



0959-4752(95)00008-9

STUDENTS' DRAFTING STRATEGIES AND TEXT QUALITY

ANNIE PIOLAT and JEAN-YVES ROUSSEY

Centre de Recherche en Psychologie Cognitive, URA 183, CNRS, 29 Avenue
Robert-Schuman, 13621 Aix-en-Provence, Cedex, France

Abstract

The study reports an analysis of the drafts produced by two groups of students during an exam. Drafts were categorized as a function of some of their graphic features (e.g. their length), and of their different planning strategies used for their production (e.g. note draft, organized draft, composed draft). Grades obtained by the students on their essays related to the different categories of drafts. Results show that 2/3 of both groups of students made some kinds of draft. Drafts mostly consisted of note drafts or long composed drafts. Very few consisted of organized drafts. However, students that wrote these latter drafts obtained the best ratings. Drafting strategy was homogeneous for half of the students who used one category. The other half successively used two drafting modes. In that case they mostly associated writing with jotting down notes or with some marks of organization. Here, again, students who organized, even partially, their drafts obtained the highest grades. Very few corrections were brought to the long drafts and they concerned the surface (spelling or lexicon), not the content or the plan. This research shows that only a limited number of students used an efficient drafting (organized draft) even though such a strategy is generally associated with the highest ratings. Copyright © 1996 Elsevier Science Ltd

Introduction

Most models of writing distinguish several levels of information processing (for a review, see Fayol, 1991; Piolat & Roussey, 1992a). At each level, specific subprocesses and knowledge are used by writers to compose their final text. Planning processes carry out idea retrieval and organization (Faigley, Cherry, Jolliffe & Skinner, 1995; Hayes & Flower, 1980). Sentence generation processes are used to take the preverbal message prepared during planning and translate it syntactically and lexically into a text (De Beaugrande, 1987; Espéret & Piolat, 1990; Levelt, 1989). The execution process (graphemic encoding) generates the text. At each of these processing levels, the output is evaluated (and revised, if necessary) by a verification system (Fitzgerald, 1987; Piolat & Roussey, 1992b; Roussey, Piolat & Guercin, 1990). The writer's skill level and the nature of the writing task determine whether and how these processes and knowledge are implemented (Galbraith, 1992; Scardamalia & Bereiter, 1991).

The study presented here deals more specifically with university students taking an essay examination to obtain a final grade in a psychology course. It was designed to contribute to the analysis and evaluation of how information retrieval and organization during the planning phase

affect writing. Planning modes were assessed by analyzing the students' rough drafts, assumed to at least partially reflect their underlying processes.

Planning Processes

Hayes and Flower (1980) described the writing activity as a complex and costly "juggling" of different activities monitored by the so-called "planning processes" (generating, organizing, and goal-setting). These processes are used to devise various types of plans (plans to do, plans to say, plans to compose). Such plans are necessary because the mental representation of the information the writer wishes to convey is rarely in sequential format (Fayol, 1991; Levelt, 1982; Newell & Macadam, 1987), while sentences can only be produced after the information has been structured in a strictly linear fashion (De Beaugrande, 1987; Levelt, 1989). In addition, owing to the constraints of the production situation (the addressee, communicative implications, type of text required, etc.; Bronckart, 1985), it may be necessary to restructure and re-rank the information in the message. Ideas (concepts, propositions) may have to be rearranged and presented in a different order from the one in which they were recovered from memory, which is done during organization and goal-setting. Moreover, some of the information activated during planning may not even be included in the final text, such as the writer's comments about how to present and organize the content of the text.

Because the writing activity is so complex, the best planning strategy is to divide the problem into subtasks, thereby reducing the number of simultaneous constraints. This is achieved by making several different operating plans to establish priorities and define an order for carrying out the tasks. There appear to be three interdependent types of plans which can be activated and/or constructed by the writer (Flower, Schriver, Carey, Haas & Hayes, 1989; Hayes & Flower, 1980). (1) "Plans to do" solve the rhetorical problems generated by the discourse situation (Dolz & Schneuwly, 1989). (2) "Plans to say" deal with content, and contain a simplified or abstract version of the information the writer wishes to express (Sharples & Pemberton, 1988). (3) "Plans to compose" define specific, local procedures such as "find a transition . . ." or "look for additional information . . .", and aid the writer in exercising metacognitive control over the composition process (Raphaël, Englert & Kirchner, 1990).

Such plans, whether simply elicited (because they already exist in the writer's repertoire) or created at the time, are usually mental entities in the form of scripts or formulas defining what the writer should say or do (Flower *et al.*, 1989). But plans of this type may also be written, as in the rough drafts of experienced writers such as students (Hayes & Flower, 1980) and professionals (Hay, 1993).

The Written Products of Planning

During rough draft writing, different forms and marks can be used to make a plan or denote a planning subprocess (Sharples & Pemberton, 1988). Such marks are the elementary and incomplete concretization of the mental work being carried out. In some cases, short "labels" such as word fragments, single words, or phrases are used as anchors for a mental schema or "place holders" for a portion of text to be written. If such labels are used to express familiar, well-organized information, the subsequent formulation step will be easy, but if they refer to

large sections of text, like "introduction" or "overview", the writer will have to do some additional planning and sentence generating in order to create the desired portion of the text. In other cases, highly explicit, fully composed sequences ranging from a sentence to an entire document are written down from the start, even if later revising is necessary.

