a seemingly disproportionate development. No set rules can be laid down on such matters. The way they are managed depends on the intellectual tact and sensitiveness of the individual (1933, p.116).
Nor are the various phases of the process dependent upon the order of previous processes:

The elaboration of the hypothesis does not wait until the problem has been defined and an adequate hypothesis has been arrived at; it may come at any intermediate time. And as we have just seen, any particular overt test need not be final; it may be introductory to new observations and new suggestions, according to what happens in consequence of it (1933, p.116).

Within this dialectical process, Dewey stresses that the operations of inquiry are both intermediate and instrumental and this also applies to questions, propositions and other instrumentalities. He writes that ‘inquiry is progressive and cumulative’ and that ‘propositions are the instruments by which provisional conclusions of preparatory inquiries are summed up, recorded and retained for subsequent uses’ (1938, p.311). As provisional and intermediary, ‘all propositions as distinct from judgements have an interrogative aspect’ that help to further inquiry (1938, p.162) and ‘inquiry and questioning, up to a certain point, are synonymous terms’ (1938, p.105). One of the most essential aspects of all research is judging which questions to ask in order to formulate the ‘best methods of observation, experimentation and conceptual interpretation’ (1938, p.170). The formation of questions and the resolution of doubt themselves occur on many levels. Dewey writes that ‘complex questions involve a constellation of sub-problems, and the solution of each of them is a resolution of some tension’ (1938, p.176), just as ‘the final judgement is attained through a series of partial judgements’ (1933, p.133). He writes that ‘determination of what questions to ask and how to ask them is an affair of judging what should be done in order to secure the materials, factual and conceptual, which is necessary and sufficient to resolve an unsettled situation’ (1938, p.170).
Similarly, the propositions that are developed in inquiry are often temporary means to greater understanding and ‘in an inquiry of any high degree of difficulty many propositions are entertained during its course only to be discarded or modified in subsequent inquiry’ (1938, p.311). While propositions and other logical forms are instrumental in the progressive nature of inquiry, they should not be treated prescriptively:

The logical forms that characterize conclusions reached and adopted cannot therefore prescribe the way in which we should attempt to arrive at a conclusion when we are still in a condition of doubt and inquiry. Yet partial conclusions emerge during the course of reflection. There are temporary stopping places, landings of past thought that are also stations of departure for subsequent thought (1933, p.75).

Such qualifications again highlight the difference between the standard model of problem-solving, with its clear planning stage and Dewey’s approach, in which plans should be treated as ‘hypotheses directive of practical operations, not truths or dogmas’ (1938, p.512).

Like all operations involving doing and making and the reshaping of antecedent existential material, the operations of inquiry ‘involve both material and instrumentalities’ (1938, p.15). The existential materials of inquiry are facts, while the instrumentalities are ideas, concepts, hypotheses and other logical forms. Two essential kinds of operation that function together are operations of observation and operations of reasoning: ‘operations of observation, collection of data and inference … are directed by ideas whose material is itself examined through operations of ideational comparison and organization’ (1938, p.161). While both facts and
concepts function as materials in inquiry, concepts and ideas also function as instrumentalities. Within operations of inquiry, facts circumscribe the problem and provide existential material, while concepts and hypotheses ‘anticipate a possible solution’ and ‘direct observational operations’ (1938, p.124). Therefore, inquiry can be largely understood as the ‘application of conceptions and hypotheses to existential matters through the medium of doing and making’ (1938, p.439), ‘the kind of doing and making ... which determines means – material and procedural – of effecting a prospective end, a unified situation, as a consequence’ (1938, p.461).

Dewey also stresses that inquiry is ‘a process of progressive and cumulative re-organization of antecedent conditions ... of temporal transition effected in existential materials’ (1938, p.246). This emphasis on transformation of the existential matter of inquiry rather than of the mental states of the inquirer is an essential difference between Dewey’s conception of inquiry and cognitivist conceptions of problem-solving. Rather than merely being a ‘practical convenience nor yet a means of modifying states of mind ... inquiry effects existential transformation of the existential material that instigates inquiry’ (1938, p.463). This is essential because ‘without deliberate variation of given existential conditions, the latter as given neither circumscribe nor describe the problem to be solved by inquiry, nor provide material that adequately tests any proposed solution’ (1938, p.463). Biesta and Burbules stress ‘the importance of existential operations in the process of knowing, either as the manipulation of or intervention into what is being investigated, or as the changing of the conditions under which what is being investigated is observed and examined’ (2003, p.91).
Although, in any inquiry, operations of observation and operations of reasoning can be distinguished, these operations always function together. As Biesta and Burbules point out (2003, p.59), ‘the process of inquiry thus consists of the cooperation of two kinds of operations: existential operations (the actual transformation of the situation) and conceptual operations (reflection or thinking)’. Operations of observation are largely concerned with the shaping of subject matter so that it ‘lends itself to the application of conceptions as modes of operation’ (1938, p.15). This is according to Dewey’s definition of observation as ‘the restrictive-selective determination of a particular object or quality within a total environing field’ (1938, p.150). In other words, observation always involves selection from that field.

Operations of discourse concern the ‘development of such conceptual structures as are applicable to existential conditions’ (1938, p.16) and the way in which concepts used in combination deductively generate other concepts (1926, p.198), gradually becoming ‘a logical system, whose portions are deductively connected with one another’ (1929, p.117). These operations always work together in a functional correspondence that is essential to controlled inquiry because ‘the more material and instrumentalities are shaped in advance with a view to their operating in conjunction with each other as means to consequences, the better the operations are controlled’ (1938, p.15) and therefore ‘specific contents, factual or conceptual, as well as forms in which they are ordered, are determined in strict correspondence with each other’ (1938, p.372). On the one hand, ‘fact-finding procedures are necessary for (1) determination of problems and for (2) provision of data that indicate and test
hypotheses; while formulation of conceptual structures and frames of reference is necessary to guide observation in discriminating and ordering data” (1938, p.507). Ideas or meanings ‘when developed in discourse [direct] the activities which, when executed, provide needed evidential materials’ (1938, p.112). Universes of discourse and conceptual structures are what determine ‘the significance of factual material’ (1938, p.121) since concepts have the ‘capacity to order and organize particulars into a coherent whole’ (1938, p.157). In the example from geology referred to earlier, Dewey writes:

No inference is possible from the observed rock in isolation to the object inferred. But when it is ordered, by means of a complex conceptual structure, in conjunction with a multitude of materially independent data, the inferred position is taken to be warranted (1938, p.466).

Both observation and the formation of conceptions are co-operational in Dewey’s dialectic of inquiry.

In line with his conception of the essential operations of inquiry, Dewey distinguishes two kinds of propositions, which continually interact in the gradual resolution of the problem (and, in the case of secondary research, in the construction of the text): ‘on one side, sets of propositions in the relations which ground an inferential conclusion, and on the other side, series of propositions in the relations that constitute ordered discourse’ (1938, p.347). Propositions about subject-contents, or factual data, function as material means (1938, p.136) or as ‘the factual or existential materials which determine the final subject of judgement’ (1938, p.311). These propositions enable inferences to be made (1938, p.311) and are related like ‘lines that intersect one another and which, in intersecting, describe a configurate
area’ (1938, p.318). Propositions about meanings and their relations function as procedural means and underlie the construction of discourse. They are related to one another as ‘the ideational material, the conceptual meanings, which determine the predicate of the final judgement’ (1938, p.311). They are also essential in developing formulated relations between ideas and need to be developed in an ordered series, which Dewey describes as ‘the rungs in a ladder’ (1938, p.318). As the essential operations of inquiry, ‘the two types of propositions are conjugate, or functionally correspondent’ and ‘form the fundamental divisions of labour in inquiry’ (1938, p.255). In connection with the problem under investigation, ‘propositions about observed facts correspond strictly with conceptual subject-matter by means of which they are ordered and interpreted’ (1938, p.233).

As in composing, an essential aspect of inquiry is the determination of relations. Dewey writes that ‘understanding, comprehension, means that the various parts of the information acquired are grasped in their relations to one another’ (1933, p.78, my emphasis) and ‘that particular set of relations which is relevant to the problem in hand has to be determined’ (1938, p.511). As Biesta and Burbules write, ‘knowledge is always knowledge-of-relations’ (2003, p.85).

Within the broader context of semiosis, both composing and inquiry also unfold through the action of forms that find other forms. For Dewey, logical forms are not static entities but instrumentalities for inquiry:

Definition, general formulae, and classification are the devices by which the fixation of a meaning and its elaboration into its ramifications are carried on. They are not ends in themselves – as they are frequently regarded even in elementary education – but instrumentalities for facilitating understanding, aids to
interpretation of the obscure and the explanation of the puzzling (Dewey 1933, p.182).

Furthermore, the operation of logical forms is entirely subservient to the ends of inquiry: ‘all logical forms (with their characteristic properties) arise within the operation of inquiry and are concerned with control of inquiry so that it may yield warranted assertions’ (1938, p.4), which are made ‘in the service of specified ends’ (1938, p.386). What is important for Dewey is ‘contents having a certain form’ (1938, p.12, original emphasis) and ‘the relation of form and matter is that of the connection of methods with the existential material instituted and ordered by methods’ (1938, p.470). Logical forms are not inherent properties of texts, nor mental operations, but conditions that can only be satisfied ‘by means of extensive and complex existential operations performed on existential materials’ (1938, p.379). However, in inquiry, as in composing, forming is not entirely intentional: ‘logical forms accrue to subject-matter when the latter is subjected to controlled inquiry’ (1933, p.101, my italics). Just as semiosis is something that happens to us, ‘we bring together logical universals in discourse, where they copulate and breed new meanings’ (1926, p.194).

4.4 Pragmatic Semiotic Perspectives on Writing

Despite its growing importance in education, the work of Peirce, Dewey and Deleuze is virtually unknown in the fields that inform research writing instruction. Rhodes (1998, p.237) writes that, as a result of the work of Berthoff (1981, 1982a,
1982b, 1999), ‘Peirce’s pragmatic semiotics may have a very wide influence in composition practice, despite the relative lack of attention in composition scholarship’. He adds, however, that ‘the greatest significance of Peirce’s pragmatic semiotics remains unrealized in scholarly work in composition’ (1998, p.237). Berthoff’s work provides a useful starting point for further development of a pragmatic semiotic perspective on writing in general and research writing, more specifically. As the title of her book The Making of Meaning (1981) suggests, Berthoff’s primary focus is on meaning-making. Following Peirce, Berthoff stresses the need to understand that ‘meaning is a three-valued relationship’ (Berthoff 1999, p.671). She uses the diagram in Figure 4.3 to represent the ‘triadicity of meaning relationships’, which she also views as a ‘theory of language as mediating form’ (1981, p.44). Berthoff uses her own terms in the original diagram, although she uses Peirce’s terms in other articles, for example: ‘the central tenet of Peirce’s semiotics is that one sign requires another for its interpretation; that is to say, the Representamen (sign) and its Object (Referent) are mediated by the Interpretant’ (1982b, p.74).

![Figure 4.3: The Triadic Sign Relation in Berthoff (1981) (Peirce’s terms added in brackets)](image-url)
Berthoff explains the diagram as follows:

The diagram represents the ‘sign,’ or what I’ve been calling the ‘meaning relationship’. What the word stands for – the referent – is known in terms of the reference. The dotted line stands for the fact that there is no immediate, direct relationship between words and things (including other words); we interpret the word or symbol by means of the idea it represents to us. It takes an idea to find an idea. We know reality in terms of our ideas of reality. This curious triangle with the dotted line can help us remember that what we know, we know by means of mediating form. The triangle represents mediation, the interdependence of interpreter (what he already knows), the symbol (image or word), and the import or significance it has (1981, p.44).

This triadic conception of signs emphasises that ‘constructing and construing, writing and reading and perceiving are all acts of interpretation’ (1981, p.36). Therefore, it can ‘help us to focus on ways to bring students to see texts as the intermediary form of a process of making meaning that began in mysterious and unknowable ways, unfolding in sometimes predictable ways and sometimes in surprising ways, and which continues as texts are construed and reconstructed’ (1981, p.44). For Berthoff, all texts are signs that are continually open to interpretation.

In fact, in seeking to understand the creative, interpretative process of composing, Berthoff explicitly rejects the ‘notion of the sign relationship as dyadic, constituted by a signifier and a signified’, which ‘removes intention, purpose, and interpretation from consideration’ (1981, p.108), in favour of Peirce’s ‘formulation that one sign requires for its interpretation another sign’ (1981, p.109). The essential difference is that, in Peirce’s triadic conception of the sign, ‘meaning does not subsist in lexical definition but requires context and perspective’ and includes ‘the meaning-maker.
and the idea he thinks with, not just the sign and what it stands for’ (1981, p.109).
Unlike dictionary definitions, ‘meaning is dynamic and dialectical ... it depends on context and perspective, the setting in which it is seen and the angle from which it is seen’ (1981, p.42) just as ‘there is no empty sign, no clean machine awaiting its competent operator’ (Berthoff, 1999, p.671).

Berthoff’s work provides a useful entry point for a pragmatic semiotic approach to the development of teaching and learning environments for research writing, since her main concern is how writing can be taught and learned. For Berthoff, composing is essentially a dialectic process of ‘forming concepts, making meaning, finding and creating forms’ (1982a, p.2), in which forms find other forms and relationships. She conceives of ‘a continuum of making meaning’ in which writing and reading are analogous to all creative processes by which we make sense of the world (1981, p.61). Not only does ‘the process of construing – making sense of a text’ involve ‘the same acts of mind as constructing – creating a composition’, such as ‘questions, paraphrases, transformations, abstract oppositions of all kinds’ (1982a, p.213), but reading and writing are ‘fundamentally analogous to what we do when we interpret any situation, event, state of affairs’ (1981, p.10). With particular relevance for research writing, Berthoff’s understanding of composition is also analogous to what happens in inquiry or research:

Composing – putting things together – is a continuum, a process that continues without any sharp breaks. Making sense of the world is composing. It includes being puzzled, being mistaken, and then suddenly seeing things for what they probably are ... writing is like the composing we do all the time when we respond to the world, make up our minds, try to figure out things again (1982a, p.11).
The key point of analogy is that composing is essentially forming and therefore writing is ‘analogous to all other forming’ (1981, p.28). This process is active: ‘meanings don’t just happen: we make them; we find and form them’ (1981, p.69).

As in all acts of meaning-making, the composing ‘mind in action selects and orders, matches and balances, sorting and gathering as it shapes meanings and controls their interdependencies’ (1982b, p.69).

The chief speculative instruments in this constructive process are perception or imagination, and language or dialogue, which work together in the construction of meaning. Berthoff places great importance on the imagination as a speculative instrument: ‘if we can reclaim the imagination as the forming power of the mind, we will have the theoretical wherewithal for teaching composition as a mode of thinking and a way of learning’ (1981, p.64). This is because ‘the imagination is the shaping power: perception works by forming – finding forms, creating forms, interpreting forms’ (1981, p.64). Furthermore, the imagination is not confined to the initial stages of writing, because ‘writing at all stages is a way of seeing ideas develop’ (1981, p.77) and ‘perception is a model of all form-creating and form-finding’ in both writing and reading (1982b, p.68). For Berthoff, ‘visualizing, making meaning by means of mental images, is the paradigm of all acts of mind: imagining is forming par excellence, and it is therefore the emblem of the mind’s power’ (1981, p.65). Perception is even ‘fundamental to conception, to concept formation’ (1981, p.36).

The second speculative instrument that Berthoff emphasises is language and
dialogue: ‘if we can learn to think of language not as a tool, a single-purpose facilitator, but as an instrument that lets us see in many different ways – as both microscope and telescope, x-ray and radar – then we can better discover how to make room at the centre of all our courses for interpretation, for the study of meaning’ (1981, p.42). She stresses the necessity for ‘ways of thinking of language as an instrument, a means of seeing and articulating relationships’ (1981, p.10) and for ‘linguistic forms, syntactical and rhetorical structures’ to be provided ‘not for imitation but for use as speculative instruments’ (1981, p.77). Language is not a vehicle for thought, but an instrument for thinking more clearly, just as thinking directs the use of linguistic and rhetorical forms. This is because ‘the relationship between thought and language is dialectical; ideas are conceived by language; language is generated by thought’ (1982a, p.47). In fact, Berthoff sees writing as a dialectic process by which a range of apparent oppositions are resolved.

