

# REAL TIME STUDIES IN WRITING RESEARCH: PROGRESS AND PROSPECTS

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**Abstract.** The last half of the 20th century provided an opportunity for the explosive growth and development of research on writing. From a product-oriented to a process-oriented approach, new theoretical models of writing emerged. Following this shift in conceptual frameworks, new methods of investigations were applied in research. However, in the context of this development, careful analyses of the literature demonstrate clearly that systematic, theoretically-driven empirical research focused on writing has been barely measurable compared with research on speech production and language comprehension. Methods presented in this book illustrate how the study of writing processes is becoming ever more tractable with the use of real time methods that take advantage of their unobtrusive recordings of the writing process.

**Keywords:** real time studies, models of writing, writing processes.

## 1. INTRODUCTION

In the field of writing studies, no development has been more influential than the process-oriented approach. A rapid glance through the major journals in the field clearly illustrates the changes that followed the shift between the product-oriented approach to the process-oriented approach. This is indeed obvious when one looks at the kind of studies conducted since the publication of Hayes and Flower's (1980) well-known chapter. The number of studies emphasizing the analysis of written texts to understand the composing process drastically decreased.

The short history of writing research illustrates how changes in conceptual framework have an impact on the methods of investigation that are used. The aim of this introductory chapter is to provide an overview of this history by highlighting the coupling between writing theories and tools and techniques for the study of writing. The chapters that follow will give a snapshot of the real time methods that currently accompany the newest conceptions of the writing process and processes.

This chapter is structured in three parts. First, we surround the strange paradox in which writing studies are embedded. Indeed, although writing is an activity in which we all are frequently engaged during our life, psychological research has paid relatively little to the understanding of the writing process. Next, we briefly describe how

methodological investigations of writing have evolved in parallel with new different theoretical approaches of writing. Finally, we give an overview of the chapters presented in this book.

## 2. THE PARADOX OF WRITING STUDIES IN PSYCHOLOGY

The last half of the 20th century provided an opportunity for the explosive growth and development of research in human cognition and particularly in writing. However, in the context of this development, careful analyses of the literature demonstrate clearly that systematic, theoretically-driven empirical research focused on writing has been barely measurable (Levy, 1997). Even within the domain of language, research on speech production and language comprehension has dwarfed the scholarly work on written language production. That writing has not been a major subject of research by psychologists, despite the fact that their professional recognition depends heavily upon the quality and quantity of their own writing, creates an interesting paradox.

This paradox can be explained partly because writing is clearly one of the most complex activities that people can accomplish. For instance, writing first involves cognitive processes. It engages not only text-related cognitive processes, but also processes involved in multiple cognitive activities, such retrieval from long-term memory, lexical access, defining goals, and so forth. Further, as Faigley (1986) claimed, writing and especially academic writing, involves collaborative and social acts. From this perspective, writing has been studied by paying attention to how the writer is a constituent of a culture and to how writing is inserted in a social space. But writing is also a *mode of learning*, a *discovery process*, and so on. In fact, writing is clearly a multi-dimensioned activity. This surely explains why writing is inherently difficult to study.

The scarcity of research in writing is well illustrated, as Levy (1977) indicated, in the field of human cognition studies where writing has very few connections with other theories of cognitive activities. Surprisingly, studies conducted on discourse production processes have largely ignored what has been discovered in text production research. The same strange phenomenon is observed in text comprehension studies, although research on revision should highlight what happen when one reads a text. In this sense, writing research seems to have developed almost independently from other fields in cognitive psychology.

Nevertheless, an other reason, and perhaps the principal reason, that explains the current paradox derive from the scarcity of tools and techniques that can be used to investigate writing. Indeed, for a discipline that historically has sought cause-effect relationships, isolating the causes of specific written responses (*i.e.*, effects) has been as elusive as finding the Holy Grail. It has been as difficult for researchers to devise methods to study writing processes in isolation as it has been for them to constrain and to assign quantitative values to writers' responses.