More concretely, when the *generation* subprocess is activated, unorganized and unordered notes are jotted down (lists of words, phrases, sentence fragments). Information in linear format (sequences of sentences) may also be produced during this subprocess through the activation of the sentence generation process. When the *organization* subprocess is activated, notes or sentences are accompanied by various types of marks, often non-linguistic, which are used to express the organization of ideas (underlining, indexing, indentation, numbering, etc.). The chronological (and/or a hierarchical) structure becomes concrete via this subprocess. Notes are linked together into a network, a tree, etc., or put in table-of-contents or outline format (letters of the alphabet, numbers, etc.). When the *goal-setting* subprocess is activated, adjustments are made to what is already written (portions of text are added, deleted, moved) and metacognitive remarks and evaluations are written down.

The various written marks and items used during the draft-writing activity are indicators of both the type of text the writer hopes to produce and the current state of the production process (Gebhardt, 1982). But the observed diversity of rough drafts makes it very clear that the planning strategies used by different individuals to prepare a given text are functionally very different.

Types of Draft Writers

A writer may or may not activate all of the possible planning processes. Two or more processes may be employed simultaneously or in succession, and at different times during the elaboration of the text. The observed differences between drafters and between the written marks they produce are thought to depend above all on differences in individual writing skills (Bereiter & Scardamalia, 1987; Burtis, Bereiter, Scardamalia & Joram, 1983; Scardamalia & Bereiter, 1991). Novice writers "recount" their knowledge in the order in which it is retrieved from memory. They only activate the generation process, retrieving ideas one at a time and translating them into sentences without attempting to change their structure.

More experienced writers, who in many cases do not have an available solution in memory, use a Knowledge Transforming Strategy to reorganize their ideas in order to arrive at an adequate solution. These writers analyze the writing instructions in order to determine the content and the rhetorical constraints which govern the production. They then construct goals which act as control structures to manage two interacting "problem spaces". Such goals determine both the organization of content (thematic knowledge) and the formal characteristics of the text (knowledge about the production situation and linguistic constraints). This dual control filters retrieved ideas, which may either be superficially restructured or deeply transformed so as to satisfy the constraints imposed at both levels. The sentence generation process, or Knowledge Telling Strategy, can only take place once this dual constraint has been satisfied by the organization and goal-setting processes. Experienced writers can employ either the Knowledge Transforming Strategy or the Knowledge Telling Strategy, depending on the circumstances.

The functional diversity of experienced draft writers is great, even when the number of years of practice in writing or the amount of thematic knowledge is the same. Bridwell, Johnson and

Brehe (1987), Galbraith (1992), and Sharples and Pemberton (1988, 1990) identified two typical but very contrasted types of draft writers, the "executors" and the "discoverers". Executors make extended efforts to devise detailed plans before putting their ideas into text format. During this preparatory phase, they clarify their ideas and their points of view on the issue. The plans they scaffold may remain "mental" or may be written down on paper. Draft writers of this type only translate their ideas into words when they are sure of what they want to say and how they want to say it. They essentially use a planning-writing strategy which avoids having to make extensive revisions after the sentence generation phase. Discoverers, on the contrary, write by spontaneously and freely starting to formulate available ideas without worrying in advance about how to structure their message. They find ideas as they compose. They clarify and refine their point of view by extracting what appears essential from these initial ideas. They frequently write a summary of what they have already written, in an attempt to see a possible plan emerge. At the same time, they continuously change their draft, evaluating retrieved ideas and relating them to their overall goal (text purpose and adaptation to the addressee). They constantly revise and reformulate on paper. Discoverers essentially employ a critical rewriting strategy.

Little experimental research has been conducted to study the effects of planning strategies on the quality of the final text, as it is difficult to find undebatable criteria for evaluating written work (Breetvelt, Van den Bergh & Rijlaarsdam, 1994; Spencer & Fitzgerald, 1993). Writing effectiveness appears to depend on several factors. Among other things, it is thought to be clearly linked to the quantity and structure of the writer's knowledge (Caccamise, 1987; Durst, 1989; Eigler, Jechle, Merziger & Winter, 1991; Kellogg, 1987b, 1988, 1990; McCutchen, 1986; Newell & Macadam, 1987; Smagorinsky & Smith, 1992). It also appears to depend on the writer's ability to employ various types of planning processes and to consciously control their effects during drafting, which is conducive to idea structuring (Higgins, Flower & Petraglia, 1992; Isnard & Piolat, 1993; Matsushashi, 1987; Scardamalia & Bereiter, 1987, 1991; Torrance, Thomas & Robinson, 1993).

The above considerations suggest that writing expertise does not depend solely on the writer's knowledge about the theme in question, nor on his/her ability to put ideas into words. It also appears to be linked to the writer's ability to voluntarily engage in planning processes and assess their effects in order to find a suitable solution (Bryson, Bereiter, Scardamalia & Joram, 1991; Roussey & Piolat, 1991).

Research Objective

Most of the results mentioned above have been obtained by using methods which do not analyze drafts to any significant extent (verbal protocol method: Hayes & Flower, 1983). Moreover, the number of writers considered is generally small. The main objective of the present study was to analyze the draft writing practices of a large sample of subjects and to examine their effects on the quality of the final papers produced.

Several questions were addressed. Firstly, as more or less "experienced" writers, do university students need to write a rough draft to foresee and prepare their text? Secondly, if they do write a rough draft, how do they go about it? Do they retrieve information in the form of lists? Do they organize it? Do they express their ideas accurately? Do they proceed in steps? Do they modify their drafts? Do they all make the same type of plan to express their ideas? Thirdly, is

there a relationship between the type of draft students write and the quality of their final text? These questions served as the basis for the predictions stated below.