Composing is also ‘a dialectic of chaos and form’ (1982a, p.65). Chaos refers to the disorganised material that writers often generate through ‘pre-writing’ activities such as brainstorming, listing and clustering. Although such activity may consist of chaotic, random thoughts, it is essential to have ‘a chaos of names’ and to have done ‘some preliminary opposing’ so as to have material to use ‘as forms to find forms, linguistic structures to help you to discover and formulate relationships and thus to make meanings in making statements’ (1982a, p.136). Therefore, Berthoff stresses the need for writers to understand how to use chaos:

Knowing that chaos is the source is the condition of knowing how to use it.
Learning the use of chaos is a method for learning to intuit the relationship of parts
in a whole that is coming into being, which in compositional terms means coming to *mean*: the juncture of thought and language is the making of meaning (1981, p.57).

By generating an initial chaos of ideas, writers begin to map out the text that will eventually emerge: ‘the ambiguities and complexities of composing are right there from the beginning’ and ‘elements of what we want to end with must be present in some form from the first; otherwise, we will never get to them’ (1982a, p.3). Furthermore, pre-writing modes are translatable: ‘the reason that free writing, listing, and other modes of pre-writing can lead to something else is that the seemingly shapeless, seemingly random words, the images and phrases and fragments are stand-ins for fuller statements, for relationships, for assertions and questions’ (Berthoff 1981, p.38).

Another critical dimension of writing is the ‘dialectic of parts and bundles’ (Berthoff 1982a, p.157). Writing essentially involves perceiving relationships and assembling parts into wholes; hence, the need to ‘teach ways and means of finding, inventing, rediscovering, selecting, shaping, and assembling parts into bundles of several kinds’ (1981, p.20). Writers also need to know that ‘discovering the parts and developing ways of bundling them are interdependent operations’ (1982a, p.3).

Indeed, one of the major difficulties of constructing a complex, multigeneric text, such as a research paper or thesis, is the need to simultaneously discover the parts and organise them into the emerging whole:

what makes it hard is that you have to do two things at once: you have to bundle the parts as if you knew what the whole was going to be and you have to figure out the whole in order to decide which parts are going to fit and which are not. The only
way to do that is to keep everything tentative, recognizing that getting the parts
together, figuring out the whole, is a dialectic process (Berthoff 1982a, p.47).

Critically, both the intuition of relationships and the formation of concepts are
instrumental in this tentative process. For Berthoff, as for Peirce, intuition and
concept formation are not distinct domains, but interconnected dimensions of
thinking. Forming in writing occurs through two modes of ‘abstracting’: ‘successive
generalization’, and ‘direct insight’ (1981, p.61). Rather than distinct domains, the
affective and cognitive dimensions of composing are two complementary forms of
abstraction: ‘that which forms by means of successive generalizations and that
which forms without conscious, deliberate generalizing’ (1981, p.3).

The various kinds of forming that underlie writing as a constructive process function
to both impose limits and to open up new possibilities. Many forms act to provide
limits: ‘throughout the composing process the writer is engaged in limiting: selecting
and differentiating are ways of limiting; we limit when we compare, classify,
amalgamate, and discard; defining is, by definition, a setting of limits’ (1981, p.78).
Analogy, on the other hand, which Berthoff identifies as ‘the principal means of
articulating relationships and thus of forming concepts’ (1982a, p.136), enables the
writer ‘to see the familiar in fresh ways and to assimilate the strange by pretending
that it’s familiar by inventing a perspective from which it would be familiar’ (1982a,
p.137).

What drives the dialectic of composing? Here, Berthoff invokes Peirce’s theory of
meaning or pragmatic maxim. This is most directly expressed in his own classical
definition: ‘Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object’ (CP 5.438). Berthoff interprets Peirce’s maxim very practically in relation to the act of writing and expresses this in the form of a question: ‘How does it change your meaning if you put it this way?’ (1981, p.71). As a process of ‘transforming’, writing is a ‘way of seeing what-would-happen-if’ (1982a, p.136). Putting things in another way is essential to writing, since ‘transformations are one of the chief means by which the rhetorician/composer can put things in a new light and thus clarify relationships and form concepts’ (1982a, p.136). The dialectic of composing turns on the choices that writers make and the consequences of these choices for the meaning of what they write.

Rhodes notes that ‘while Berthoff’s work has been prominently published, highly praised, and often cited, there has been surprisingly little effort by other composition theorists to extend her Peircean line of inquiry’ (p.236). This is possibly partly due to the fact that while Berthoff pioneered a Peircean understanding of writing, she seldom directly acknowledges the influence of Peirce, apart from in later articles (for example, 1999), and seldom uses his terminology. Although Berthoff’s work is not essentially concerned with research from sources, it complements Dewey’s theory of inquiry, which provides a conceptual framework for the adaptation of Berthoff’s Peircean approach to writing in general to research from sources as a more specific, inquiry-based form.
The impact of Dewey’s philosophy on composition and reading studies has been greater than that of Peirce, but still remains relatively implicit. Given the enormous influence of Dewey on educational philosophy in general (Biesta and Burbules 2003; Phillips 2008), his influence on composition studies is not surprising. Thirty years ago, Emig wrote that ‘John Dewey is everywhere in our work’ (1980) and, more recently, Fishman (1993, p.315) added that ‘as Emig suggests, understanding Dewey is essential for understanding ourselves, for understanding the discussion among competing theories which has been the field’s focus the past twenty-five years’. Over the years, a number of composition and reading theorists and practitioners have built on Dewey’s philosophy (Rosenblatt 1978, 1993; Emig 1980; Phelps 1988; Newkirk 1989; Russell 1993; Fishman 1993; Jones 1996; Crick 2003). However, as Crick points out, ‘despite the intermittent appeals to Dewey’s tacit role in the history of composition, “explications of Dewey’s role have been few”’ (2003, p.315), and with the exceptions of these works, Dewey remains a source largely untapped’ (p.258, citing Fishman 1993).

Of all Dewey’s ideas, the most influential on theories of writing seems to have been the concept of transaction, largely through the influence of Rosenblatt’s (1978, 1993) transactional approach to reading. In relation to reading and writing, on the one hand, the meaning of texts is conditioned by the individuals who produce or receive them: ‘each individual, whether speaker, listener, writer, or reader, brings to the transaction a personal linguistic-experiential reservoir, the residue of past transactions in life and language’ (p.381). On the other hand, acts of interpretation
are ‘partly “constructed” from the resources of public discourse’ (Crick 2003, p.269). Therefore, Dewey’s transactional approach ‘dissolves the binary between external discourse and inner experience’ (p.270), between ‘pregiven mind and pregiven discourse’ (p.272). The concept of transaction illuminates writing as ‘a mutual shaping of author, culture and text’ (Fishman 1993, p.323), in which ‘students and their texts mutually shape one another’ so that ‘what is at stake in the construction of a new text is the construction of a new self’ (p.326). Like all acts of expression, writing requires ‘a gradual process of experimentation and criticism to succeed in the artistic manipulation of objects and symbols’ – it is ‘a prolonged interaction of something issuing from the self with objective conditions, a process in which both of them acquire a form and order they did not at first possess’ (Dewey 1934, p.255, cited in Crick 2003, p.255). This Deweyan view of writing clearly complements Berthoff’s view of writing as forming, but emphasises the way in which the writer’s subjectivity is formed alongside the text.

Several authors have also drawn attention to the relevance of Deleuze’s philosophy for the practice and pedagogy of writing in higher education (James and McInnes 2001). For the writer, ‘writing is not just a cognitive or linguistic skill but is part of a more complex, elaborate and uncertain gendered, affective, and psychic process of becoming’ (James and McInnes 2001, p.3). This is why ‘every assemblage of self has both movements of reterritorialization [a remaking of what is known and how it is known] which tend to fix and stabilise its elements and “cutting edges of deterritorialization [which destabilise the ‘knowings’] which carry it away…”‘
Although Deleuze and Guattari’s concepts are the least familiar to the fields that influence the design of teaching and learning environments, they complement Peirce and Dewey’s semiotics in important directions that are further developed below and in the Conclusion.

4.5 Recent Work on Abductive and Diagrammatic Reasoning

More recently, in the broader field of education, important work has been done on abductive and diagrammatic reasoning as methods of discovery in research and knowledge construction. A key question that has driven this research is: What exactly is abduction and how does it occur? Although abduction has a logical structure, this does not explain how it actually occurs. While formal abductive reasoning is doubtless employed, consciously or unconsciously, in acts of meaning-making and discovery, it is always contextualised in experiential and experimental inquiry. As Magnani writes, ‘theoretical abduction certainly illustrates much of what is important in creative reasoning … but … fails to account for those cases in which there is a kind of “discovering through doing”‘ (2005, p.265). Recent work in a number of educational fields has investigated the practical ways in which abductions occur.

New ideas arise from the interaction of numerous means in all forms of meaning-making and inquiry, including research from sources. Paavola and Hakkarainen
make this clear: ‘When understood as a part of actual problem-solving processes of human inquirers, the abductive search for ideas in inquiry and learning is a part of the on-going activity where cultural, collaborative, and material means constrain and instigate the search for new ideas’ (2005, p.237). They add that ‘in an abductive model, new ideas emerge by taking various clues and restrictions into account, and by searching and combining existing ideas in novel ways’ (2005, p.248). In this experimental process, ‘various kinds of sign processes (symbolic, indexical, iconic) mediate the search for new ideas’ (2005, p.250). Writers interact with the full range of semiotic and other resources available: ‘puzzling phenomena and observations, tacit knowledge, clues from the material world and from the research object, existing ideas, cultural knowledge and tools, social interaction – all these provide material and direction for new ideas’ (Paavola and Hakkarainen 2005, p.250). Furthermore, as Semetsky (2006, p.50) points out, abduction is a ‘necessary component of the logic of discovery or hypothesis-generation’, but so are deduction and induction.

Within these complex interactions, abductions occur through the search for patterns, in which various phenomena and background knowledge provide both constraints on and suggestions for new ideas. Paavola stresses that ‘the whole strategic situation must be taken into account’ in abductive reasoning, which means that ‘more than one step or move can and must be taken into account at the same time’ (2004a, p.270, original italics) and ‘one must not just concentrate on the form of argument’ (2004a, p.272). This is because the ‘hypotheses are to be searched for in relation to various phenomena and background information and not just in order to explain one,
surprising phenomenon’ (2004a, p.270). For Paavola, ‘the basis for the aha-
experience is a situation where, first, various constraints and hints characterize the
situation and then some solution seems to fit with these constraints’ and ‘take into
account many counter-arguments and moves in advance’ (2004a, p.273). Therefore,
inquiry requires a degree of strategic thinking:

   The inquirer must be able to combine the new ideas with existing knowledge or
   constraints (or to be able to show that the existing knowledge is in some ways
   inadequate). These constraints can be negative, in a sense that they inhibit new
   ideas, but they can also be positive in suggesting methods, theories, information and
   so on which must be taken into account and which might give clues how to solve
   the problems in question (Paavola 2004a, p.273).

A large part of inquiry involves reworking existing knowledge (Paavola 2004a,
p.278) and often the hypotheses are present in some form from the outset. As Peirce
writes: ‘it is true that the different elements of the hypothesis were in our minds
before; but it is the idea of putting together what we had never before dreamed of
putting together which flashes the new suggestion before our contemplation’ (Peirce
CP 5.181, cited in Paavola 2004a, p.272). Therefore, ‘the difficult part in discovery
is the recognition that the hypothesis really is a viable way of solving this particular
problem’ (2004a, p.273). Paavola refers to Hanson’s logic of discovery, also derived
from Peirce, to explain this search for an overall pattern. In this process, one:

   1) proceeds retroductively, from an anomaly to
   2) the delineation of a kind of explanatory H which
   3) fits into an organized pattern of concepts
   (Paavola 2004a, p.279).

Therefore, the goal is to find a general pattern or explanation, which involves taking
all of the evidence, both constraints and clues, into account. Within this overall
strategy, a number of other strategies and methods are often employed.

A well-known and frequently discussed strategy in inquiry, particularly in formal research, is the use of questions. According to Sintonen, ‘the process of abduction characteristically involves a series of strategically organized question-answer sequences’ (2004, p.251). It is ‘a model-based game in which an inquirer subjects a source of information (such as Nature or a community of fellow knowledge seekers or even a database) to a series of strategically organized questions’ (p.254). The game is ‘model-based in that it is, at any given time, tied to a particular model M and its language’ (p.255) – abduction always occurs in the context of particular codes of practice or discourse. This questioning strategy involves the formation of questions ‘in two sizes, large and small ones, where the small questions have the instrumental role of bringing in information needed in the construction of the answer to the big initial question’ (p.254). Researchers need to ask good small or operational questions: ‘a good question is something which, if an answer is forthcoming, would get us closer to constructing an answer to the initial one’ (2004, p.256). Therefore, ‘by finding answers to subordinate questions, an agent approaches step by step toward answering the big initial question, and thus changes his or her epistemic situation’ (2004, p.263). It is important to note that ‘abductive reasoning is not a single-step procedure but rather involves fathoming a series of question-answer steps’ (p.262) in which ‘questions are used as premises as well as conclusions, and the result is a logic of question-transformation’ in which questions are also ‘reformulated or abandoned’ (p.264). The use of questions in inquiry can be
seen as a form of dialogue, both with the phenomena under investigation and with fellow inquirers, in which asking the right questions gradually leads to the resolution of the problem.

The use of diagrams such as concept maps in the creation of new ideas has also been investigated. Dewey states that ‘physical and imaginative shaping of material so that it takes the form of diagrammatic representation’ is one of the necessities of inquiry (1938, p.484). Berthoff also recognises the value of diagramming (1990, p.19) and the pervasiveness of diagrams in many forms of reading and writing, noting that ‘a gloss or paraphrase or abstract is a skeletal structure by which you can represent those relationships that are meanings’ (Berthoff 1982a, p.220). More recently, several authors have specifically suggested the fit between concept-mapping and Peircean or triadic semiotics, based on the results of empirical studies. For example, Kankunnen (2001, p.288) writes that Peirce’s semiotic paradigm provides ‘a framework for understanding the “connection-making of meaning-making”’ in concept-mapping, while Kosonen, Ilomäki and Lakkala (2008, p.261) write that concept mapping can support knowledge creation and triological learning (explained below).

In fact, there are several reasons for the potential of diagramming tools, such as concept maps, to afford abductive reasoning. The first is the way that they combine several kinds of signs in a visual, manipulable display. Concept maps can be used to both create conceptual relations and restructure these relations as the process of
writing unfolds. Just as we ‘consider geographic knowledge on a map, we see key representations of the essential connections among mountains, valleys, and rivers’, so ‘visual tools are used primarily to make and represent connections among ideas and concepts’ (Hyerle 1996, p.9). The visual nature of concept maps not only supports the writer, but creates a ‘concrete shared mediating object for collaborative working’ (Kosonen, Ilomäki and Lakkala 2008, p.261) and provides “‘snapshots’ tied to a moment in time’ (Kankunnen 2001, p.316) that can enable teachers to “‘read’ students’ thoughts more accurately than before’ (Kankunnen 2001, p.320).

Secondly, since they are easily manipulable, concept maps enable instrumental operations of inquiry. Referring to Peirce’s emphasis on the importance of modifying habits in learning and development, Kankunnen writes that ‘concept mapping serves as an aid to abductive reasoning (a tool to help students to acquire “the habit of changing habits”) because it allows for continuous concept updating and gives students access to the verbal and non-verbal signs needed to build new and meaningful connections’ (2001, p.318). Kosonen, Ilomäki and Lakkala (2008 p.261) also write that if concept maps are reorganised and re-written after meetings, they can support the ‘transformation and reflection between various forms of knowledge’ and that this ‘iterative updating’ serves ‘long-term knowledge advancement’. The potential of Peirce’s concept of diagrammatic reasoning has also been explored in this connection. Peirce defines this as follows:

By diagrammatic reasoning, I mean reasoning which constructs a diagram according to a precept expressed in general terms, performs experiments upon this diagram, notes their results, assures itself that similar experiments performed upon any diagram constructed according to the same precept would have the same
Hoffman and Roth provide another useful account:

Diagrammatic reasoning is a three-step activity that contains constructing representations, experimenting with them, and observing the results. The idea is that by representing a problem in a diagram, ephemeral and fleeting thoughts become concretized in a fixed and visible format, so that self-control of thought and experimenting with our own knowledge and cognitive means becomes possible (2004, p.200).