An important step for research tools and methods for investigating writing resulted from the changes in theoretical conceptions on writing that appeared in the mid 1970s. A large body of researchers, teachers and scholars began to be concerned with the cognitive processes underlying writing. This resulted in a parallel change in the

methods of investigation. The next section describes this theoretical development and the methodological changes that accompanied it.

### 3. FROM OFF-LINE TO REAL TIMES STUDIES

Before the end of the 1970s, the goal of writing studies was mainly educational. Psychologists conducted studies about writing and its teaching in the way that scholars and students think about composing issues. The main framework that guided these researches was rhetoric. The writing process was conceived in three main stages: pre-writing (searching information and conceiving meaning), then writing and, finally, re-writing. Writing was investigated by looking at factual descriptions of the composition process (biographic information about the writers, correspondences of established and famous writers, journals, prefaces, etc.). Texts were dissected according to the formal descriptive categories of rhetoric (modes of arguments and of discourses) and with respect to texts considered as good or poor following the grammar and usage conventions.

However, during the 1970s, the focus of attention began to shift. Not only conceptions of basic research on writing, but also those of teachers and of scholars. It began to appear that it was impossible to understand what happen in the writer's mind during a composition by looking only at the texts and documents produced by the writers. Taking into account that limit of past studies, the field of writing studies redefined itself. The major aim was now to find out what actually happens when people write – in other words, to discover the cognitive processes that occur during writing (Emig, 1971; Britton, Burgess, Martin McLeod, & Rosen, 1975). This shift from exclusive written products studies to the examination of the writing processes was accompanied with changes in the methodologies of research. Case studies were one of the tools that researchers began to use in order to investigate the procedure in which writers are engaged during composition. More importantly, during this period, writers' verbalizations began to be intensively used following the principles of thinking-aloud protocol analysis proposed by cognitive theorists (Newell & Simon, 1972).

Thinking-aloud protocol analysis was the first new major technique available for studying the cognitive processes involved in writing in the 1980's. With this technique, while composing, writers simply speak aloud about anything that comes to mind. They are explicitly instructed to avoid introspecting. Using this experimental paradigm, Hayes and Flower (1980; Flower & Hayes, 1980) developed their well-known model of writing.

The seminal work of Hayes and Flower actually initiated the experimental process-oriented approach of writing and definitely broke with the product-oriented one. They identified writing as a problem-solving activity engaging several cognitive processes. The conceptual model of writing they proposed was structured in several structural and functional systems. Three main writing processes (Planning, Translating and Revising) were identified that are managed by a particular processor: the monitor. Further, structural parts representing the task environment and the knowledge involved in writing were added in the model. Their model was therefore directly in the line of the conceptual framework delineated by Newell and Simon for the *General Problem Solver* (1972). Hayes and Flower (1980; Flower & Hayes, 1980) thus

related writing research to what was at the time a mainstream theoretical perspective in cognitive psychology. Writing was not only considered as a cognitive situation but also, and perhaps mainly, as a problem-solving activity. As Faigley (1986) indicates, the Flower and Hayes model promoted a 'science consciousness' within the writing community, and especially among teachers and scholars.

As writing was now considered in the light of the information-processing paradigm, methods coming from this paradigm could be integrated in composition studies. However, the studies that examined the process of writing as it unfolded in real time came slowly and infrequently. The technology of 1980's had not developed sufficiently for such studies to be feasible in many laboratories.

A major development in writing process research occurred in the last decade of the 20th century, as the desktop computer became ubiquitous and software development tools came to market, enabling those even with modest budgets and computer skills to push the frontiers of writing research ahead dramatically. Complex experiments can now be created and administered, and copious behavioural data can be collected and analysed in sophisticated new ways. Our understanding of the writing process has grown impressively from new real time methods that have been developed, enabling researchers to take full advantage of their capability to unobtrusively make archival recordings of the writing process.