Method

Subjects

The sample consisted of rough drafts and essays written by students as the final examination in a cognitive psychology course. To meet the objectives of the present study, and in particular, to show that there is a relationship between the way a rough draft is written and the quality of the final essay, the drafts of more than one class of students had to be analyzed. Had we only used one class, the problem posed would have been the relevance of the draft typology defined, and the specific vs general nature of the corresponding drafting modes for essay exam writing. In an attempt to alleviate these problems and increase the generality of our findings, the productions of two class years were analyzed. The two class years were drawn at random from the four available years of exams stored in the files at the University of Provence, France (Y1: class of June 1991; Y2: class of June 1993). In all, the sample included the rough drafts and final essays of 1089 students (Y1: $N = 440$; Y2: $N = 649$).

Material and Procedure

The essay writing and grading conditions were the conventional ones used at the University of Provence. The examination was closed-book, took place in a lecture hall, and lasted 3 hr. It included an essay question and a multiple choice questionnaire (M.C.Q.). At the time, all subjects were first year psychology students. During the school year, they had prepared for the exam by reading and studying six excerpts from articles or books on psychology, so theoretically they possessed the necessary thematic knowledge to write the essay (this assumption was not verified for this study, however). The essay question concerned one of the excerpts studied during the course. The excerpts were the same for both classes; only the formulation of the essay questions differed. As is customary in this type of course, each student was randomly assigned one of six (Y1) or seven (Y2) possible essay questions. Note that this writing situation is a "natural" one. It can be assumed to trigger substantial writing efforts on the part of the students, who probably had a familiar writing strategy at their disposal. Below is an example of the essay questions used.

Example of essay questions: "About the paper by Lindsay and Norman (e.g. chapter 9: use of memory), show, through an example, that the search for information in long term memory can be analyzed as a problem solving activity."

The M.C.Q. was printed on the front side of six sheets of paper, the backs of which were used for writing the rough draft of the essay. The final essay was written on a four-part exam sheet provided by the professor (no other paper was available). Upon leaving the exam room, the students turned in their essays and the answered M.C.Q. with their rough drafts on the back. The exams were graded at the time by the course professors. Obviously, neither the students nor the professors knew that their "work" (their writing for the former, their grading

for the latter) would be analyzed for the purposes of the present study. A given professor graded all essays for a given question, on the conventional French grading scale ranging from 1 to 20. Criteria typically retained for students' essays include drawing inferences from the ideas expressed in the portion of the text submitted to the students.

The present analysis of the writing samples included two steps: (1) the rough drafts were categorized by "drafting mode" on the basis of certain predefined criteria, and (2) the drafting modes were compared with the grade obtained on the essay. In most cases, statistical calculations were made to determine whether the observed differences were significant.

Data Analysis

The rough drafts samples were categorized at several levels, ranging from very general to very specific. Each categorization level was designed to answer certain questions concerning the relationship between the drafting mode used and the grade obtained on the essay. The present authors and one student categorized the drafts independently, without knowing the corresponding essay grade. A judge who was not aware of the purpose of the study was called upon to settle cases of disagreement.

Use of a Draft

Some students had no draft on the back of their M.C.Q., while others deliberately erased or made their drafts illegible. Of the 1089 essays in the sample, 482 had legible drafts. Thus, the sample was divided into three categories on the basis of draft availability:

- No draft*
- Erased/illegible draft*
- Available draft.*

Draft Size

Since the length of the drafts varied considerably, the sample was categorized a second time on the basis of draft size. This is an important variable, since it may reflect the amount of knowledge possessed by the writer on the topic. Because it was difficult to estimate the number of words in a draft owing to crossed-out, incomplete, and abbreviated words, a spatial criterion (based on a rapid scan of the sample) was used. Two size categories were defined:

- Short drafts:* $\frac{1}{3}$ of a page or less
- Long drafts:* more than $\frac{1}{3}$ of a page.

For greater accuracy, the long drafts were later subdivided into two categories (note that very few drafts covered more than two pages):

- 1-page long drafts* (one page or less)
- 2-page long drafts* (two or more pages).

Type of Draft

The type of draft was determined by analyzing the linguistic and non-linguistic items it contained. The criteria used for this analysis (summarized in Table 1) were derived from the studies presented above in the introduction. The number of categories was initially set at three:

Table 1
Linguistic and Non-linguistic Characteristics of Draft Types ND, OD,
and CD

Type of draft	Characteristics
Notes (ND)	Scattered unorganized notes, words, phrases Non-linear format
Organized (OD)	Organized notes (lists, numbering, arrows indentation, indexing, etc.) Non-linear format
Composed (CD)	Lexically and syntactically explicit ideas Linear sequence of sentences

Note drafts (ND)

Organized drafts (OD)

Composed drafts (CD).

Note drafts contained note-like items indicating the search for ideas. The items were not very explicit and consisted of unorganized lists of words or groups of words, either in columns or spread randomly across the page. *Organized drafts* contained arrows and signs of indexing (circled words or sentence fragments with arrows pointing elsewhere, sequences of symbols listing ideas, etc.) and beginnings of an outline format (1, 2, 3 or A, B, C) next to the ideas. As above in the note drafts, the ideas were not stated very clearly. *Composed drafts* were in linear format. The ideas were written out following the formal conventions of the language. Some of the composed drafts were exact copies of the final essay.

Draft Uniformity

In order to more accurately represent the different ways of planning reflected in the drafts, the long drafts were further broken down into two categories on the basis of the number of planning modes used. Indeed, some of the long drafts were uniform, containing items of one type only (ND, OD, or CD). Others, while primarily consisting of items of one type (and thus, clearly identifiable as ND, OD, or CD), had some of the characteristics of another category. Thus, two additional categories were defined:

Uniform long drafts

Mixed long drafts.