The importance of diagrammatic reasoning lies in its ability to ‘depict thought’s very movement, its processual character, in terms of interconnecting lines, schemes, figures, abstract mappings’ (Merrell 1995, p.51, cited in Semetsky 2007, p.199). Hoffman and Roth investigate diagrammatic reasoning as part of ‘a dialectical model of learning that explains the development of a knowledge network by an ongoing process of mutual tuning of its nodes’ (2004, p.197). Within this process, they identify two essential preconditions: ‘(a) a representation of this knowledge network in a way that it can become an object of reflection (diagrammatic reasoning) and (b) the capacity to generate new hypotheses in relation to a range of possible interpretations of those representations (abduction)’ (Hoffman and Roth 2004, p.197). Within developing knowledge networks, initially unconnected knowledge forms can be connected in ways that lead to new understandings. The importance of diagrammatic reasoning within this process lies in the fact that ‘crucial for working in a reflective way with one’s own rhizomic knowledge network is that we have to focus on it, that is, we must represent it in signs that we can interpret’ (Hoffman and Roth 2004, p.204). Therefore, Hoffman and Roth (2004, p.204) suggest ‘the development of specific learning environments in which...’
diagrammatic and abductive reasoning play a central role’. Such environments centre on ‘(a) representing given knowledge in diagrams, and (b) generating new hypotheses and new interpretations of those representations by abduction’ (p.204). The visual nature of concept maps enables experimentation and diagrammatic reasoning to occur. Therefore, ‘concept mapping helps students to recognise the reasoning process and learn to control it’ (Kankunnen 2001, p.297) and allows both students and teachers to observe ‘how the reasoning faculties develop, step by step, in relation to the connection-making (meaning-making) process’ (Kankunnen 2001, p.318).

Several authors have also suggested that the iconic nature of diagrams enables the kind of experimentation that leads to abductive inferences. According to Stjernfelt, like all icons, diagrams are unique in that they are the only operational signs, the only kind of signs ‘by the contemplation of which more can be learnt than lies in the directions for its construction’ (2000, p.358). Diagrams such as concept maps are operational in the way that they allow the making of new meanings in the form of new propositions and links, especially diagonal relations between concepts that were not necessary in the construction of the diagram in the first place, but which can lead to new insights. In this way diagrams function as epistemological devices (Stjernfelt 2000, p.378) that can lead to knowledge creation. This operational quality underlies ‘the special role of iconic and perceptual elements in abductive reasoning’ (Paavola 2004a, p.275).
Deleuze and Guattari, however, question the classification of diagrams as icons. In their radical re-interpretation of Peirce’s categories of signs – which includes linking him to a Saussurian paradigm – Deleuze and Guattari develop their own understanding of the differences between indexes, icons and symbols and distinguish the diagram as a separate class of signs of its own:

Peirce’s distinctions are based on signifier-signified relations (contiguity for the index, similitude for the icon, conventional rule for the symbol); this leads him to make the ‘diagram’ a special case of the icon (the icon of relation). Peirce is the true inventor of semiotics. That is why we can borrow his terms, even while changing their connotation. First, indexes, icons, and symbols seem to us to be distinguished by territoriality-deterritorialization relations, not signifier-signified relations. Second, the diagram as a result seems to have a distinct role, irreducible to either the icon or the symbol (Deleuze and Guattari 1988, p.531).

Deleuze and Guattari reinterpret Peirce’s three main kinds of signs as ‘indexes (territorial signs), symbols (deterritorialized signs) and icons (signs of reterritorialization)’ (1988, p.65, original italics). Indexes are territorial signs that act to stabilise the relations between objects or concepts; symbols are deterritorialised because they establish meanings through convention and can easily take them in new directions, while icons reterritorialise objects or concepts by creating certain resemblances.

Diagrams are a special case, since they capture relations in objects without resembling them in any way and also have the capacity to create new meanings. Diagrams such as concept maps are actually sign complexes that contain other signs. They are composed of symbols (words) and indices (lines and arrows) that connect these symbols and stabilise the relations between them. The concept map itself, as a
diagram, maps out the relations between the words and concepts it contains. For Kankunnen, concept mapping can support learning in general, which ‘involves the interaction of a universe of signs, objects, and interpretants while our concepts move closer and closer to their “final” interpretants’ (2001, p.320). Semetsky writes that ‘every mapping engenders the territory (to which it is supposed to refer, as in the classical image of thought), a static representation of the order of references gives way to a relational dynamics of the order of meanings’ (2006, p.80). Like rhizomes or trajectories, diagrams are signs of things to come.

A vital aspect of concept maps created in research from sources is the fact that many of the words they contain are taken from the sources – articles and books – used in the research. Therefore, it is important not to ignore the dialogic aspect of these diagrams, which like all texts in research from sources, reiterate and transform the words of others. Therefore, as well as connecting different semiotic modes, diagrams such as concept maps link words and statements across textual boundaries, deterritorialising and reterritorialising their meanings. As Semetsky writes:

> A map or diagram, in its function of linking discursive and non-discursive modes of expression, acts as a diagonal connection, the purpose of which is to ‘pursue the different series, to travel along the different levels, and cross all thresholds; instead of simply displaying phenomena or statements in their vertical or horizontal dimensions, one must form a transversal or mobile diagonal line’ (Semetsky 2006, p.80, citing Deleuze 1988, p.22).

Diagrams enable writers to combine their own ideas with the words and statements of others in original ways that avoid the pitfalls of plagiarism. Deleuze and Parnet write:
To encounter is to find, to capture, to steal, but there is no method for finding other than long preparation. Stealing is the opposite of plagiarizing, copying, imitating, or doing like (1987, p.7).

As McHoul (1997b) points out, the appropriation of the words of others is a diagonal, transversal process that results in the creation of new ideas.

Finally, several authors have stressed that abductive strategies always interact, or transact, in ecological or sociocultural contexts. Not only do ‘individuals work in particular historical and cultural contexts and in an interaction with other people and their environment while developing new ideas’ (Paavola 2006, p. 7), but ‘cultural, collaborative, and material means constrain and instigate the search for new ideas’ (Paavola and Hakkarainen 2005, p.237). As Paavola writes:

> Even when the inquirer is apparently doing his research individually, he or she is using and developing concepts, theories and observations developed by others, and trying to communicate, develop and defend them for other people. So the focus should not be just on an individual having insights or making inferences but also on the interaction with social and material environments which provide a basis for these insights and inferences (2006, p.9).

Since it involves ‘not just the inquirer’s dialogue with “Nature” (i.e. with the object of inquiry, or with fellow inquirers)’, but also ‘a process where mediating artefacts and processes (like signs, theories, methods) are used and developed’, this sociocultural means of abduction can be referred to as ‘trialogic’ (Paavola, Hakkarainen and Sintonen 2006, p.142). New ideas, or abductions, occur through a variety of means, which is why it is so important for these means to be accommodated in teaching and learning environments.
4.7 Critical Remarks

It should be noted in concluding this chapter that a number of authors presented as proponents of the semiotic pragmatic perspective are also clearly influenced by sociocultural theory. In fact, the affinity between semiotic or pragmatic perspectives and sociocultural perspectives has been frequently noted (Greeno, Collins and Resnick 1996; Duffy and Cunningham 1996; Cunningham 1998; Schuh and Cunningham 2004; van Lier 2004; Prior 2007). The differences between the two perspectives are suggested in the Conclusion.

A possible criticism that should be met here is the use of the terms ‘cognition’, ‘mind’ and ‘distributed cognition’ by proponents of semiotic theory. In discussing the social nature of semiosis, Cunningham writes that ‘cognition … is not an internal, individual, representational process, but rather one which is distributed throughout physical, social, cultural, historical and individual contexts’ (1998, p.830). Along similar lines, Duffy and Cunningham also explicitly associate the mind-as-rhizome metaphor with the concept of distributed cognition, stating that they are ‘not proposing the metaphor of rhizome for an individual mind, but to minds as distributed in social, cultural, historical, and institutional contexts’ (1996, p.177). They refer to ‘the rhizome distributed across minds and cultural artefacts’ (1996, p.179) and write that all learning is ‘a social, dialogical process of construction by distributed, multidimensional selves using tools and signs within contexts created by the various communities with which they interact’ (1996, p.182).
Paavola also proposes a broad sociocultural context for his own semiotic perspective, in which ‘basic conceptions of abduction have to be embedded, to be a part of socially, materially, culturally, and temporally distributed cognition’ (2006, p.1). It could be suggested that such usages of the term are equally guilty of ‘re-describing the socio-cultural world in the terms of the theory of cognitive science’ (Button 2008, p.94) and that the ‘the problematics associated with cognitive science and the objections that are levelled against it’ (p.96) apply equally to the semiotic pragmatic perspective presented here.

Although a full response to such criticism is beyond the scope of this thesis, two brief responses can be given here. The first is to suggest the difficulty of expressing the complexity of the ecological relations explored in section 4.2 above, for which the term ‘distributed cognition’ is perhaps an unfortunate abbreviation. The second response is to appeal to Peirce’s pragmatic maxim and to say that the significance of our understandings ultimately depends on their consequences for our actions. The final chapter of this thesis explores the practical implications of the semiotic pragmatic perspective presented in this chapter for the development of teaching and learning environments for research from sources.
Conclusion

The aim of this thesis was to investigate theoretical frameworks that provide sound understandings of both the research writing process and the effective use of new methods and technologies, such as portfolios and diagramming software, which can facilitate this process. Adequate theoretical accounts of research from sources also need to bring together the individual and social dimensions of writing, from individual problem-solving to collaboration with others and participation in the ongoing dialogue within and between particular disciplines. All adequate accounts of research from sources also need to explain how research writing actually occurs, how it is carried out by individual writers within social contexts and how it involves both process and product on many levels. They also need to accommodate different ways of thinking and learning, communicating and writing, from individual conceptualisation to the appropriation of generic forms. Since research from sources is a form of research, adequate accounts also need to explain it as a mode of inquiry and how the use of tools such as portfolios and diagramming tools can function as means of inquiry. Finally, given the intrinsic difficulty of this metagenre, adequate accounts need to be grounded in sound theories of how people learn and how originality and synthesis are possible. Having explored cognitive constructivist, sociocultural and pragmatic semiotic perspectives on writing, the extent to which each perspective meets these requirements can now be discussed.

From a cognitive-constructivist perspective, research from sources can be viewed as
an individual, goal-driven journey of discovery. Writing is a kind of self-action in which the starting points are the task environment, the representation of the problem and what the writer already knows. Students use a range of heuristics or strategies to construct texts, from brainstorming to planning to drafting in a recursive process. As they read and write, students build internal schemas that transform their cognitive structures and personal knowledge. The construction of text unfolds through multiple representations of the problem as writers transform their unorganised ideas into structured prose. The role of the teacher is to make students aware of the effective strategies or heuristics that can facilitate this process. The use of diagramming software such as Inspiration can also facilitate a range of different strategies as well as enabling students to move backwards and forwards between them.

To what extent does this perspective on writing meet the requirements for an adequate theoretical framework for the design of teaching and learning environments for research from sources? As the second chapter argues, cognitivism fails to fully take into account the role of language, which is particularly problematic for international students. It does not explain the incorporation of ideas from secondary sources and the way in which this can contribute to the development of an original thesis. In explaining the writing process in terms of the orchestration of mental processes, it also neglects the role of social affordances in the constructive process. Despite its focus on problem-solving, the perspective fails to give an adequate
account of reflective thinking and inferencing and the kind of creative, critical skills involved in research from sources as a mode of inquiry.

From a sociocultural perspective, research from sources can be viewed as a socially-situated and mediated activity. The starting point is the complex ecology in which constructive activities occur. Writing is an interaction between writers and the other elements of activity systems and communities of practice. Meaning-making is mediated by language, signs and tools, as well as systems of genres and coding schemes of various kinds. Writing is dialogic and builds on the words of others, past and present. As they internalise linguistic utterances and appropriate genres and other semiotic resources, students acquire particular ways of being in the world or forms of life. The role of teachers and social others is to scaffold the development of these genres and ways of acting. Portfolios and diagramming software can function as part of an activity system, in which students use a range of tools to create artifacts that can be shared and discussed according to understandings that are built up through a community of practice.

To what extent does this perspective meet the requirements of an adequate theoretical framework? As the third chapter argues, variants of the perspective tend to overemphasise meaning-making at the level of utterances or written genres and to ignore the different kinds of thinking and the full range of semiotic modes that writing involves, although there is in the work of Prior and others, a move towards recognising multimodality and semiosis. Furthermore, variants of the perspective
also tend towards prescriptive, product-focused teaching methods, without explaining the ways in which genres and other semiotic resources function within the process of inquiry. As a result of their focus on the internalisation of generic forms, such approaches fail to explain the complex learning that research from sources involves; as Berieter (1985) points out, the concept of internalisation is no solution to the learning paradox.

From a pragmatic semiotic perspective, research from sources is a complex mode of inquiry that involves the action of signs or semiosis on many levels. The starting point is a situation of doubt or uncertainty. Meaning-making and the construction of texts occur through experimentation with signs and the acts of inference that this affords. The development of logical arguments (chains of conclusions and premises) predominantly involves deductive inference, while the testing of ideas through secondary research involves inductive inference. The development of new ideas at any point involves abductive inference. Rather than being the result of occult processes, new ideas in writing emerge as abductions that result from complex inferential processes. Writing is a transaction between writers and other elements that mutually evolve in a complex ecology. Genres and other semiotic resources are instrumentalities that function within inquiry.

To what extent does this perspective meet the requirements for an adequate theoretical framework for the design of teaching and learning environments for research from sources? Firstly, the pragmatic semiotic perspective on research
writing avoids the dualisms of process and product, subjectivity and objectivity, individual and social. The perspective goes beyond the resolution of dualisms to bring new ways of seeing that puts existing perspectives in a different light. Biesta and Burbules write that pragmatism is ‘as much a way of un-thinking certain false dichotomies, certain assumptions, certain traditional practices and ways of doing things, and thus it can open up new possibilities for thought’ (2003, p.114). Ronald and Roskelly write that a Peircean approach to writing allows us to look ‘beneath the surface of apparently conflicting ideas to discover oppositions transformed – not merely synthesized – into new conceptions’ (1990b, p.7).

From a pragmatic semiotic perspective, writing is a transactional process of becoming. Research from sources is a transaction between writers, writing tools, texts of various kinds (including those produced by the writer and source material), communities of practice and other elements of the complex ecology of research writing. Each element in this process is transformed as the transactional process unfolds over time (Crick 2003, p.272), according to the trajectory that develops; both the known and the knower come into being as ‘the objective subject-matter of inquiry undergoes temporal modification’ (Dewey 1938, p.122). For Berthoff, the composing process leads to the development of both the writer and the writer’s world:

When we represent our recognitions, when we give form to our feelings, when we remember what we have experienced, reflect on it, interpret it, we thereby determine what it is we strive to know. By this process, both the world and the self are realized: they are thus determined (1999, p.671).

As Biesta and Burbules (2003, p.12) write, ‘in the act of knowing – and hence in
Both the knower and what is to be known are changed by the transaction between them.

Although the transactional process of research from sources can be viewed from the point of view of the individual, contrary to cognitivist perspectives, individual writers cannot be separated from the environments they co-evolve with. In developing his semiosis-as-rhizome metaphor, Cunningham stresses that semiosis ‘takes place not within mind within a body, but rather at the connections, in the interactions ... this thinking is always “local”, always a limited subset of the potential (unlimited) rhizomous connections’ (Cunningham 1998, p.831). Each individual is defined by ‘a set of beliefs through which the world makes sense, the particular slice of the rhizome that characterizes our world’ (Cunningham 1998, p.832). From the point of view of the individual, ‘cognition ... is a matter of constructing and navigating a local, situated path through a rhizomous labyrinth, a process of dialogue and negotiation with and within a local sociocultural context’ (Cunningham 1998, p.834). Burnett writes that ‘the rhizome is as individual as the individual in contact with it’ and that ‘it is that individual’s perception, that individual’s map, that individual’s understanding’ (1993, p.28). However, contrary to some sociocultural perspectives, individual constructions shape sociocultural realities. The ‘connectivity’ of rhizomes ‘functions as a structure of individuation since at any given moment the “centre” of any rhizomorphic structure is the individual’s position in relation to the structure’ (Burnett, 1993, p.19). Therefore, just as individuals are not predetermined, neither are social entities and relations.
The pragmatic semiotic perspective helps to explain research from sources in terms of ‘the sociohistorical, hence pragmatic, dimension of discourse’ (McHoul 1997a, p.109). This dimension involves the creation of new relations from complex empirical conditions. It concerns “the conditions under which something new is produced”, the actual, empirical conditions of experience and of concepts, conditions which by coming together in new and unpredictable ways are capable of producing unanticipated results’ (Baugh 1993, p.22, quoting Deleuze and Parnet 1987). Within such conditions, various forces interact with ‘already existing forces entering into new relations through chance encounters, where these encounters are nevertheless the extrinsically determined effects of previous encounters’ (Baugh 1993, p.23). In fact, the meaning of any quotation or paraphrased statement in research from sources is always determined by the new relations into which it enters. As cultural objects, the words of others are, in McHoul’s terms ‘appropriable’, since ‘any cultural object is, if only purely in principle, alienable or appropriable’ (1997b, p.10). They are also open to interpretation and transformation through the mobile diagonal line that links statements across textual boundaries. Such diagonal relations are vital to research from sources as a mode of inquiry.