Currently, the main models of writing (Kellogg, 1996; McCutchen, 1996, Berninger & Swanson, 1994) systematically include general components of human cognition. For instance, all three of these models integrate human processing limits by describing the links with working memory. This is particularly obvious in Kellogg's model (1996) where relations between writing processes and the different systems of working memory are detailed. Consequently, research methods initially developed in the studies of working memory are now applied in writing studies. The chapter of Levy and Ransdell (this volume) is an example of such work. Further, low-level cognitive processes are also taken into account. For instance, graphic transcription processes related to the execution of the written texts are also included and kinematic aspects of handwriting can now be measured with the help of digitiser tablets. The same thing happens for the study of low-level lexical processes in writing that were not studied a few years ago. Priming studies developed for speech production research can now be fruitfully used to understand the characteristic of the processes involved in lexical access and in spelling (see Bonin & Fayol in this volume).

With both these new tools and techniques and the integration of principle of cognitive science in writing research, writing processes are thus studied more easily, experimental paradigms can be shared among multiple laboratories, findings can be replicated (or not), and theories of writing can be extended, modified, abandoned, and created anew. The Internet will certainly help to extend and generalize our knowledge in the near future, as writing researchers reach out to the world community for research participants.

Clearly, the study of writing processes is in flux, but it is becoming ever more tractable. The ensemble of chapters in this volume represents a snapshot of the state of the art in writing research methodology at the beginning of the 21st century. Because the research frontier is being advanced with such speed, it would be foolhardy of us to attempt to predict what contemporary methods will be like ten years hence.

Paradigms shift in every discipline. Perhaps the new paradigms will be wholly unlike anything presented in these pages. Undoubtedly, they will be more sophisticated and powerful, but we have every reason that many of them will have evolved from natural extensions of some of those described in this book.

#### 4. OVERVIEW

The tools and techniques described in this book focus only on real-time methods. This was an intentional design decision on our part because, in the last decade, the development of writing theories has occurred primarily as a function of new computer-based methodologies that have enabled researchers to build appropriate new paradigms for understanding writing. Furthermore, this improvement of our understanding of writing has also led researchers to link writing theories with mainstream thinking about cognitive psychology.

We hope this book can be used as a tool book or handbook for investigating writing, either by designing experiments or by studying text production in real-life environments. After reading a chapter, many readers should be able to immediately implement each technique described in the book. This is not to say that some methods (for example, those described by Levy and Ransdell in Chapter 2 or by Kellogg, Olive, and Piolat in Chapter 3) can be used without the user having some computer programming expertise or access to a consultant who has these skills. Nor is it to say that certain methods, particularly Latent Semantic Analysis described by Foltz and Landauer in Chapter 7, cannot be used without significant additional background reading for the reader to establish full competence in the techniques.

Accordingly, this book focuses both on theoretical and methodological questions related to the use of these computer-based techniques and on how to implement them. Each chapter presents the theoretical background that directed the development of the method, the procedure and minimum equipment requirements for conducting a prototypic analysis of writing sessions, some ways to analyse the data obtained with these techniques, and discusses how the basic method can be varied to answer research and/or educational questions.

We have directed the book to a variety of audiences for writing research, but primarily aimed it to those whose objective is to understand the writing process either in laboratory or in traditional applied and field writing contexts. Thus, although the book mainly addresses basic research questions, it may prove to be useful to practitioners (see, for example, Perrin's chapter) and writing instructors (see, for example, Foltz and Landauer's chapter).

The experimental methodologies presented in the following chapters illustrate how recent technological advances have provided new insights about the process of writing and how writing research can be related to current theories in other fields of psychology. The three next chapters (2, 3 and 4) present techniques that allow researchers to collect data about written language production at general level, for example, without investigating one particular processes or type of text. For instance, these techniques and methods provide information about the relationship between writing and the human memory (Chapter 2) or about the dynamic of writing (Chapters 3 and 4).

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