Finally, the mixed long drafts were subdivided according to which combination of items they contained. For example, some drafts consisted mostly of notes with a few signs of organization or a few composed sentences, others were mostly composed but had a few notes, etc. In all, six mixed-draft subcategories were defined:

ND mixed drafts with some OD

ND mixed drafts with some CD

OD mixed drafts with some ND

OD mixed drafts with some CD

CD mixed drafts with some ND
CD mixed drafts with some OD.

Note that only two of the 482 drafts met the formal criteria for classification in all three categories (ND, OD, and CD).

Drafting Phases

The mixed long drafts could be classified according to another criterion, this time spatial. While in some of the drafts, the two ways of drafting were interlaced on the page, as if the two modes of idea planning were being used simultaneously, others contained two distinctly separate planning areas, one occupying the upper part of the page and the other occupying the lower part. In the latter case, the writer sometimes even drew a line separating the two areas. Thus, two phasing categories were defined:

1-phase mixed drafts
2-phase mixed drafts.

Draft Revision

Some of the long drafts showed signs of revision (adding, erasing, deleting, moving, substituting) spanning linguistic elements of various sizes (letters, words, phrases, sentences). These revisions, few in number, indicated a draft-control activity on the part of the writer. To account for this activity, the long drafts containing signs of revision (e.g. corrected spelling, word changes, moved sentences) were divided into two categories:

Revised drafts (10 or more corrections)
Unrevised drafts (fewer than 10 corrections).

Predictions

The predictions stated below are all based on the assumption that students are "experienced" essay writers (i.e. they have been writing essays for more than 10 years) and that owing to this high level of expertise, they use some sort of strategy to prepare the content of their texts. However, we can expect to find some differences in the degree of expertise among students in this population, either owing to differences in secondary school curricula (psychology students have different high school backgrounds, including literature, economics, science, etc.), or to differences in individual habits developed during long periods of "personalized" learning of writing skills.

The use of a draft and its size should be related to the quality of the final essay. Because it is more work to write a long draft than a short one, and because more ideas are involved, it was predicted, first, that students with drafts would have a better grade on their essay than those without (prediction 1 on the benefits of drafts), and, second, that students with long drafts would have better grades than those with short drafts (prediction 2 on the benefits of long drafts).

In addition, the following predictions were also made. Students with organized draft (OD)

should have a better grade on their essay than those with note draft (ND) or composed draft (CD). Indeed, ND drafters settle for retrieving information from memory and then converting it directly into the final essay, without any visible attempt to structure the ideas retrieved. Likewise, CD drafters fail to organize their ideas, focusing their attention on the syntactic and semantic choices that must be made in order to generate the text (prediction 3 on the benefits of idea organization). A beneficial impact of idea organization on the quality of the final text should also be observed for essays with mixed drafts containing any signs of organization (prediction 4 on the benefits of even a minimal amount of idea organization).

Results

In order to make sure that the results were comparable across years, the data from each class were analyzed separately in each case. Two methods were used to quantify the results. First, the number of drafts of each type was counted, and a χ^2 statistic was computed to determine whether these counts were significantly different. Second, analyses of variance were computed in order to determine whether the mean grade obtained on the essays varied significantly by type of draft. Note that it was assumed here that the writers would use a familiar drafting mode and thus, that this variable could have been used to distinguish them *a priori* (making it an independent variable)*.

The results for the two samples were highly similar for all predictions. Hereafter, only the significant differences between the two class years will be mentioned.

Analysis of the Corpus as a Whole

Use of a Draft

The students who wrote a draft before composing the final essay, including those who deliberately erased it before turning in their M.C.Q.'s, were significantly more numerous than those did not write a draft (Y1: 251 vs 189, χ^2 ($df = 1$) = 8.74; $p < 0.01$; Y2: 433 vs 216, χ^2 ($df = 1$) = 72.5, $p < 0.001$; see Table 2).

Draft Use and Essay Grade

For both class years, the mean grade obtained on essays preceded by an erased draft was not significantly different from that obtained on essays with legible drafts (Y1: $F(1,438) < 1$, n.s.;

*The potential impact of the essay question also had to be considered, even if this variable was confounded with another, the essay grader (the same professor having graded all essays on a given topic). Exam result analyses have shown that there is a great deal of interindividual variation in essay grading. Given the large size of our sample and the constant work overload of professors, the professors could not have been asked to grade essays on different topics (which would allow for calculation of a mean for a given essay). Two questions related to the essay-question variable arose during the analysis of the results for the two class years: (1) Did the number of drafts in each of the three categories (ND, OD, and CD) differ across essay question? In other words, was there a question effect on drafting mode? (2) If there was a relationship between the level of performance (the grade obtained on the essay) and drafting mode (ND, OD, or CD), did it vary by question? For a lack of space in the present article, these issues will not be discussed. Note simply that the results presented here are valid for all essay questions considered. The essay content did not substantially change the relationship between the drafting mode and the quality of the final essay (lack of significant interactions).

Table 2
Number of Students and Mean Grade Obtained on Essays () in each Class Year with no Draft, an erased Draft, or a Legible Draft

	No draft	Erased draft	Legible draft	Total
Class year 1	189(5.51)	97(8.86)	154(8.80)	440
Class year 2	216(5.49)	105(9.46)	328(9.36)	649

Y2: $F(1,645) < 1$, n.s.; see Table 2). The mean grade of all essays preceded by a draft (whether legible or erased) differed significantly from the mean of the essays without a draft (Y1: $F(1,438) = 67.374$, $p < 0.0001$; Y2: $F(1,645) = 109.10$, $p < 0.001$; see Table 2). Thus, prediction 1 turned out to be true: on the average, students who produced a draft obtained a higher grade than those who did not.