The perspective provides an in-depth understanding of research writing as an experimental, collaborative process of inquiry. It can help both writers and teachers of writing to ‘understand inquiry and research as processes of experiential and experimental learning, which result in more diverse ways of action, reflection, and understanding’ (Biesta and Burbules 2003, p.38). As Peirce explains, there are
several methods of fixing belief and writers need to develop their own ideas, as well as appropriating and reshaping the ideas of others, but they need to do this through an experimental process of meaning-making.

The pragmatic semiotic perspective explains the conditions in which new ideas are created, as well as understandings of how these ideas are tested and logically developed. Abductive inferences result from various different kinds of experiences; and the interaction of thought with various semiotic modes, resources and activities can give rise to new ideas. Deductive inferences result from more formal reasoning at a propositional level involving the designation, specification and arrangement of concepts and claims. Inductive inferences result from the testing of ideas through conversation and reading and can help writers to evaluate ideas and make decisions as to their validity. Experimentation is the method that drives these acts of inference and facilitates their interaction in a collaborative process in which ‘we seek to have our students resolve their doubts on the basis of evidence, flawed and incomplete though it may be, rather than, or not only, on the basis of what others have said or on what seems to make sense’ (Cunningham, Schreiber and Moss 2005, p.184). As Garrison and Neiman (2007, p.22) write, ‘the goal of inquiry is to investigate the consequences of our hypotheses and habits of belief in order to determine the validity of their meaning and the soundness of their claims to truth’ and this always occurs in a community of inquiry. Cunningham, Schreiber and Moss write that ‘the test of adequacy of my method is not “an immediate appeal to my feelings and purposes”, but whether it advances our understanding in ways judged satisfactory by
our community of inquirers’ (2005, p.183). Therefore, the process of inquiry that the pragmatic semiotic perspective illuminates is inherently social.

As with cognitive perspectives, the pragmatic semiotic perspective is largely concerned with thinking and problem-solving. The essential difference is that in the pragmatic semiotic perspective, these activities always occur in and through signs. For Peirce, ‘the ability to think’ is the ‘foremost goal of education’ (Cunningham 2007, p. 3) and his semiotics provides insights into the role of thinking and meaning-making in education (Cunningham 2007; Cunningham, Schrieber and Moss 2005; Cunningham, Baratta and Esping 2005). Similarly, Dewey’s pragmatism is largely an exploration of the thinking that underlies all inquiry. For Dewey, reflective thinking is always concerned with practical acts of inquiry, rather than the orchestration of cognitive processes: ‘thinking is inquiry, investigation, turning over, probing or delving into, so as to find something new or to see what is already known in a different light. In short, it is questioning’ (Dewey 1933, p.265). In fact, inquiry is both the goal and the test of thinking: ‘when thinking is successful, its career closes in transforming the disordered into the orderly, the mixed-up into the distinguished or placed, the unclear and ambiguous into the defined and unequivocal, the disconnected into the systematized’ (Dewey 1926, p.66). Dewey adds that ‘thought and reason are not specific powers’ but ‘consist of the procedures intentionally employed in the application to each other of the unsatisfactorily confused and indeterminate on the one side and the regular and stable on the other’ (1926, p.67). He also views thinking in its practical connections with things: ‘there is
no single and uniform power of thought, but a multitude of different ways in which specific things – things observed, remembered, heard of, read about – evoke suggestions or ideas that are pertinent to a problem or question and that carry the mind forward to a justifiable conclusion’ (Dewey 1933, p.55). The key differences between Dewey’s conception of reflective thinking (or inquiry) and that of cognitive approaches is its inseparability from the transformation of existential material.

Dewey writes:

The objective cannot be attained by conjuring with mental states. It is an end brought about only by means of existential changes. The question for deliberation is what to do in order to effect these changes. They are means to the required existential reconstruction; a fortiori, the inquiries and decisions which issue in performance of these acts are instrumental and intermediate (Dewey 1938, p.162).

Rather than being the transformation of cognitive structures, ‘thinking is ordering of subject matter with reference to discovering what it signifies or indicates’ (Dewey 1933, p.246), and this necessarily involves experimentation with and transformation of existential materials, as well as the use of semiotic resources, such as generic forms.

The pragmatic semiotic perspective also provides an adequate account of the interaction of process and product, on many levels, in research writing. Dewey writes that ‘it is no linguistic accident that “building”, “construction”, “work”, designate both a process and its finished product’ (Dewey, cited in Crick 2003, p.273). Furthermore, according to his instrumental approach to logical forms, products are not just end products, but also function as intermediate or instrumental means within the constructive process.
In order to understand the nature of writing, it is necessary to understand the ‘dialectic of chaos and form’ (Berthoff 1982a, p.65). Writers need to understand how to use chaos, but they also need to know how to use linguistic and logical forms like hierarchical structures and generic forms of writing. When such forms are taught as standardised graphic organisers, outlines or templates, as in traditional rhetoric or the instruction of basic genres as ‘rigid text templates’ (Johns 2003, p.204), they can inhibit creativity. However, if they are treated as instrumentalities, within the process of inquiry, they facilitate the kind of ordering of chaos that can lead to new abductions. In Deleuze and Guattari’s terms, it is a matter of creating both chaos and striated spaces in which new smooth space, new chaos, can develop.

Teachers of writing also need to understand that the rhizomes that constitute a writer’s work in progress are configurations of signs that map out a becoming, trace trajectories and territories in the making. As such, they should be read as unfinished, as affective lines of flight that need to be shaped according to rhetorical patterns and genres (classifications, oppositions, comparisons, causal relations and so on) and the development of a series of claims, but which need not be expressed in such forms in the initial, chaotic stages of writing. Teachers need to be aware that traditional methods of grammatical feedback and error correction, while essential in the later stages of writing, can block creative, inferential processes in the early stages, when attention to questions and hypotheses is more appropriate.

In fact, one of the profoundest insights of the pragmatic semiotic perspective may be
its ability to comprehend the future tense of research writing. One of the most difficult aspects of all research projects is the uncertainty of what is to come. All research writers need to come to terms with what Grosz refers to as ‘the surprise of the new ... the inherent capacity for time to link, in extraordinarily complex ways the past and present to a future that is uncontained by them and has the capacity to rewrite and transform them’ or ‘the process of production and creation in terms of openness to the new instead of preformism of the expected’ (1999, p.7, cited in James and McInnes, 2001, p.5). As Deely points out, semiosis is inherently concerned with the future:

Wherever the future influences a present course of events, therefore, we are confronted by semiosis. Never confined to what has been or is, semiosis transpires at the boundary between what is and what might be or might have been (1990, p.27).

Research writing is always concerned with the ‘what if’ of triadicity; it is always a question of interpretation and of mapping out possible future trajectories. Deleuze and Guattari write that ‘writing has nothing to do with signifying. It has to do with surveying, mapping, even realms that are yet to come’ (Deleuze and Guattari 1988, p.3). This is why writing is always a pragmatic exercise:

... pragmatics has no other meaning: Make a rhizome. But you don’t know what you can make a rhizome with, you don’t know which subterranean stem is effectively going to make a rhizome, or enter a becoming, people your desert. So experiment (1988, p.251).

Such experimentation and inquiry are at the heart of the pragmatic semiotic perspective on research writing.

The perspective also explains how different levels of thinking and the use of various semiotic modes can function in the process of inquiry. It views semiosis or the
action of signs as both diagrammatic and dialogic. It also views meaning-making as a matter of seeing relationships and explains the way in which writers can use various modes – from diagrams to notes to prose – in the development of new ideas. However, it also views semiosis as inherently dialogic, and connected to the ideas of others, ‘either directly as in some communicative action or indirectly via some form of semiotic mediation – signs and/or tools appropriated from the sociocultural context’ (Cunningham 1998, p.830). The signs that make up ‘inner speech’, however chaotic, are still infused with social meanings. All abductions, inductions and deductions are necessarily of social origin – they derive from regimes of signs whose meaning is socially determined.

Finally, the perspective offers a range of insights into learning, originality and creativity. For both Dewey and Deleuze, the difficulties of learning are an essential part of all inquiry. Dewey writes:

Surrender of what is possessed, disowning of what supports one in secure ease, is involved in all inquiry and discovery; the latter implicate an individual still to make, with all the risks implied therein. For to arrive at new truth and vision is to alter (1926, p.245).

Referring to learning in general, but with particular relevance for international research students, Deleuze writes that ‘learning to swim or learning a foreign language means composing the singular points of one’s own body or one’s own language with those of another shape or element, which tears us apart but also propels us into a hitherto unknown and unheard of world of problems’ (1994, p.192).

Building on Deleuze’s philosophy, James and McInnes write that ‘learning to write [unfolds] along “lines of flight” along which the assemblage [one’s habitus,
disposition, subjectivity) breaks down or becomes transformed into something else’ (2001, p.5, citing Paton, 2000, p.44). So how does the pragmatic semiotic perspective deal with the learning paradox or the development of new ideas? To some extent, Dewey’s conception of learning resonates with the cognitive learning maxim of beginning with what the learner already knows:

Increase of the store of meanings makes us conscious of new problems, while only through translation of the new perplexities into what is already familiar and plain do we understand or solve these problems. This is the constant spiral movement of knowledge (Dewey 1933, p.116).

However, Dewey suggests that the solution of the learning paradox can only lie in ‘the use in inquiry, of doubt, of tentative suggestion, or experimentation’ (1933, p.128) within situated activity. The development of new ideas occurs through abductive inferences that arise from such practical inquiry. This complex view of learning and writing avoids the limitations of both cognitive notions of schema transformation and sociocultural notions of internalisation and, in doing so, dissolves the paradox that such partial conceptions create.

The pragmatic semiotic perspective can also help students and teachers of writing to understand the challenges involved in expectations of originality and creativity. Ballard and Clanchy’s distinction between ‘simple’ originality, which involves ‘reshaping material into a different pattern’ and creative originality, which involves a ‘totally new approach’ or ‘new knowledge’ is an intuitive one. Eco defines ‘creative abduction’ as a situation where the subject ‘delves directly into the as yet unshaped continuum, mapping his perception as he organizes it’ (Eco 1979, p.254). This is true creativity in which ‘in the face of an as yet uncharted “land” or
unfamiliar “earth” ... (the “continuum” or “purport” of semiotically unformed substances), a cartographer has to invent the very “legend” (the “forms”, “rules” or “codes”) with which to interpret and to map out the land or earth as “territory” (as semiotically formed substance)” (Bosteels 1994, p.356). Simple originality is much more commonplace, as Dewey observes:

All thinking whatsoever – so be it is thinking – contains a phase of originality. This originality does not imply that the student’s conclusion varies from the conclusions of others, much less that it is a radically novel conclusion. His originality is not incompatible with large use of materials and suggestions by others. Originality means personal interest in the question, personal initiative in turning over the suggestions furnished by others, and in sincerity in following them out to a tested conclusion (Dewey 1933, p.258).

As Paavola and Hakkarainen write, in general conceptions of originality, ‘new conceptual structures do not require that the elements of which they have been constructed are new, but that the area to which they are applied is new or the combination is new, sometimes in a radical way’ (2005, p.243). Furthermore, ‘even if new ideas are developed apparently by an individual, this process employs means that are culturally developed, and is in relationship to what other people have said or written in that subject area’ (2005, p.248). However, Ballard and Clanchy’s suggestion that ‘creativity’ and ‘hypothesising’ are confined to higher research is a simplification that tends to obscure the real difficulties of synthesising information in any original production, which always involves a certain degree of creative thinking and the development of hypotheses, or abductions, on many levels. In fact, for all students, international and domestic, the creative and critical thinking involved in research from sources is anything but simple. Many students lack the know-how to ‘[recombine] ideas and information into an argument’ and ‘[reshape]
material into a different pattern’ (Ballard and Clanchy 1990, p.12). Following Dewey, the synthesis of original ideas and sourced material within a disciplinary context is a complicated process that requires both conceptualisation as well as the effective transformation of existential materials. The degree of originality relates to the extent to which secondary resources are treated as existential subject-matter and transformed according to the reasoning (concepts) of the writer. Hence the need for effective teaching and learning environments to guide this process.

The semiotic pragmatic perspective developed in this chapter has many implications for the design of teaching and learning environments for research writing, such as the AESSBC described in Chapter 1. In fact, it provides both broad principles and specific teaching and learning practices. As Hoffman and Roth write, ‘semiotics (the theory of signs, or representations) not only provides an adequate framework for understanding knowledge development, it also offers specific tools (like diagrammatic reasoning and abduction) to understand these processes’ (2004, p.204). The perspective also suggests some guidelines for the use of tools such as portfolios and diagramming software.

Firstly, a ‘pragmatist understanding of the research process’ (Biesta and Burbules 2003, p.27), as well as an understanding of semiosis as the basis of all inquiry, suggests some general teaching and learning principles. Cunningham stresses the importance of understanding semiosis ‘as it is engaged in educational settings’, in terms of the way in which students ‘come to perceive, know and act while engaged
in study to resolve problems (and what educators can do to foster these processes’)
(2007, p.6). Above all, teachers need to create learning environments that both
provide all of the necessary tools and semiotic resources, as well as promoting
experimentation and collaboration. The role of the teacher, rather than intervening in
processes, or scaffolding generic activities, is to co-create affordances, to increase
the power of writers to affect and be affected, and therefore to foster abductive
inferences. Dewey emphasises the importance of creating the right conditions, rather
than prescribing a rule-driven process. Although inquiry unfolds through phases,
Dewey specifically rejects the notion that ‘students should be made consciously to
note and formulate these various phases as a means of intellectual control’ (1933,
p.283). Rather, ‘fundamental control is effected by means of the conditions under
which students work – the provision of a real situation that arouses inquiry,
suggestion, reasoning, testing, etc’ (1933, p.283, emphasis added). As Deleuze
writes, learning is always a practical encounter with signs: ‘the movement of the
swimmer does not resemble that of the wave, in particular, the movements of the
swimming instructor which we reproduce on the sand bear no relation to the
movements of the wave, which we learn to deal with only by grasping the former in
practice as signs’ (ibid.). Deleuze makes a distinction between the kind of general
knowledge that can be imparted through direct instruction and the learning that
occurs through practical encounters with problems and signs: ‘learning is the
appropriate name for the subjective acts carried out when one is confronted with the
objectivity of a problem (Idea), whereas knowledge only designates the generality of
concepts or the calm possession of a rule enabling solutions’ (1994, p.164). This
does not mean that scaffolding is unnecessary. As Paavola and Hakkarainen write:

... an engagement in controlled and disciplined processes of abduction requires specific support and guidance. Learning is not just about knowledge acquisition but also participation in certain kinds of cultural and social practices, and about collaboratively creating and developing shared artifacts, practices and knowledge objects in long-term processes (2005, p.237).

Therefore, the goal of instructional activities is to provide the kind of affordances and promote the kind of participation in meaningful activities that are likely to lead to abductive thinking.

For Dewey, success in inquiry is a matter of developing the right habits. He writes that ‘the problem of method in forming habits of reflective thought is the problem of establishing conditions that will arouse and guide curiosity; of setting up the connections in things experienced that will on later occasions promote the flow of suggestions, create problems and purposes that will favour consecutiveness in the succession of ideas’ (1933, p.56, original emphasis). Building on Peirce’s concepts of habits as ‘guiding’ or ‘leading’ principles (CP 3.160-3.164, CP 5.365-5.369), Dewey writes that ‘every inferential conclusion that is drawn involves a habit (either by way of expressing it or initiating it) in the organic sense of habit, since life is impossible without ways of action sufficiently general to be properly named habits’ (1938, p.12, original emphasis). Leading principles begin as habits that gradually lead to awareness ‘not only of what is done from time to time but of how it is done’ (1938, p.12). Dewey gives the example of the craftsman, who ‘learns that if he operates in a certain way the result will take care of itself, certain materials being given’ (1938, p.12, original emphasis). He then explains that ‘when these habits are
noted and formulated, then the formulations are guiding or leading principles’ (1938, p.13) that function by setting ‘forth operations to be performed which are logically basic’ (1938, p.338). The various instrumentalities used in the construction of research papers – logical forms and hierarchies, genres and ways of using diagramming software – can be understood as leading principles. Once they become habitual, through practice, they can guide the writing process, given the right materials and conditions. Hence, the need to establish teaching and learning environments that provide such conditions and that focus on the use of generic resources within the process of inquiry. Teaching and learning environments for research from sources should also enable students to work collaboratively to discuss different abductive possibilities for the problems they are investigating. In doing so, they can not only develop warranted assertions, but ‘reflexive’ awareness of the problems they are investigating and of the inquiry process itself.

In addition to providing broad principles, the semiotic pragmatic perspective illuminates both the potential and limitations of tools such as portfolios and diagramming software and suggests some specific guidelines for their effective use. The potential of these tools is that they provide a range of affordances that can facilitate semiosis and inquiry, but their limitations also need to be understood. The great potential of portfolios is that they enable a constructive and collaborative environment in which inquiry and reflective thinking can occur. Drawing on the work of Dewey and others, Riedinger (2006) suggests that portfolios can promote reflective thinking. According to Riedinger, portfolios can support ‘reflections of all
types: in action, before action, in solitude, in consultation with peers, in consultation with instructors, coaches and advisors, written, spoken, videotapes, or graphically represented’ (2006, p.91). However, Riedinger also notes that reflective thinking does not come naturally and must be taught in a way that avoids resistance and clichéd responses (p.94). Therefore, both students and teachers need to understand the construction of research writing portfolios as an iterative, inferential process and need to view portfolio entries as provisional instruments in this process. In the original AESSBC research paper portfolio, students were encouraged to redraft and update their concept maps and required to complete a general reflection form on all portfolio entries:

What do you think were the main aims of this task?
What difficulties did you encounter with the task?
How did you approach the task?
What did you learn from the task?

However, it was realised that such retrospective reflections did not directly inform the constructive process. As a result, the reflection forms have been replaced with a more formalised process of reflection-in-action, in which students discuss their work in research groups, before constructing new versions. This has resulted in the kind of diagrammatic reasoning that leads to abduction and the development of new ideas, along the lines of ‘perceptions at moment t1, our activities at moment t2, and our perceptions at moment t3’ (Biesta and Burbules 2003, p.92).

The great potential of diagramming software is that it enables students to actively practise such diagrammatic reasoning through a variety of modes. In the diagram view in Inspiration software, students can develop and experiment with their ideas in
a range of diagrammatic forms. In the outline view, students can experiment with the 
order of claims or statements, just as they can experiment with relationships between 
concepts in the diagram view. Such diagrammatic reasoning can lead to new 
abductions in both modes (diagram and outline) and can help to promote the kind of 
structural redrafting that word-processing tends to limit. Following Berthoff’s 
emphasis on the importance of transformation, student writers can be encouraged to 
approach all written drafts in the same way. The use of concept maps can also be 
used to promote transactional reading. The production of text-analysis diagrams 
need not be limited to accurate representation of the text, but can also enable the 
synthesis of ideas from sources and the writer’s own ideas.

As suggested above, the use of concept maps and other diagrams should be viewed 
as part of an unfolding, constructive process and not as ends in themselves. Concept 
maps are snapshots of trajectories, not the trajectories themselves. As well as being 
instrumental artifacts in an unfolding genre system, the concept maps and other 
documents that students produce for research paper portfolios need to be viewed as 
traces of a trajectory of thought that goes beyond these visible artifacts. Diagrams 
such as concept maps are complex iconic signs that combine symbolic signs (words) 
and indexical signs (arrows) and show relations between them. The meaning of 
words in these diagrams is rhizomatic. It is not confined to relations visible in the 
map but reaches out to the intertext and context of writing and therefore the 
meanings in concept maps are always open to interpretation (see Witte 1992). 
Berthoff writes that a major problem with the use of schematic representations is
that ‘the relationship of the sign to its referent is easily misconceived and the signs themselves become the focus of interest’ (1981, p.76). Although diagramming tools now provide a more flexible environment, it is still necessary to heed Dewey’s remark that ‘by its nature technology is concerned with things and acts in their instrumentalities, not in their immediacies’ (Dewey 1926, p.122). Schuh and Cunningham discuss concept maps in connection with Deleuze and Guattari’s distinction between maps and tracings (replacing ‘maps’ with ‘trajectories’ to avoid confusion). They write that:

The traditional notion of a concept map, a technique for accessing hypothetical knowledge structures, might be considered a tracing. Concept maps are extracted and inspected as an intact item. When seen in isolation, they often imply a hierarchical structure and seem to lose the characteristic of interconnectivity beyond their own boundaries. Given research questions and interests, as well as the research tools used, a trace may, at times, be an appropriate means for capturing a picture of a piece of the rhizome (2004, p.338).

Schuh and Cunningham add that ‘although tracings can exist (thus concept maps, for example, are valid entities), they must always be transferred onto a trajectory’ and that ‘the concept map, or more specifically the knowledge that it represents, is complete and can be understood only when placed within the rest of the rhizome, complete with all potential points of connections’ (Schuh and Cunningham 2004, p.338). Artifacts such as concept maps, however useful as tools for thinking, should not be confused with the writer’s thinking, which always exceeds them. Schuh and Cunningham write that:

Boundaries are imposed as the trace is severed from the rhizome in which it existed. Thus again, there is no innate hierarchy – only one that is imposed. A rhizome trajectory relies on the existence of the unlimited connections; a trace prunes them (2004, p.338).
Kankunnen suggests that students explain their maps (2001, p.302) both in interviews with teachers and in group interviews, and that they update their maps in the light of new understandings. Collaborative activities such as the research group meetings, consultations and presentations conducted in the AESSBC can facilitate such experimentation and reflection, as well as providing a source of new ideas.

Finally, the pragmatic semiotic perspective also highlights the fact that the capacity to use such tools effectively depends on the experience of the user. As Hoffman and Roth point out, ‘we have to have collateral knowledge of the meaning of a sign before we can use it to make distinctions, specify objects and relations, and structure our observations and experiences’ (2007, p.108). Experiments with diagrams are also constrained and regulated by ‘the rules and conventions of the system of representation we choose to represent something’ (Hoffman 2007, p.198, citing Peirce, CP 4.418). Therefore, diagramming tools afford the construction of signs whose meaning is largely determined by conventions requiring prior or collateral knowledge; in other words, they require knowledge of conventions of use that exceeds the technical affordances of the tool (Norman 1999). In fact, the ability to use concept maps effectively requires a great deal of collateral knowledge, from understanding the conventions of concept maps themselves (for example, the logical hierarchy of concepts and the use of certain kinds of predicates to label the links) to collateral knowledge of disciplinary content and genres. Therefore, student writers need specific training in the use of the software, as well as instruction in the conventions that might guide their use in particular educational contexts. While the
basic affordances of diagramming software like Inspiration can be easily learned in a few hours, the use of the tool to help write academic texts is considerably more complex.

Although the pragmatic semiotic perspective presented in his thesis resonates with other perspectives to a certain extent, it offers new understandings of the process of research from sources. As the thesis has shown, it greatly differs from the standard model of problem-solving (Pea and Kurland 1987, Pea 1997) and the ‘invisible pedagogies’ of progressive education (Kalantzis and Cope 1993), with which it has been confused. It is also quite distinct from other forms of constructivism. As Cunningham writes:

Constructivism and positions related to it are rather vague about exactly what is being constructed, and about what it means to embed a problem in a relevant context. If, however, we use the language of semiotics and think of knowledge construction as semiosis, as the building up of structures of signs, we gain access to a very well-developed theory of signs, a theory that provides fertile ground for further hypotheses into the nature of human cognition. Likewise, recasting the notions of situated or anchored instruction in terms of Umwelten, and the related notions of abduction and reflexivity, offers insights into the construction process not obvious in other perspectives (Cunningham 1992, p.184).

The pragmatic semiotic perspective provides an understanding of the ways in which products inform process, in which objectification and becoming are one and the same process and in which individuals create and recreate social forms of life. It also reveals the importance of both observation and interpretation, of existential operations and conceptualisation.

In exploring the perspective and its difference from the two existing approaches, this
thesis has also made a number of original contributions. These include the extension of the already discussed dichotomy between cognitive and social approaches to cognitive-constructivist and sociocultural approaches; the drawing of the connection between cognitive process to writing and cognitive-constructivist approaches to diagramming software and other constructivist tools; the drawing of the connection between the North American genre school and the pragmatic semiotic approach; a more detailed application of the work of Peirce and Dewey to writing than has previously been carried out; and the evaluation of each of the perspectives as theoretical frameworks for the design of teaching and learning environments using portfolios and diagramming software.

This thesis began with a practical problem and a series of practical questions. What kind of process is research from sources? How can international students be helped to practise research from sources? How can teaching and learning environments, making use of portfolios and diagramming software, be designed to facilitate this process? This practical problem resulted in a practical response: the design of the research paper portfolio. This was largely based on what seemed to work in practice and resulted in an eclectic mixture of methods and approaches. Although the portfolio certainly appeared to help students to write research papers, this practical response led to new problems which required a sounder theoretical grounding. Therefore, although the thesis is largely theoretical, it begins and ends in practice. As Biesta and Burbules write, ‘if, as Dewey argued, knowledge is indeed a factor in human action, then theory no longer comes before practice, but emerges from and
feeds back into practice (2003, p.105).

The thesis has been a pragmatic exercise in several senses of the term. Firstly, it is largely an example of reflection-in-action and reflection-on-action related to my own work in designing teaching and learning environments for research from sources. In this regard, the material presented in Chapter 1 and the Appendices represents the practical aspect of the thesis, which evolved alongside the more theoretical content of the remaining chapters. Dominant theories and tools of the trade, as well as less familiar theories and innovative techniques, served as instrumentalities in this process of development. As Biesta and Burbules write:

Educational inquiries provide ‘intellectual instrumentalities’ that can be used as ‘input’ into new inquiries, that is, as resources for dealing with the unique problem with which educators are faced. The results of previous inquiries can make educational action more intelligent, because they provide resources that enable educators to see new problems or see problems in a new light, to guide their observations, and to help them with interpreting the problematic situations they encounter (2003, p.80).

The way in which both theoretical perspectives and practical methods are treated in this thesis is quite particular to the specific educational context described in the opening chapter. Biesta and Burbules write that ‘educational problems are always unique and for that reason always require unique responses, tailored as best as possible to the idiosyncrasies of the actual, unique situation’ (2003, p.81), just as ‘knowledge provides us with possibilities for refining and supporting our day-to-day problem solving’ (p.107). The focus of this thesis has been greatly shaped by the practical situation in which it arose.
Secondly, the thesis is itself a form of semiotic inquiry. In its final form, the thesis began with a state of doubt and the hunch that a semiotic pragmatic perspective could provide a better explanation of research from sources. It then unfolded through a process of reflective thinking and diagrammatic reasoning, experimentation with semiotic resources and inferencing that is best understood by this writer in terms of the perspective that the thesis itself develops.

Thirdly, in attempting to ask what happens if we take a semiotic view of research writing, if we treat everything as semiosis, the thesis follows Peirce’s pragmatic maxim. Biesta and Burbules write that:

For pragmatism the crucial question always has to do with what might follow when we act in a specific way or follow some idea. Knowledge itself, as we have seen, is nothing but an articulation of the possible connection between what we do and what will follow. Our objects of knowledge can also be understood as summarizing possible relations between doing and undergoing (2003, p.101).

This thesis has only begun to answer the question of what happens if we treat research from sources as the action of signs, as a series of semioses, but it has hopefully laid useful steps for others to follow.
Appendices

Appendix 1: Research Paper Example

Employment Discrimination in Chinese Workplace

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June, 2006
Introduction

During the last quarter of a century, China’s economy has changed from a centrally planned system that was closed to international trade to a market-oriented system that has a rapid growth. It is reported that the restructured economic system has contributed to a more than ten-fold GDP increase since 1978 (CNN.com, 2003, P.1). However, due to vast population and absence of anti-discrimination laws, the Chinese government began to struggle to sustain adequate job growth for tens of millions of workers in response to the increasingly urgent issue of employment discrimination. Accordingly, it is vital to investigate the reason why employment discrimination existed so widely despite the rapid growth of the economy; and whether there is an appropriate way to solve the problem. This research paper analyses the reasons for the problem of employment discrimination in Chinese workplace and aim at reaching a practical approach in order to solve this problem. The paper argues that discrimination in Chinese workplaces is a complex problem and that solving the problem will be a long and complicated process.

The paper includes three parts. The first part focuses on the general forms of employment discrimination. The second part indicates the possible causes of the problem. In the third part, a series of potential solutions are presented in favour of combating with employment discrimination in China.

Forms of Employment Discrimination

It is necessary to introduce the discrimination situation in current China. There are four main forms of discrimination in Chinese workplace: appearance discrimination, gender discrimination and health discrimination and identity discrimination. Besides, other kinds of discrimination such as regional discrimination, educational background discrimination and also widely exist in Chinese workplace.

Appearance discrimination, which means the bias on good facial appearance or height that are irrelevant to the requirement of the post. The typical case happened in Sichuan Province, in 2001. An undergraduate student Jiang was refused to apply a post in Cheng Dou branch of People’s Bank of China. The reason was he is unqualified of the height limitation which clearly listed in the advertisement that “Only male above 1.68 meters and female above 1.60 meters in height are qualified to be the candidates.” (Zhou Wei, 2004, P.1.) Accordingly, the student Jiang, who is the one of 30% male in Sichuan Province that are no more than 1.65 meters, failed the recruitment competition even before an interview.

Gender discrimination, that discriminates against women workers in terms of their pregnancy, illness, marital status. It is reported that women, who make up around 67% of the labor force, remain the largest group of discriminated against. (CNN.com, 2003) This can be explained by the example that happened in Beijing. In October, 1996, Sun Lili became pregnant with her first child. But her work unit asked her terminating pregnancy because ‘it is not a good time’ and refused to give her pregnancy ‘requisite permission’. Considering her health condition, Sun insisted on keeping the child and eventually she was dismissed by her work unit, together with a 3,100 Yuan fine (about AU$ 400, nearly a third of her yearly income). The work unit’s explanation was that Sun had not got the pregnancy ‘requisite permission’ from the employer’s family planning office for the one-child policy before her pregnancy (Christine M. Bulge, P.4).

Health Discrimination is mostly behaving on HIV or HBV (hepatitis B virus) carriers. This discrimination not only comes from enterprises or state owned institutions, but also from government regulations. For example, according to Zhou Wei, ‘[before the year 2004] local governments in 30 provinces state explicitly in their official document that HBV carriers cannot be employed as civil servants’ (Zhou Wei, 2004, P.2). Actually, this regulation
ignores 120 million HBV carriers’ equal employment rights in China. Because of this unreasonable limitation, many candidates lost their chance to work in government even if they had an excellent performance in the interview or examination.

Identity discrimination, that discriminates against migrant workers and laid-off workers. Nowadays, people concern that laid-off workers are living ‘on the edge of society’. This is the group of people who contributed a lot in the early stage of the nation development but now lost their job because of bankruptcies of state-owned enterprises which were resulted from the national economy reform. Also due to their outdated knowledge and over 40 years-old average age, they have more difficulties to compete with the young and fresh-minded job-hunters. Moreover, they are shouldering heavy financial burdens from their parents’ health care fee and children’s college tuition fee. Hence, unemployment for them, means

Besides, there are some other forms of discrimination, such as regional discrimination, which discriminates against people from rural area or so-called “behindhand area”; and educational background discrimination that discriminate against students who graduate from infamous university or skill-oriented college. All these forms of discrimination compose the morbid employment environment in China.