Draft Size

A significantly greater number of students in both class years wrote long drafts (Y1: 74%; Y2: 80.8%) than short ones (Y1: 26%; Y2: 19.2%; Y1: $\chi^2 (df = 1) = 35.6$, $p < 0.001$; Y2: $\chi^2 (df = 1) = 124.4$, $p < 0.001$; see Table 3).

Draft Size and Essay Grade

A long draft enabled the students in both class years to obtain a better grade on the essay than did a short draft (Y1: 9.7 vs 6.83, $F(1,148) = 9.81$, $p < 0.003$; Y2: 9.72 vs 7.57, $F(1,322) = 12.53$, $p < 0.001$; see Table 4). Thus, prediction 2 was true.

Draft Type

The number of occurrences of each type of draft differed for both class years (Y1: $\chi^2 (df = 2) = 24.01$, $p < 0.001$; Y2: $\chi^2 (df = 2) = 118.58$, $p < 0.001$; see Table 3). Very few students organized their drafts. They preferred simply jotting down notes (the most frequent way of drafting) or composing directly.

Each way of drafting had its own characteristic length, as indicated by the significant interaction between the number of drafts of each type and their size (Y1: $\chi^2 (df = 2) = 9.68$, $p < 0.01$; Y2: $\chi^2 (df = 2) = 54.31$, $p < 0.001$). Most of the organized or composed drafts were long. Drafts composed of notes alone were short or long, and more often short for class year 2.

Table 3
Number of Legible Drafts in each Class Year, by Type of Draft (Notes, Organized, Composed) and Draft Size

		Notes	Organized	Composed	Total
Class year 1	Short	19	5	16	40
	Long	25	26	63	114
	Total	44	31	79	154
Class year 2	Short	46	4	13	63
	Long	35	24	176	265
	Total	111	28	189	328

Note that in this sample, none of the drafts contained diagrams.

Table 4
Mean Essay Grades for each Class Year, by Draft Type (ND, OD, CD) and Draft Size (Short, Long)

		Notes	Organized	Composed	Mean
Class year 1	Short	7.05	8.20	6.13	6.83
	Long	8.88	10.42	9.73	9.70
	Mean	8.09	10.06	9.00	
Class year 2	Short	8.06	8.00	5.69	7.57
	Long	9.61	10.75	9.62	9.72
	Mean	8.97	10.36	9.35	

Draft Type and Essay Grade

Prediction 3 turned out to be true. For both class years, the use of an organized draft enabled the students to obtain a higher mean grade on the essay than the use of the other two draft types (Y1: 10.06 vs 8.09 and 9.00, $F(1,151) = 4.326$, $p < 0.04$; Y2: 10.36 vs 8.97 and 9.35, $F(1,325) = 4.128$, $p < 0.05$; see Table 4). The difference between the mean grades of essays preceded by an ND draft or a CD draft was non-significant in both class years (Y1: $F(1,151) = 1.48$, $p = 0.225$; Y2: $F(1,325) < 1$, n.s.).

For the essay grade, the interaction between draft type and size was not significant for either class year (Y1: $F(2,148) < 1$; Y2: $F(2,322) < 1$).

Analysis of Long Drafts

Draft Size and Type

Once again, for both class years, the long drafts were divided into two categories according to size (one page or two or more pages). One-page long drafts significantly outnumbered two-page long drafts (Y1: 72 vs 42, $\chi^2(df = 1) = 7.89$, $p < 0.01$; Y2: 176 vs 89, $\chi^2(df = 1) = 28.56$, $p < 0.001$; see Table 5).

The number of long drafts of each size varied by type of draft (ND, OD, CD). Two-page composed drafts were more frequent than two-page organized drafts, and much more frequent than note drafts (Y1: $\chi^2(df = 2) = 7.29$, $p < 0.05$; Y2: $\chi^2(df = 2) = 19.05$, $p < 0.001$).

Draft Size and Type, and Essay Grade

The results presented in Table 6 indicate that for year-2 students only, the mean grade of essays with a two-page composed draft was significantly higher than that of essays with a one-page composed draft (10.8 vs 8.7; $F(1,259) = 13.86$, $p < 0.001$).

Table 5
Number of Long Drafts of Each Size (1-page, 2-page), by Class Year and Draft Type (ND, OD, CD)

	Notes		Organized		Composed		Total
	1-page	2-page	1-page	2-page	1-page	2-page	
Class year 1	20	5	19	7	33	30	114
Class year 2	57	8	17	7	102	74	265

Table 6
Mean Grade of Essays with Long Drafts (1-page or 2-page), by Class Year and Type of Draft (ND, OD, CD)

	Notes		Organized		Composed	
	1-page	2-page	1-page	2-page	1-page	2-page
Class year 1	8.62	9.8	10.37	11.0	9.12	10.33
Class year 2	9.6	9.75	10.47	11.43	8.7	10.8

Table 7
Number of Long Drafts of each Type (ND, OD, CD), According to Whether they Contained only One Type of Drafting Mode (Uniform) or Combined Several Types (Mixed), by Class Year

		Notes	Organized	Composed	Total
		Class year 1	Uniform	12	16
	Mixed	13	10	27	50
	Total	25	26	63	
Class year 2	Uniform	30	12	84	126
	Mixed	35	12	92	139
	Total	65	24	176	

Draft Uniformity

As indicated in Table 7, uniform long drafts were as frequent as mixed ones, regardless of the type of draft (Y1: $\chi^2 (df = 2) = 1.006$, n.s.; Y2: $\chi^2 (df = 2) = 0.11$, n.s.). Even for the organized drafts of year-1 students, the number of mixed drafts did not differ significantly from the number of uniform ones ($\chi^2 (df = 1) = 1.38$, n.s.). Note that students who produced a mixed draft used at most two of the three possible drafting modes.