Causes of Employment Discrimination

The problem of discrimination is caused by various reasons. It can be generally classified into two groups: the problem of legal system and that of the society. It is without doubt that ineffective legal system, which is supposed to take full response to ensure equal employment, is now indulging employment discrimination. The inefficiency manifest on the following two aspects:

Firstly, the conflict of laws makes judicial system has difficulties on applying appropriate the laws in particular case. For instance, in Sun’s case, the Constitution protect the equal rights of women in all aspects of social life; whereas the local administration laws regulate that women should get the “requisite permission” before pregnancy which refers to the Planned Parenthood part in the Constitution. Consequently, this kind of conflict disorders the judgment and leads to the inefficiency to judicial system.

Secondly, the inefficiency of legal system is largely due to lack of punishment for employment discrimination behaviors. By now, there is no relative law to define employment behaviors as “illegal”. Accordingly, most employers can not realize their behaviors as discrimination. In Jiang’s case, even though he gained the support by the court, Cheng Dou branch of People’s Bank of China just withdrew the height limit in advertisements without any further action.

Besides the problems of legal system, employment discrimination is mostly caused by the reasons that come from Chinese society. They are behaving on social bias, social insecurity and surplus laborers. Initially, social bias in Chinese society partly contributes to employment discrimination, especially on gender discrimination. It can be argued that the discrimination against female is due to biased traditional values. Traditional Chinese attitudes hold that women should stay at home and take care of the family and children. Since China was liberated in 1949, more and more women went out of houses and find jobs in the society. While working full-time, most of them have to take responsibility for housework and child care. Therefore, employers prefer to hire a man who will be less affected by their family. Furthermore, employers complained that “women do not make good leaders; male employees will resist having to report to a female boss; and women are not as ‘capable’ as men in terms of physical strength or intellectual ability”. Based on these biases, many women are suffering unfair treatment of different extend.
In addition, lack of social secure is another reason that causes employment discrimination in Chinese workplace. Since the national economy reform in 1978, the state became rolling back the welfare in order to lighten state’s burden and develop the insurance system as well. This reform did lead to the economy growth and greatly help the development of insurance system. In contrast, as Cooke claimed, ‘the development of the social welfare system is severely lagging behind ...’ (Fang Lee Cooke, P.344). Consequently, enterprises now have to afford female employees’ childbearing and childrearing insurance, which means, the more the young female workers they employ, the higher the cost they afford. In other words, lack of social secure directly aggravates employment discrimination.

The last but ultimate reason of employment discrimination in China is surplus laborers in Chinese labor market. It is reported that in 2005, there are 24 million laborers in labor market whereas only 10 million job opportunities provided, apparently, 14 million laborers have no chance to find a job last year (Liu Ning, 2005, P.2). While in this year 2006, the unemployment population is estimated to be 15 million (Zhou Shan Employment office, 2006), which makes the situation more serious than ever before. Surplus laborers leave the employers a huge space to select employees by working out unreasonable requirement in recruitment, with excuses such as ‘human resource distribution needs’ or ‘the organization’s needs’.

**Proposed Solutions to the problem of employment discrimination**

Because of the variety of reasons, fighting employment discrimination in Chinese workplace will be a long process. Even though the situation is fairly complicated, theoretically, it is still possible to find effective solutions that can combat with employment discrimination. The solutions include education, legal system changes, media release and government intervention.

Changing legal system is the most efficient way to solve employment discrimination in China. Firstly, to keep law system consistent would be clear for judgment to apply to in practice. Secondly, specialized anti-discrimination laws should be established to punish discrimination behaviors, so employers could realize that discriminate against specific groups of people is illegal, and is banned by law. Back to Jiang’s height discrimination case, what this bank should do is not only withdrew the height limit in advertisements, but also publicly apologize to all the citizens in order to enlarge the positive effect of this event.

Ideally, education is the key to correct the social bias. Like combating with gender discrimination, Bulger suggests to ‘call for all members of Chinese society to strive to form civilized habits that respect and protect women and for women’s federations to improve in representing and safeguarding women’s rights and interests (Christine M. Bulger, 1999-2000, P.20). On the other hand, it is sensible of the government to provide more education opportunities to the laid-off workers in order to help these people to be re-employed. Chinese government did well on providing gratuitous education opportunities to laid-off workers these years, by which successfully fought against age discrimination and identity discrimination in workplace.

Rather than keeping unused labor force inside, it would be a good way to promote Chinese labor market up to a world-wide level, namely, government organize the export of labor force. It is a fact that the population of unemployment in China is estimated to keep on increasing within at least fives years. At this stage China is not able to raise this increasingly amount of unemployed people, but what the government can do now is to organize these people to go outside and find the job at the places where they are needed. By then, not only abate the pressure of inland labor market, but also upgrades their family’s living standard. Moreover, government implement can help to enable employees’ working rights and safety, by which workers can be benefited veritally.
Setting legal-aid organization can effectively help safeguarding employees’ equal job opportunities. An example of such protector is Zhou Wei, the author of The Right to Work and Its Realization in China, who himself is a legal-aid provider in opposing employment discrimination. However, it is necessary for such protection to be institutionalized, by which, to ensure an institution that provide legal-aid and protect employees from being discriminated against.

Finally, release Chinese media will be a very important solution to the problem of employment discrimination in China. As the most powerful monitor organ in supervising the equal employment process. Chinese media is eager to be further released. Moreover, media plays the most significant role in educating people how to protect their equal employment rights in a legal way and warning employers that employment discrimination is against human right and must be banned.

Conclusion

The problem of employment discrimination has become an urgent issue in China. It not only against human rights, but also undermines the harmony of society. For instance, such discrimination causes unemployment, crime and even destabilization of politics. As concerning the reason, employment discrimination is caused by a set of complex matters which comes from both unenforceable legal system and overpopulation. Therefore, it can hardly be solved by any single solution. Although, fighting employment discrimination will be a long process, it should be an optimistic future since the increasingly awareness of people. In order to solve this problem, the effort of all aspects of the society need to be combined and such combination includes establishments of stricter laws, changes of social attitude, interferences of government and release of media. Clearly the, Chinese government is making visible progress in combating with employment discrimination. So we have a lot of reasons to be confident that the government will make new progress and finally win the battle.

References:


Min Li 2006
# Appendix 2: Research Paper Assessment Sheet

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Appendix 3: AESSBC Research Paper Portfolio

1. MODULE 1 RESEARCH PAPER PORTFOLIO

1.1 The Research Paper

The major writing task for the Bridging Course is to write a secondary research paper on a specific problem in your discipline area (an example is given at Appendix 1)

1.1.1 Main Requirements

Word Length: 1500 words

Content: The paper should investigate a specific problem in your discipline area. You should not just present general information about your discipline, but should investigate a specific problem and present your own ideas and conclusions, based on the reading you have done.

Secondary Research: Your research should involve the use of at least 3 secondary academic sources, including academic journals, book sections or Internet articles (these must be valid academic articles).

1.1.2 Introduction to Secondary Research Papers

In your tertiary studies in Australia, you are likely to be set a variety of written tasks that require you to research a particular topic and present your findings. Such projects may be based either on primary data, such as the results of surveys that you have conducted, or on secondary data, such as previous research articles and books that have been written by others on the topic.

The completion of a secondary research paper has been chosen as the main writing task for the Bridging Course, for a number of reasons. Secondary research papers provide the opportunity to practise essential skills necessary for tertiary study, including the ability to carry out independent research and to assimilate secondary information in original written work, through the use of paraphrasing, quoting and referencing.

What is a Secondary Research Paper?

A secondary research paper is in many ways like a long essay that investigates a particular academic or practical problem (such as the causes and solutions of discrimination in Chinese work places). This kind of paper is referred to as secondary because it is largely based on previous research, although it should present an original thesis in relation to the problem it investigates.
What is the Purpose of a Secondary Research Paper?

The purpose of a secondary research paper is to present and support a definite thesis in relation to a particular problem and to support this thesis with information gathered from the research of others. Secondary research papers are often written by academics on theoretical topics. However, they are also written by professionals about practical problems and can perform a similar purpose as research reports, although the style and structure is different.

1.1.3 The Structure of a Secondary Research Paper

The structure of research papers can vary from discipline to discipline and there is no one standard model. The research paper model used in the Bridging Course can be compared to a long essay. Like an essay, the research paper should have an introduction, a body and a conclusion. Unlike an essay, it is divided into sections under clear and informative headings, which help to orient the reader to the focus of each section. The headings in the example essay are as follows:

- Introduction
- Forms of Employment Discrimination
- Causes of Employment Discrimination
- Proposed Solutions to the Problem of Employment Discrimination
- Conclusion

Note: In this example, the headings of the body sections contain similar wording to the research and focus questions, and the thesis statement. Although this is not necessary, it is necessary for all of the sections of a research paper to support the thesis statement.

The Introduction

The introduction of a secondary research paper should familiarise the reader with the subject, introduce the research questions, state the thesis and give a clear indication of the contents of the paper. The structure that is most commonly used in introductions is general-specific, in which the general topic is first outlined and then the specific problem introduced within this context.

The Body

The body of your research paper should be divided into sections, in which specific points relevant to the thesis are addressed. To some extent these sections correspond to the paragraphs in an essay, since they generally develop particular ideas that support the thesis statement. The following model shows the similarities between paragraph, essay and research paper structure:
However, there are a number of differences between a research paper and any essay. Firstly, a research paper is much longer, and this is why sections and subheadings are necessary. In fact, each section in the research paper itself resembles a small essay, since it also often contains a main point and supporting points that form the topic sentences of the paragraphs. Secondly, the structure of a research paper is more flexible. Although all of the sections should support the main thesis statement, the number of sections and the number of paragraphs within each section may vary, although there should be a balance between all of the parts of the paper. Furthermore, within these sections, a number of different organisational patterns and rhetorical strategies can be used.

The Conclusion

The conclusion of a research paper should summarise the argument that has been presented and also provide the reader with something to think about. For example, it could suggest the implications of the main points that have been made or suggest solutions to the problems raised.

1.1.4 The Research Process

Although there are many different ways to do research, the following process is followed in the first team as a way to begin the development of a secondary research paper, see the diagram on page 8. The first step in the process is to choose a particular issue or problem to investigate and to write your problem in the form of a research question (such as *What are the causes of discrimination in Chinese workplaces and what is the best way to solve this problem?*). This research question can then be the focus of your research. The next step in the process is to develop more specific research questions, or focus questions, which analyse the problem further. The focus questions that were developed for the example essay are as follows:

- How many forms of discrimination are there in there?
- What are causes of discrimination in Chinese workplaces?
- What are the solutions to discrimination Chinese work places?

These research questions can help to guide your thinking and help you to develop and organise your ideas. The third step is to develop search terms that you can enter into an electronic database to find articles relevant to your research (secondary sources), such as those in the reference section at the back of the model research paper. This can be a difficult part of the process and it is necessary to experiment with different search terms. In some cases, where no search terms related to the problem result in relevant articles, it may be necessary to choose a new problem (although this should be a last resort)

When you have found a relevant article, the fourth step is to analyse or summarise the article. The fifth step is to begin writing by answering the focus questions you have written. Finally, during this process, you should try to form a hypothesis relating to your main problem, which is a tentative answer to your research question. If your further research proves that this hypothesis is correct, you can then use it as the thesis statement of your research paper. However, research is not usually so simple and there are a number of possibilities:

- The initial hypothesis will be confirmed
- The initial hypothesis will be adapted or modified
- The initial hypothesis will be rejected and another hypothesis will be needed

It is not expected that students will have found relevant texts or have a definite hypothesis by the end of the module. It is common some students do not have a clear research problem by this time because of difficulties in the research process.
1.2 The Portfolio

In order to help you to start and develop your research paper, you will complete a portfolio containing a collection of work related to your research (your teacher will show you examples of portfolios).

1.2.1 Introduction to Portfolios

The word *portfolio* derives from the Latin words for ‘carry’ and ‘leaf’. The term is used in a number of different fields, including business, the Arts and politics. In education, a portfolio is a collection of student work that completed throughout a course of study.

Much of the written work completed in this course will be done as part of the research paper portfolio. This is a collection of diagrams and texts that are completed throughout the course as part of the process of writing a secondary research paper.

Student portfolios have a variety of purposes. Firstly, portfolios support complex academic tasks, such as research papers and projects. These tasks often involve a wide range of smaller activities and tasks, which are completed in stages as portfolio entries. Secondly, portfolios promote independence in the learning process. Although some portfolio tasks will be assigned by the teacher, students are generally given a certain amount of choice in the way they carry out these tasks and are also encouraged to show some originality in the design of their portfolios. The construction of a student portfolio is treated as an on-going process, for which the student takes a large amount of responsibility. Students are generally expected to carry out portfolio tasks in their own time, although time may also be given in class. Thirdly, portfolios promote reflection about the learning process. Each of the texts displayed in student portfolios are often accompanied by written reflections, and these are considered an important part of the portfolio itself. Finally, portfolios provide an alternative form of assessment and evaluation. As well as forming a part of course assessment, portfolios provide a visual record of achievement.

The purpose of the research portfolio in the Bridging Course is to support the process of writing a secondary research paper. Each of the portfolio tasks is designed to gradually help you to choose a topic, narrow your ideas, explore a specific problem, explain your ideas, summarise and evaluate articles and ultimately develop your paper.

**Discussion Questions**

- What do you understand about the use of portfolios in education?
- Have you ever assembled a portfolio of work before?
- How do you feel about this method of approaching academic work?
- What do you think some of the criteria for a successful portfolio might be?
1.2.2 Module 1 Portfolio Guide

The portfolio for Module 1 should contain the following:

Entry 1: Diagram of Key Concepts and Possible Problems (or research questions) in Discipline Area

- Inspiration diagram(s)/outline(s)
- Reflection form

Entry 2: Diagram of Focus Questions Related to the Chosen Problem (or research question)

- Diagram(s)/outline(s)
- Reflection form

Entry 3: Set of Inspiration Diagrams Analysing the Problem According to Focus Questions

- Diagram(s)/outline(s)
- Reflection form

Entry 4: Summary of a Text Related to the Problem

- Text analysis Inspiration diagram(s)
- Draft(s)
- Reflection form

Entry 5: Written Explanation

- Draft(s)
- Reflection form

Entry 6: Preliminary Presentation

- PowerPoint slides
- Reflection form

Due date, Requirements and Assessment

The portfolio will be due for assessment on Friday of week 9 in Module 1. A reflection form must be completed for each entry (see Appendix C). A portfolio checklist and assessment form will be used to assess your portfolio (see Appendices D and E).
1.2.3 Module 1 Portfolio Entry 1

Diagram of key concepts and problems (or research questions) in discipline area

Goal

The goal of Entry 1 is to choose a problem to investigate by mapping key concepts and possible problems in your discipline area.

Example

What are the causes of discrimination in Chinese work places and what is the best way to solve this problem?

What are the possible future development paths of HR management in Chinese industrial enterprises?

Source: An Introduction to Human Resource Management by John Stredwiec 2005

Human Resource Management in China by Cherrie Jihua Zhu 2005

Source: Min Li 2006
Procedure

Create an inspiration diagram with the name of your discipline area as the main idea. Add as many key concepts as you can think of to your diagram to map out your discipline area to the best of your knowledge. If you do not have enough knowledge of your discipline area, search the UWA website for the homepage of your discipline area, or other sites (such as Wikipedia). Once you have added enough concepts, think of some possible research questions and add these to your diagram.

*Note: The goal is not to produce a definitive map of your discipline, but to choose a problem that you are interested in investigating.*

What Are Academic Problems?

The word *problem* has very different connotations in scientific or academic discourse than it does in everyday language. In ordinary usage, the word has a negative connotation and generally refers to a difficult situation, matter or issue.

The complementary term *solution* is commonly used to refer to *the act or means of solving a problem*. In scientific or academic usage, however, the word *problem* has a neutral connotation and refers to *a matter for investigation*.

This usage probably originates from the use of the word in the pure sciences of mathematics and physics, in which the complementary concepts of *problem* and *theorem* are central components of the methodology of these sciences. In this sense, the Oxford Dictionary defines a problem as *an inquiry starting from given conditions to investigate or demonstrate a fact, result or law*, while a theorem is *a general proposition not self-evident but proved by a chain of reasoning; a truth established by means of accepted truths*. These rather specific, technical concepts appear to have been generalised over time and are now used in all discipline areas.

In this more general academic sense, a problem, defined as a matter to be investigated, is quite different from a real world problem. For example, global warming is a real world problem but it is not an academic problem. Academic problems related to this real world problem would include investigations into the real causes of global warming, the extent to which it is caused by human activity and the best responses to the problem.

Discussion Questions

- How much knowledge do you have about your discipline area? Will you need to do some research in order to complete this task?

- How do you now understand the meaning of the word *problem* in the context of the task?

- What is the difference between a real world and an academic problem?
1.2.4 Module 1 Portfolio Entry 2

Diagram of focus questions related to the problem (or research question)

Goal

The goal of this entry is to develop a series of focus questions for your research. A focus question is one whose answer provides supporting information used to answer the research question. Focus questions are typically related to particular rhetorical patterns (such as classification, comparison and so on) and developing a series of focus questions can help you to develop the content of your research paper. As you proceed through your research, you may need to add (or subtract) focus questions as needed. Here are some of the characteristics of focus questions. They:

- are related to different rhetorical patterns
- provide supporting information which is used to build the answer to the essential question.
- help you develop a keyword list for Internet searching.

Example

Source: Min Li 2006
Procedure

- Create an inspiration diagram with your research question as the main idea. Add as many focus questions as you can think of to your diagram.

- Use research and focus questions to develop a search strategy. Once you have developed a series of focus questions, you can use your research questions and focus questions to search for articles.

This can be done by highlighting the key words in your questions as follows:

What are the causes of discrimination in Chinese work places and what is the best way to solve this problem?

From this research question, causes, discrimination, Chinese, work places are the some keywords which can be used in a search tool to look for articles directly relevant to the main problem. A search tool is either a directory, like Yahoo!, or a search engine like Google. Both are useful in finding relevant information.

What is the history of discrimination in Chinese work places?

From this focus question, the terms history and discrimination, can be combined with Chinese and work places to locate articles related to the focus question.

- You should analyse every focus question in this manner. After you have done this, you will have generated a list of keywords that can be used with a Web search tool.
1.2.5 Module 1 Portfolio Entry 3

Set of Inspiration diagrams analysing the problem according to focus questions

Goal

The goal of this task is to develop your ideas further by constructing a range of diagrams to answer some of the focus questions you developed in Task 2.

Example

Focus questions:

- How many forms of discrimination are there in Chinese workplaces?
- What are causes of discrimination in Chinese workplaces?
- What are the solutions to discrimination Chinese workplaces?

Diagrams

Diagrams such as the following could be used to generate ideas as answers to these questions.
Source: Min Li 2006
Procedure

Select at least three focus questions from Entry 2. Create a diagram to answer each question, with a key phrase as the main idea. You may be able to partly answer these questions from your own knowledge, but it will probably be necessary for you to do some research before you can fully answer the questions. If the information comes from a secondary source such as an academic article, then you should cite the source.

The examples above are based on common rhetorical patterns (classification, cause and effect, solution) but you can construct any kind of diagram that helps to develop your ideas. It is helpful if the form of your diagram helps to make the meaning clear. For example, notice that there are no arrows in the classification diagram above, but that there are arrows in the causes and effect diagram, indicating the direction of the cause and effect.

Note: The number of diagrams is optional but there should be at least three diagrams for this entry in your portfolio. You can either create your own diagrams in Inspiration software or you can use or modify Inspiration templates.
Explanation of the problem in your own words

Goal

The aim of the task is to combine the ideas expressed in previous entries in a written explanation. (The meaning of term *explanation* is general, in this case, and you do not have to use the language of the explanation genre throughout, as studied in weeks 4 & 5). The larger purpose of this task is to help you to be able to discuss your ideas and to develop them further. Some of the sentences you write may also be useful for the introduction of your research paper.

Example

One of the functions of Human Resource Management is to provide equal job opportunities to employees. In my research, I would like to investigate the causes of discrimination in the Chinese workplace and the best way to solve this problem. This has recently become a serious social problem in China and there are many news reports and discussions about employment discrimination in the media. My hypothesis at this stage is that the main reasons for job discrimination in China are the large number of laborers versus finite job opportunities and the absence of Anti-Discrimination laws, and that the most important solution is to establish Anti-Discrimination Laws to protect workers legally.

One focus of my research will be the forms of discrimination in China. These include familiar kinds of discrimination - such as gender, educational background, disability, age and health discrimination - and other forms of discrimination that are completely irrelevant to the job itself, such as height discrimination, appearance discrimination, identity discrimination and regional discrimination.

Another focus will be the causes of discrimination. Because of the huge population in China, there are a large number of job-hunters, which has led employers to develop unreasonable qualifications in order to select candidates. On the other hand, Chinese legislative bodies have still not established any Anti-Discrimination laws, which allows companies to do whatever they want. Workers are unprotected in front of their bosses and when their rights are infringed upon, there are no legal ways to get help.

Finally, as well as suggesting general solutions, I would like to focus on specific forms of discrimination, such as gender discrimination, educational background discrimination and health discrimination (HIV/HBV carriers), in order to analyse the causes and try to find some solutions to these forms of discrimination.

Source: Min Li 2006

Procedure

Write a brief explanation of your research, as it has developed so far. Use the following questions to write your explanation (you do not necessarily have to follow the order of the questions).
- What is the larger context of your research? (relates to Portfolio Task 1)
- What is the specific problem you are investigating? (In other words, what is the research question?) How does it fit into the big picture of your discipline area? What kind of problem is it, for example, social, economic, technological, psychological, or another kind of problem? (relates to Task 2)
- Do you have a tentative hypothesis at this stage?
- What are the most important sub-issues of the problem (in other words, what focus questions do you think you will need to investigate further? (relates to Task 3)

Length 100 - 250 words.
1.2.7 Module 1 Portfolio Entry 5

Summary of text related to the problem

Goal

The purpose of this task is to help you to find and summarise a text related to your problem.

Example

Text Analysis Inspiration Diagram

![Text Analysis Inspiration Diagram](image-url)

Source: Min Li 2006
Summary of the Article

**Fighting Gender Discrimination in the Chinese Workplace**

In the article **Fighting Gender Discrimination in the Chinese Workplace** (Christine M. Bulger, [http://inforeagle.bc.edu/bc_org/avp/law/lwsch]), it mentions one aspect of my research on employment discrimination in Chinese workplace—Gender Discrimination. According to this article, three reasons have been stated by the author: historical reason, employer's bias and the objection of Laws. In the old days, women had no right to go to work until 1949, the year when China was liberated. It is quite a short history and by now working women still can not be completely accepted and acknowledged by the society. Chinese traditional attitudes hold that women should stay at home and take care of the family. Since most women who work full-time also have to take responsibility for housework and child care, employers prefer to hire a man who will be less affected by their family. Furthermore, employers complained that “women do not make good leaders; male employees will resist having to report to a female boss; and women are not as ‘capable’ as men in terms of physical strength or intellectual ability”. Finally, Chinese Legal System has many flaws such as unclear definition in the Constitution, and conflict of Laws which make the courts have difficulties about how to apply the laws in particular case.

In order to solve the problems, the author suggested two solutions: to establish Laws and Legal Systems, and education. The reason why women are unfairly treated in workplace is not because lack of Laws, instead, it is the problem of lack of enforcement mechanisms. To avoid the conflict of Laws, government should formulate a policy to govern all the laws in the same standard. On the other hand, both the society and women themselves need education. The Chinese traditional attitudes towards the role of women should be changed. Moreover, improving women's educational opportunities is an efficient way to make women more competitive with men.

Source: Min Li 2006

**Procedure**

1. Develop search terms related to the problem you have chosen to research.

2. Enter the search terms into an electronic database related to your discipline area.

3. Select an article that is relevant to your topic.

4. Follow the steps you have been shown to write a summary of the article.
   - Highlight key words and claims and write notes in the margin
   - Identify the controlling idea and main rhetorical patterns
Construct a concept map of the main ideas in the article using Inspiration software
Write the summary

1.2.8 Module 1 Portfolio Entry 6

Preliminary presentation

Goal

The final presentation is designed to assist the development of your research project and to provide a speaking assessment. It is not expected that you will be able to fully present your research, but that you can either give a preliminary presentation of your research, or a progress report on your research, depending on your current situation. Choose one of the following options for your presentation, or combine the options in a logical way:

Example

See example in portfolio sample

Procedure

Chose one of the following options and plan your presentation. Then create PowerPoint slides using material from your portfolio.

Option 1: A Preliminary Presentation on Your Research

Present your ideas, as they have developed so far. The structure of your presentation could be as follows:

Introduction

- Introduction to the specific problem
- Introduction of sub-issues
- Statement of hypothesis or hypotheses

Body

- Explanation or outline of sub-issues (or aspects of the problem)
- Summary of article
- Evaluation of article (e.g., whether it is useful or not)

Conclusion

- Preliminary evaluation of hypothesis
- Plan of action
Option 2: A Progress Report on Your Research

Discuss the progress of your research, including any difficulties you have encountered. The structure of your presentation could be as follows:

Introduction

- Introduction to the specific problem
- Introduction of progress made and difficulties you have encountered
- Statement of progress made in relation to difficulties encountered.

Body

- Explanation or narration of progress made and specific difficulties you have encountered
- Summary of article
- Evaluation of article (e.g., whether it is useful or not)

Conclusion

- Summary of progress made and difficulties encountered.
- Plan of action
2. MODULE 2 RESEARCH PAPER PORTFOLIO

2.1 Introduction to Module 2 Research Paper Portfolio

The Module 2 research paper portfolio is aimed at assisting you in the development of your research paper and final presentation. The portfolio has been designed for both students entering in Module 2 and students continuing from Module 1. Students entering in Module 2 should read the information in section 3 of the Module 1 program in this handbook.

The Module 2 portfolio entries have been designed to both guide students through the process of writing a research paper and enabling continuing students to consolidate the work they have done in Module 1. The following diagram shows the process of writing a research paper.

The process of writing a research paper

- Map out key concepts relating to the problem
- Develop a series of propositions or claims
- Find and analyse secondary sources relating to the problem
- Extract supporting claims from secondary sources
- Integrate own ideas and secondary information within a hierarchical plan
- Write a series of drafts of the paper
Module 2 Portfolio Guide

The Module 2 portfolio should contain the following sections and contents:

Entry 1: Concept map
- One or more concept map using Inspiration software
- Reflection form

Entry 2: Preliminary Outline
- Outline in Word or Inspiration
- Reflection form

Entry 3: Summary of text related to the problem
- Secondary source (this should show evidence of text analysis, such as highlighting or margin notes)
- Text Analysis Inspiration Diagram(s)
- Draft(s)
- Reflection form

Entry 4: Summary of a text related to the problem
- Secondary source (this should show evidence of text analysis, such as highlighting or margin notes)
- Text Analysis Inspiration Diagram(s)
- Draft(s)
- Reflection form

Entry 5: Research paper outline
- One or more plan, using Inspiration or word templates
- Reflection form

Entry 6: Critical review of an article related to the problem
- Secondary source (this should show evidence of text analysis, such as highlighting or margin notes – it may the same source that was used for Entry 3 or Entry 4)
- First and second draft
- Reflection form

Entry 7: Research paper
- Three secondary sources (these should show evidence of text analysis, such as highlighting, margin notes or concept-maps)
- First and second draft
- Reflection form
Entry 8: Final presentation

- PowerPoint slides
- Reflection form

Due date, Requirements and Assessment

The final portfolio will be due on Friday of Week 8. A reflection form must be completed for each entry. A portfolio checklist and assessment form will be used to assess your portfolio (see Appendices L and M).

Note: At least three secondary articles must be used in the research paper portfolio, but the same article can be used in more than one entry, as shown in the following diagram:
2.2.1 Module 2 Portfolio Entry 1

Concept map

Goal

The goal of this entry is to map out key concepts that are relevant to the problem you are investigating. This will represent the big picture of your research, which can be used develop your ideas further and as a tool for discussion with peers and teachers.

Example

Source: Min Li 2006
Procedure

Create an Inspiration diagram with key phrases related to your problem as the main idea. Add symbols containing concepts related to the problem. These should be linked together to express the logical relationships between the ideas. This can be done in two ways. One way is to label the links with a verb phrase (such as results in, has type, has kind, can be solved by and so on) that expresses the logical relationship between the symbols. The other way is to add symbols containing higher order concepts (such as effects, causes, solutions and forms). The example above contains a combination of these two ways of relating ideas.

Students continuing from Module 1 can use information from Entries 2 and 3 from the Module 1 portfolio to complete the concept map. Students entering in Module 2 will need to think of a problem to investigate before beginning the concept map. If you are entering in Module 2, you may be able to develop the concept map from your own knowledge, but it will probably be necessary for you to do some research before you can fully develop your ideas. This task may take some time to complete and you may need several weeks to complete the entry.
2.2.2 Module 2 Portfolio Entry 2

Preliminary Outline

Goal

The goal of this entry is to develop the most essential claims that you will be making in your research paper. Developing these claims will provide a focus for the section of your research paper and will help you to think clearly about the structure and content of your paper.

Example

<table>
<thead>
<tr>
<th>Larger context</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the functions of Human Resource Management is to provide equal job opportunities to employees. Employment discrimination has recently become a serious social problem in China and there are many news reports and discussions about employment discrimination in the media.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Central Conflict or Key Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the causes of discrimination in Chinese work places and what is the best way to solve this problem?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrimination in Chinese work places is a complex problem and that solving the problem will be a long and complicated process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>First Section Heading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forms of Employment discrimination</td>
</tr>
</tbody>
</table>
### Main Supporting Point

There are four main forms of discrimination in Chinese workplace: appearance discrimination, gender discrimination and health discrimination and identity discrimination.

### Second Section Heading

Causes of Employment Discrimination

### Main Supporting Point

The causes of discrimination can be generally classified into two groups: the problem of legal system and that of the society.

### Third Section Heading

Proposed solutions to the problem of employment discrimination

### Main Supporting Point

Because of the variety of reasons, fighting employment discrimination in Chinese workplace will be a long process, although possible solutions include education, legal system changes, media release and government intervention.

Source: Min Li 2006

### Procedure

Use the 'preliminary outline' template on the student server. Students continuing from Module 1 should be able to include information from portfolio Entry 4 in the Module 1 portfolio to complete this task. As in Entry 1, if you are entering in Module 2, it will probably be necessary for you to do some research before you can complete the outline and this may also take some time to do.
2.2.3 Module 2 Portfolio Entries 3 & 4

Summaries of texts related to the problem

Goal

The purpose of this task is to help you to find and summarise a text related to your problem.

Example

Text analysis diagram

Source: Min Li 2006
Summary

Summary of Equal Opportunity? The Role of legislation and Public Policies In Women's Employment In China
By Fang Lee Cooke

During the last quarter of a century, China's economy has changed from a centrally planned system that was closed to international trade to a market-oriented system that has a rapid growth. It is reported that the restructured economic system has contributed to a more than ten-fold GDP increase since 1978. However, the Chinese government began to struggle to sustain adequate job growth for tens of millions of workers in response to the increasingly urgent issue of employment discrimination. Accordingly, it is vital to investigate the reason why employment discrimination existed so widely despite the rapid growth of the economy; and whether there is an appropriate way to solve the problem. In fact, it can be argued that employment discrimination is largely caused by the vast population in China and the absence of anti-discrimination laws.

While in the article “Equal Opportunity? The Role of legislation and Public Policies In Women’s Employment In China,” the author Fang Lee Cooke presented three main reasons of employment discrimination which are: lack of social security for women workers' childbearing in employment; lack of monitoring mechanisms to ensure equal opportunity in employment; and gender bias in employment legislation and policies.

In Cooke’s opinion, lack of social security for women workers’ childbearing is the first reason for gender discrimination in China. Since the economic reform in the late 1980’s, the state rolled back employee’s benefits, such as housing benefit, medical care or pensions in order to lighten the state's financial burdens and to develop the insurance system. However, the development of social security is far behind the growth of the economy. Apparently, if the enterprise pays extra to women of childbearing, this means that the more women they employ, the higher the employment cost.

Moreover, the article pointed out the problems of enforcement mechanisms to implement anti-discrimination laws. The state intervened in employment by using the legal enforcement machinery, which was controlled by the state itself. Whereas the Constitution states that the workers were the owners of the country. Therefore, any problems occurred between employers and employees were classified as internal conflicts between people. The power of legal enforcement was limited. In practice, legal enforcement machinery could not play a significant role on protecting employee’s rights.