Draft Uniformity and Essay Grade

The mixed long drafts tended to have better essay grades on the average than the uniform ones (Y1: 10.50 vs 9.07, $F(1,108) = 3.659$, $p = 0.058$; Y2: 9.95 vs 9.47, $F(1,259) = 3.475$, $p = 0.063$; see Table 8).

The use of more than one drafting mode during text planning turned out to be beneficial, especially with organized drafts (Y1: 12.2 vs 9.31, $F(1,108) = 3.37$, $p = 0.069$; Y2: 12.5 vs 9, $F(1,259) = 5.59$, $p = 0.019$). Only for those students who used several drafting modes did an

Table 8
Mean Essay Grade for Long Drafts of Each Type (ND, OD, CD), According to Whether they Contained Only One (Uniform) or Several (Mixed) Drafting Modes, by Class Year

		Notes	Organized	Composed	Mean
		Class year 1	Uniform	8.75	9.31
	Mixed	9	12.2	10.59	10.50
	Mean	8.88	10.42	9.73	
Class year 2	Uniform	9.93	9	9.37	9.47
	Mixed	9.34	12.5	9.85	9.95
	Mean	9.61	10.75	9.62	

Table 9
Number of Revised and Unrevised Long Drafts in Each Class Year, by Draft Type (ND, OD, CD)

		Notes	Organized	Composed	Total
Class year 1	Revised	5	9	29	43
	Unrevised	20	17	34	71
	Total	25	26	63	114
Class year 2	Revised	8	14	64	86
	Unrevised	57	10	112	179
	Total	65	24	176	265

OD lead to a better essay grade than a CD or an ND (Y1: 12.2 vs 9.0 vs 10.59, $F(2,108) = 2.36$, $p = 0.10$; Y2: 12.5 vs 9.34 vs 9.85, $F(2,259) = 5.35$, $p = 0.005$).

Draft Revision

The results presented in Table 9 indicate that the majority of the students in both class years did not correct their draft (Y1: 71 vs 43, χ^2 ($df = 1$) = 6.88, $p < 0.01$; Y2: 179 vs 86, χ^2 ($df = 1$) = 32.64, $p < 0.001$).

Drafts containing unorganized notes were very rarely corrected by students in either class year (Y1: 20 vs 5, χ^2 ($df = 1$) = 9.04, $p < 0.01$; Y2: 57 vs 8, χ^2 ($df = 1$) = 36.95, $p < 0.001$). Only one third of the composed drafts produced by students in the second year (112 vs 64, χ^2 ($df = 1$) = 13.10, $p < 0.001$) were revised. For both the organized drafts and the year-1 composed drafts, students who made corrections did not significantly outnumber those who did not.

Analysis of Mixed Long Drafts

Once again, the mixed long drafts were categorized according to the number of phases used to write them, their size, and signs of organization.

Drafting Phases

As shown in Table 10, the organized and composed drafts were generally written in two phases. In contrast, the unorganized note drafts usually contained intermingled portions of composing and organizing (Y1: χ^2 ($df = 2$) = 8.05, $p < 0.05$; Y2: χ^2 ($df = 2$) 10.64, $p < 0.01$).

Only the students in the first class year, most of whom produced an ND draft (10 vs 3, χ^2 ($df = 1$) = 2.77, $p < 0.10$).

Table 10
Number of 1-Phase and 2-Phase Mixed Long Drafts in Each Class Year, by Draft Type (ND, OD, CD)

		Notes	Organized	Composed	Total
Class year 1	2-phase	3	6	19	28
	1-phase	10	4	8	22
	Total	13	10	27	50
Class year 2	2-phase	17	12	61	90
	1-phase	18	0	31	49
	Total	35	12	92	139

Table 11
Proportion of Mixed Long Drafts in which Composing came After ("Compose Last") or Before ("Compose First") another Drafting Mode

		2-phase	1-phase
Class year 1	Compose last	100	100
	Compose first	0	0
Class year 2	Compose last	87.8	77.8
	Compose first	12.2	22.2

Table 12
Number of Mixed Long Drafts and Mean Essay Grade () in Each Class Year, by Size

	1-page	2-page	Total
Class year 1	26(10.00)	24(11.04)	50
Class year 2	82 (8.98)	57(11.35)	139

All mixed drafts contained some degree of text linearization. In the two-phase drafts, the composed drafting mode usually followed the other mode (*compose last*). Only a small proportion of the students in the second class year added notes or marks of organization to an already composed draft (*compose first*; see Table 11).

Drafting Phases and Essay Grade

There was no significant link between simultaneous or consecutive phasing and essay grade (Y1: mean 1-phase grade = 10.73 vs mean 2-phase grade = 10.32, $F(1,49) < 1$, n.s.; Y2: mean 1-phase grade = 9.28 vs mean 2-phase grade = 10.22, $F(1,48) = 1.85$, n.s.).

Draft Size

Only the students in the second class year produced significantly more one-page drafts than two-page drafts (82 vs 57, $\chi^2(df = 1) = 4.50$, $p < 0.05$; see Table 12).