Finally, gender bias in legislation and policies also partly contributes to gender discrimination. According to the author, there were two extreme misconceptions of women’s equal opportunities shown in China. While the former was due to the misunderstanding of what men could achieve could equally be achieved by women. At that time women were encouraged to perform the tasks which were usually carried out by men, such as working in height, in mines, and under cold water. The result was that many women were hurt because of the demands of their works. After the Cultural Revolution, this extreme situation has been reversed to another side. The current laws and policies ‘empathizes with women
though feudal social [values] and [tries] to protect women by preventing them [from] setting foot in certain domains of the male world’. However, they have ignored the important role of women in modern society.

To sum up, the main reason that has caused employment discrimination in China is the inefficient enforcement of legislation, which has resulted from China’s dramatic political, economic and social changes and which have fragmented the employment environment. Although this result doesn’t directly support my hypothesis, it does provide evidence to prove one of the reasons in the hypothesis, that is, China legal system need anti-discrimination laws to protect employees from being discriminated against.

References:

Article available from: http://www.emerald-library.com/ft

Source: Min Li 2006

Procedure

1. Develop search terms related to the problem you have chosen to research.
2. Enter the search terms into an electronic database related to your discipline area.
3. Select an article that is relevant to your topic.
4. Follow the steps you have been shown to write a summary of the article.
   - Highlight key words and claims and write notes in the margin
   - Identify the controlling idea and main rhetorical patterns
   - Construct a concept map of the main ideas in the article using Inspiration software
   - Use the ‘summary outline’ template (Appendix F) to write your summary and the ‘verbal summary outline’ template (Appendix G) to prepare for your verbal summary.
Verbal Summary Outline

Employment Discrimination

Gender Discrimination

Discipline: Human Resource Management

Focus: Causes and Solutions

Hypothesis: main reason of gender discrimination in China are surplus laborers versus such finite the job opportunities and the absence of Anti-discrimination Laws.

Equal Opportunity? The Role of legislation and Public Policies In Women's Employment In China

Summary

Causes of Gender Discrimination:

- lack of social security for childbearing
- Lack of enforcement mechanism
- Gender bias in legislation and policies

Reference:
http://www.emerald-library.com/ft

Source: Min Li 2006
2.2.4 Module 2 Portfolio Entry 5

Research Paper Outline

Goal

The goal of this entry is to structure your research paper in a linear, logical way, according to a hierarchy of claims. This outline can then be used to develop paragraphs and to integrate your own ideas with paraphrased statements and quote from the secondary sources.

Example

See examples on following pages.

Procedure

Decide whether you will use Inspiration or Word to develop your outline.

Using Inspiration

1. Open your completed concept map and select the main idea. Click on arrange in the diagram toolbar and select right tree and no stack. Then click on OK. This will convert your concept map into a right tree diagram, as in the example on the next page.

2. Arrange the symbols according to the linear order you will use in your research paper.

3. Click on outline and begin to develop your paper by adding your own claims and extracted quotes as notes to each symbol.

Alternatively, you can use the Inspiration ‘research paper outline’ template (Appendix H) on the student server, to begin your outline.

Using Word

Open the Word ‘research paper outline’ template (Appendix I) and use the template to develop your claims in the same way.

Review

When you have developed your outline, use the Research Paper Outline Checklist (Appendix J) to review your work.
Example: Outline Using Inspiration Software (diagram view)

**Introduction**

- Theme Statement
  - Age-related Discrimination (Own Study)
  - Gender Discrimination (Own Study)
  - Health Discrimination (Own Study)
  - Regional Discrimination
  - Educational Background Discrimination
  - Ethnic Discrimination

**Section 1: Forms**

- Other Kinds of Discrimination

**E. Employment Discrimination in Chinese Workplace**

- Body
  - Problems of Legal System
    - Confusing new
      - Lack of punishment for employment discrimination behaviors
    - Traditional Attitude
      - Employers bias
      - Employer bias
  - Social Bias
    - Lack of mental support
    - Social Inference
    - Social Support
  - Education
    - Labors
    - Change Social Attitude
  - Government
    - Enforce the Law
    - Establish Law to prevent discrimination behaviors
    - Set up organizations or social welfare to help protecting employees' equal job opportunities
    - Monitor, enforce, and implement
      - Monitor, enforce, and implement
      - Change Social Attitude

**Conclusion**

Source: Min Li 2006
Employment Discrimination in Chinese Workplace

I. Introduction
   A. Thesis Statement

II. Body

   A. Section 1. Forms
      1. Appearance Discrimination (Case Study)
      2. Gender Discrimination (Case Study)
      3. Health Discrimination (Case Study)
      4. Other Kinds of Discrimination
         a. Regional Discrimination
         b. Educational Background
         c. Identity Discrimination

   B. Section 2. Causes
      1. Historical Reason
         a. Traditional Attitude
      2. Employer’s Bias
      3. Problems of Legal System
         a. Lack of legal enforcement
         b. Conflicting laws
         c. Lack of punishment for employment discrimination behaviours
      4. National Economy Reform
      5. Surplus Labourers

   C. Section 3. Solutions
      1. Education
         a. Society
            (1) Change Social Attitudes
         b. Labourers
            (1) Enable employees to use laws to protect themselves from discrimination
            (2) Unemployment Training
      2. Change Laws and Legal System
         a. Establish Laws to punish discrimination behaviours
         b. Enhance enforcement of legal system
      3. Government organise labourers export
      4. Set organisations as social welfare to help protecting employees’ equal job opportunities
      5. Release Media
         a. Monitor enterprises and Judgment
         b. Change Social Attitudes

III. Conclusion

Source: Min Li 2006
3.2.5 Module 2 Portfolio Entry 6

Critical Review

Goal

The goal of this entry is to enable you to develop the ability to critically analyse the texts you are using. This is an essential skill at university, which you will need in a variety of situations.

Example

Critical review of Equal Opportunity? The Role of legislation and Public Policies In Women's Employment In China
By Fang Lee Cooke

During the last quarter of a century, China’s economy has changed from a centrally planned system that was closed to international trade to a market-oriented system that has rapid growth. It is reported that the restructured economic system has contributed to a more than ten-fold GDP increase since 1978. However, the Chinese government began to struggle to sustain adequate job growth for tens of millions of workers in response to the increasingly urgent issue of employment discrimination. Accordingly, it is vital to investigate the reason why employment discrimination exists so widely despite the rapid growth of the economy; and whether there is an appropriate way to solve the problem. In fact, it can be argued that employment discrimination is largely caused by the vast population in China and the absence of anti-discrimination laws. While in the article “Equal Opportunity? The Role of legislation and Public Policies In Women's Employment In China”, the author Fang Lee Cooke presents three reasons which directly contradict my hypothesis. Moreover, the reasons seem to be outdated and not concerned enough about gender discrimination currently in China.

There are three reasons presented in this article. Firstly, Cooke claims that ‘lack of social security for women workers and of childbearing age in employment’, which was largely due to national economic reform in the late 1980s, which caused gender discrimination. He points out the inefficiency of enforcement mechanisms, which performs on internal conflicts of the legal system, has worsened the problem. Finally, gender bias in people’s attitude also partly contributes to gender discrimination.

It is true that Chinese social security severely lags behind the rapid growth of the nation’s economy, especially after national economic reform. Cooke explains as follows:

Since the late 1980s, the state has allowed (the state owned) employing organizations to gradually roll back their extensive employee welfare provisions, such as housing benefit, medical care and pensions, in favour of tripartite social security system in which the individual employee, the employer and insurance company all have a financial stake.
This was an effective way to lighten the nation’s financial burdens and to avoid enterprises from becoming bankrupt. However, Cooke argues that the development of social welfare was far behind this development, and the direct impact on employers was the increased employment cost in terms of women workers’ childbearing costs. Therefore, employers have tried to reduce employment costs by reducing the number of female employees and childbearing age.

As for the second reason, although it sounds reasonable, it is in fact, outdated. Cooke states that gender discrimination in China is caused by the problems of enforcement mechanisms, which result from the failure of intervention to protect women’s equal rights in employment. He observes that the function of state-owned legal enforcement is largely limited by the principle ‘workers are the owners of the state’, namely, any dissension which occurs between employer and employee is classified as ‘internal conflicts between people’. Consequently, the only legal enforcement which is owned by the state can hardly exert its authority. It seems to me as if the problem of Chinese enforcement mechanisms is merely a series of internal conflicts between the legal enforcement and the principle. Is this a major problem? It probably was, but not for this stage. Thirty years before, this contradiction frequently appears due to the Cultural Revolution, which is now considered to be a political error. Today, the major problem of Chinese enforcement mechanisms is the absence of specialized anti-discrimination laws. By now, what we have in the Constitution is only the unclear article that ‘Women in the People’s Republic of China enjoy equal rights with men in all spheres of life…The state protects the rights and interests of women, applies the principle of equal pay for equal work to men and women alike…’ (Laws and Regulations of the People’s Republic of China Governing Foreign-related Matters, 1991, P.23). This article is fairly vague in practice and caused great difficulties for justice to be applied to in particular cases. Rather than the internal conflicts between the legal enforcement and the principle, it appears to be timely to argue that lack of specialized anti-discrimination laws encourages gender discrimination in Chinese workplace.

In addition, Cooke declares that gender bias in people’s attitudes, which is guided by two misconceptions, partly contributes to gender discrimination. According to Cooke, the former misconception, that was held during the Cultural Revolution, overestimated women’s physical faculties and believed that ‘what men could achieve could equally be achieved by women’. While the latter, which was widely held after the Cultural Revolution, was over-corrected and conceded that women are physically and physiologically weaker than men. Indeed, this belief has led to gender discrimination. However, it is not difficult to find out the crucial reason for the whole situation, which is, surplus laborers in the overcrowded labor market which leaves a huge space for the employers to make choices. Figure from the article Analysis of the employment situation in 2006 might be helpful to explain. It is reported that in 2005, there were 24 million job-hunters in China while only 10 million job opportunities were provided (Zhou Shan Employment office, 2006, P.2). In this year, 2006, the population of unemployed person is estimated to be 15 million and will keep on increasing within at least five years (ibid). Considering this fact,
it is probably easier to understand why gender discrimination or any other kind of employment discrimination is so serious in China.

To sum up, the author Fang Lee Cooke presents fairly objective reasons for gender discrimination in the Chinese workplace. This article is directly related to my research paper and is helpful to understand all aspects of the situation. While in order to solve the problem, it is also necessary to distinguish the most concerning and timely factors. Combining my opinion with Cooke's arguments will be comprehensively analyzing the employment discrimination problem in the Chinese workplace.

References:


Procedure

1. Choose one of the texts you are using in your research
2. Critically read the text in terms of the criteria you will be given
3. Use the Word or Inspiration templates to develop your critical review (see Appendix K for an Inspiration template).
2.2.6 Module 2 Portfolio Entry 7

Research Paper

**Goal**

The goal of this entry is to draft your research paper.

**Example**

See the example in Appendix A.

**Procedure**

Open your completed outline. If you have been working in Inspiration, open the outline view and transfer your outline into word. Then remove the unnecessary formatting and format your paper into clear section, with headings and paragraphs, as in the example. If you have been working in Word, convert the table to text and format your paper in the same way.

You should produce two drafts of your paper, a first draft and a final draft. Before, you submit your first draft for feedback, check the structure and organisation of your paper. Before you submit the second draft, check the coherence and grammar.
2.2.7 Module 2 Portfolio Entry 8

Final Presentation

Goal

The purpose of the final presentation is for you to present your research, and for you to demonstrate your ability to prepare and give a formal presentation.

Example

See example in portfolio sample.

Procedure

Structure

The structure of your presentation could be as follows:

Introduction

- General to specific introduction
- Introduction to the specific problem
- Introduction of sub-issues (corresponding to content of RP sections)
- Outline statement
- Clear statement of main point (corresponding to RP thesis statement)

Body

The body of the presentation should clearly explain the sub-issues.

It should contain:

- A clear series of claims that support the main point (corresponding to RP section main points)
- Supporting points (corresponding to RP topic sentences)
- Selected data or quoted statements from secondary sources

It could also contain:

- Brief summaries of articles, including critical evaluation
- Explanation of diagrams, charts, tables and statistics

Conclusion

- Summary of points made
- Implications of the research
- Suggestions for further research
Format

A PowerPoint presentation is preferred, but overheads may be used instead.

Some points to consider

Language

- Avoid the expression *body part*
- Be specific: the next *problem*, *solution*, or *cause*, rather than the next *one*.

Visual aids

- Avoid including more than about seven lines in an overhead
- Inspiration diagrams, such as concept maps or diagrams, may be used but should be simple or they will not be easily read.
# Appendix 4: Module 2 Portfolio Evaluation Form

<table>
<thead>
<tr>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entry 1</strong></td>
</tr>
<tr>
<td>Does the concept map contain a substantial number of concepts?</td>
</tr>
<tr>
<td>Are the concepts logically linked to show the relationships between</td>
</tr>
<tr>
<td>them?</td>
</tr>
<tr>
<td><strong>Entry 2</strong></td>
</tr>
<tr>
<td>Does the plan contain a series of logically ordered claims?</td>
</tr>
<tr>
<td>Does the plan indicate the structure of the research paper?</td>
</tr>
<tr>
<td><strong>Entry 3</strong></td>
</tr>
<tr>
<td>Does the text analysis diagram indicate key points from the article,</td>
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<tr>
<td>in relation to the problem?</td>
</tr>
<tr>
<td>Does the summary focus on key points from the article, in relation</td>
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<tr>
<td>to the problem?</td>
</tr>
<tr>
<td><strong>Entry 4</strong></td>
</tr>
<tr>
<td>Does the text analysis diagram indicate key points from the article,</td>
</tr>
<tr>
<td>in relation to the problem?</td>
</tr>
<tr>
<td>Does the summary focus on key points from the article, in relation</td>
</tr>
<tr>
<td>to the problem?</td>
</tr>
<tr>
<td><strong>Entry 5</strong></td>
</tr>
<tr>
<td>Does the critical review demonstrate the ability to think critically?</td>
</tr>
<tr>
<td><strong>Entry 6</strong></td>
</tr>
<tr>
<td>Does the research paper demonstrate the ability to synthesise</td>
</tr>
<tr>
<td>information from secondary sources?</td>
</tr>
<tr>
<td>Does the research paper meet the requirements of a tertiary level</td>
</tr>
<tr>
<td>assignment?</td>
</tr>
</tbody>
</table>
Name:

**Portfolio as a whole**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the portfolio visually coherent?</td>
<td></td>
<td></td>
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<tr>
<td>Is the portfolio divided into logical sections?</td>
<td></td>
<td></td>
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<tr>
<td>Does the portfolio contain all of the entries required?</td>
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<td></td>
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<tr>
<td>Does the portfolio indicate a process of development and revision?</td>
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<tr>
<td>Is the spelling correct?</td>
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<tr>
<td>Is the grammar correct?</td>
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<tr>
<td>Do the comments in the reflection forms demonstrate an understanding of</td>
<td></td>
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<tr>
<td>the purpose of entries within the process of constructing a research</td>
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<tr>
<td>paper?</td>
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<tr>
<td>Do the comments in the reflection forms demonstrate reflective thinking?</td>
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<tr>
<td>Does the portfolio demonstrate competence in the construction of a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>research paper?</td>
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<td></td>
</tr>
</tbody>
</table>
References


Arnaudet, M & Barrett, ME 1984, Approaches to Academic Reading and Writing, Hall, New Jersey.


Bakhtin, M 1986, Speech Genres and Other Late Essays, University of Texas Press, Austin.


Cunningham, DJ 2007, ‘Educating the Semiotic Mind: Introduction to Special Issue on


Deleuze, G 1988a, *Foucault*, University of Minnesota Press, Minneapolis.


Deleuze, G 1988a, *Foucault*, University of Minnesota Press, Minneapolis.


Fraser, K 2006, Student Centred Teaching: The Development and Use of Conceptual Frameworks, HERDSA Inc, Milperra, NSW.


Haas, C 1996, Writing Technology: Studies on the Materiality of Literacy, Lawrence
Erlbaum Associates, Mahwah, New Jersey.


Johnson, S 2001, Deleuze and Guattari’s Pragmatics and the Problems of Language Learning, Perth.

Johnson, S 2007, Academic English and Study Skills Bridging Course: Study Skills and Research Handbook, Centre for English Language Teaching, University of Western Australia, Perth.


Jonassen, DH 2000, Computers as Mindtools for Schools, Merrill, New Jersey.


Prior, P 1998, Writing Disciplinarity: a Sociohistoric Account of Literate Activity in the Academy, Lawrence Erlbaum, Mahwah, NJ.


Smith, K & Edwards, D 1997, ‘Top-Level Structuring as a Basis for the Development of