Draft Size and Essay Grade

Two-page drafts preceded essays with better grades than did one-page drafts for Y2 only (Y1: 11.04 vs 10, $F(1,49) = 1.18$, n.s.; Y2: 11.35 vs 8.98, $F(1,138) = 14.99$, $p < 0.001$; see Table 12).

Drafting Mode

Once again, the mixed long drafts were divided into two categories on the basis of whether they contained some marks of organization. In both class years, the mixed long drafts with marks of organization were significantly less numerous than ones without (Y1: 18 vs 32, $\chi^2(df = 1) = 3.94$, $p < 0.05$; Y2: 57 vs 82, $\chi^2(df = 1) = 4.50$, $p < 0.05$; see Table 13).

Table 13
Number of Drafts With and Without Signs of Organization and Mean Essay Grade (),
by Class Year

	Marks of organization	Other	Total
Class year 1	18(12.17)	32(9.56)	50
Class year 2	57(10.95)	82(9.26)	139

Drafting Mode and Essay Grade

As for the essay grade obtained with mixed long drafts, the results given in Table 13 indicate that organization efforts were beneficial in both class years (Y1: 12.17 vs 9.56, $F(1,49) = 7.71$, $p < 0.008$; Y2: 10.5 vs 9.26, $F(1,138) = 7.21$, $p = 0.008$). This means that prediction 4 was true.

Discussion

The main findings of this study are as follows:

—The results were highly consistent across class years. Students in the two classes proceeded in a similar manner when writing their drafts, and the benefits associated with those drafting strategies were comparable.

—Two thirds of the students made some type of draft before writing their final essay.

—Compared with essays written directly (no draft), essays with drafts obtained a higher average grade. The effectiveness of draft use increased with draft size (long drafts).

—Very few students used an “organized” draft. Most directly composed a long draft or jotted down notes in a short draft.

—The use of an organized draft had a positive effect on the grade obtained on the final essay, regardless of the draft’s size.

—Half of the students who wrote long drafts used only one drafting mode (notes, organization, or composition). The other half combined two modes, which they more often used consecutively than simultaneously (e.g. jot down notes then compose). In addition, when a combination of strategies was used, it usually consisted of composing (CD) accompanied by notes (ND) or signs of organization (OD). A minimal amount of organization added to notes or composed sentences improved final performance.

—The long drafts were not revised much. The corrections (adding, deleting, moving, substituting) were scarce and mostly local (spelling, word choice). The students who composed their drafts did more revising than the others, whereas those who jotted down notes hardly revised at all. Only very rarely ($N = 13$) were the organized drafts revised (moved paragraphs, for example).

These results are discussed and interpreted below in three sections.

Relationship Between Draft Use and Grade Obtained

Among the students who produced a draft (Y1 = 251; Y2 = 433, representing 2/3 of the population), one writer out of three (Y1) or four (Y2) erased the draft. These students apparently did not want their preliminary drafting work to be seen, perhaps because their drafts were

illegible or did not follow drafting conventions (abbreviated words or sentences, incomplete items, poorly formed or spelled letters, non-standard placement on the page, unclear symbols). These students most likely felt that their draft would give a "bad impression" of their way of thinking. Note, however, that the draft-erasing students did not obtain a lower average grade on their essay than did the non-erasers. Moreover, comparing the grades obtained by the students who did not draft with those who did, it is clear that drafting had an overall beneficial impact on the final essay grade. The benefits were even greater when the draft was long.

These preliminary results are consistent with our predictions: the planning involved in producing a draft enhances performance. However, they cast some doubt on the results obtained by Kellogg (1988), who concluded that writers who make a mental draft produce essays of comparable quality to those who write their drafts down. A finer interpretation of the present findings is called for. It is possible that the students who wrote long drafts were the ones who had more knowledge at their disposal. Appropriate experiments should be conducted to determine whether the writers of drafts (especially long ones) are in fact the ones who have more information available in memory. Those who know little about the topic may not need to produce a draft. Experiments conducted by Scardamalia and Bereiter (1991) and Kellogg (1990) have indeed shown that information quantity and organization affect the nature of the planning activity to a greater extent than the amount of effort devoted to the draft (in terms of time and length).

Relationship Between Draft Mode and Grade Obtained

Contrary to predictions, very few students used an organized draft. Even a fragmented or minimal amount of organization reflects the activation of the Knowledge Transforming Strategy (Scardamalia & Bereiter, 1987) or the Constructive Planning Strategy (Flower *et al.*, 1989), whose primary function is to create links between knowledge retrieved from memory. The only content plan ("plan to say") observed in this corpus consisted of ordering information in the form of a general, indented outline. No diagrams (or other types of networks) were used, not even partial ones, nor was any form of hierarchical structuring observed. Annotations such as "make sure to develop this point", which are signs of the elaboration of rhetorical plans or composing plans were totally lacking in this corpus. When the students did organize their drafts, they ordered their ideas chronologically (in order of occurrence) so as to make it easier to linearize them during the sentence generation phase. This work, even when very sketchy (as in the mixed drafts with only a few signs of organization), led to essays with significantly higher grades. This finding is compatible with prior studies demonstrating the positive effect of a preliminary "outline" on the quality of the final text (Isnard & Piolat, 1993; Chalmers & Lawrence, 1993; Flower *et al.*, 1989; Kellogg, 1987a, 1988, 1990).

The students who directly composed their drafts clearly outnumbered the others. Perhaps they used this strategy to save a step (idea organization) in the planning activity as they focused on the final goal of the writing while controlling as many syntactic and lexical problems as possible. These students clearly centered their efforts on sentence generation: even in cases where other planning activities were performed (jotting down notes, organizing), they were usually associated with sentence generation. Accordingly, the majority of these students used the Knowledge Telling Strategy rather than the Knowledge Transforming Strategy (Scardamalia & Bereiter, 1987). In other words, they mainly used "schema-guided" and "knowledge-guided" strategies (Flower *et al.*, 1989), which do not require confrontation of ideas at the

content or rhetorical levels during the drafting phase. These students wrote what came to mind via local associations. However, additional studies are needed to determine whether such students devise a "mental" plan of their text content to guide them through the production of a composed draft. It would also be worthwhile to find out whether, after studying for an exam, students have organized their knowledge well enough to be able to retrieve it directly from memory and put it into words as is. However, as attested by the better performance of the writers who used an organized draft—regardless of how organized their stored knowledge might have been—some initial structuring of the information in the final essay appears to have always been beneficial. This result is consistent with Kellogg's (1988) observations demonstrating the superiority of an "outline" type of draft over a "polished" (i.e. composed) type.

Students who settled for notes alone in their drafts obtained the poorest grades. It can therefore be assumed that such notes serve other purposes than just summarizing the topics to be developed during the final writing stage. Students may use vague and scattered notes as triggers for searching for new ideas in memory. Drafts solely in note format may reflect both a difficulty activating a Knowledge Telling or Knowledge Transforming Strategy, and a low level of availability of knowledge on the topic of the essay.

As a whole, these results lead to the conclusion that the quantitative and qualitative characteristics of the drafting activity performed by a writer affects the quality of his/her final text.

Use of Several Drafting Modes

Only half of the students who wrote long drafts relied on two different planning processes (retrieve information, organize it, write it out). Their drafts exhibited very few mixed mode characteristics (for example, an otherwise totally composed draft with an "A" and a "B" at the beginning of two paragraphs; or a note draft with a few complete sentences inserted in the middle of a list of words). Half of the mixed drafts were produced in two distinct phases. In the examination situation observed here, the students seem to have done a minimal amount of planning, employing one clearly predominant strategy: they either jotted down notes, composed, or to a lesser extent, organized their notes. Their drafting activity was scanty and not very effortful. Also, few students revised their drafts, and the ones who did, made essentially surface corrections (spelling, word choice). The revision work did not concern idea finding or attempts to come up with a more adequate organization.

As a whole in this examination situation, the students seem to have limited their planning activity. Hardly any of them employed an expert drafting mode such as the Knowledge Transforming Strategy or the Constructive Planning Strategy. Moreover, given the small amount of draft revising observed, they functioned more like "executors" transcribing their already structured knowledge, than like discoverers working through and fashioning the information to be transmitted (Galbraith, 1992).

Conclusion

This analysis of a large sample of drafts produced under the "natural" conditions of an essay examination provided evidence of a number of facts which are compatible with previous experimental findings on the effects of drafting mode on final text quality. It also brought out

some possibilities for future research. One worthwhile endeavor would be to define the functional characteristics of the different types of writers (while keeping constant other factors such as knowledge, writing expertise, etc.) in order to refine the current, all too dichotomous view of the various ways of preparing a text (Bridwell, Johnson & Brehe, 1987; Boscolo, 1995; Galbraith, 1992; Scardamalia & Bereiter, 1991). It would also be worthwhile to assess the impact of the nature of the writing task (structure of the text to be produced, preparation time, etc.) on the drafting strategy used. Stated differently, is even a minimal amount of drafting sufficient and effective with certain types of essays? Perhaps notes alone are suitable for some writing tasks. If so, which tasks? The work by Flower *et al.* (1989) and Carter (1990) has shed some light on these issues by showing that there is a link between the requirements of certain tasks and the degree of familiarity of writers of different levels of expertise.

Upon completion of this study and the analyses it involved, the initial question is still unanswered: How can writers effectively prepare a written production? Note that evaluating writing quality is in itself a complex problem, which makes it all the more difficult to answer the above question. Nevertheless, better knowledge of writing strategies lead to higher quality texts will play an undeniable role in devising future teaching aids for the acquisition of writing skills (Torrance *et al.*, 1993).

References

- Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, NJ: Erlbaum.
- Boscolo, P. (1995). The cognitive approach to writing and writing instruction: A contribution to a critical appraisal. *Current Psychology of Cognition*, 14(4), 343–366.
- Breetvelt, I., Van den Bergh, H., & Rijlaarsdam, G. (1994). Relations between writing processes and text quality: When and how. *Cognition and Instruction*, 12, 103–123.
- Bridwell, L. S., Johnson, P., & Brehe, S. (1987). Computers and composing: Case studies of experienced writers. In A. Matsuhashi (Ed.), *Writing in real time: Modelling production processes* (pp. 81–107). Norwood, NJ: Ablex.
- Bronckart, J. P. (1985). *Le fonctionnement des discours. Un modèle psychologique et une méthode d'analyse [The functioning of discourses. A psychological model and a method for analysis]*. Neuchâtel: Delachaux & Niestlé.
- Bryson, M., Bereiter, C., Scardamalia, M., & Joram, E. (1991). Going beyond the problem as given: Problem solving in expert and novice writers. In R. J. Sternberg & P. A. Frensch (Eds.), *Complex problem solving* (pp. 61–84). Hillsdale, NJ: Erlbaum.
- Burtis, P. J., Bereiter, C., Scardamalia, M., & Tetroe, J. (1983). The development of planning in writing. In G. Wells & B. M. Kroll (Eds.), *Explorations in the development of writing* (pp. 153–174). New York: Wiley.
- Caccamise, D. J. (1987). Idea generation in writing. In A. Matsuhashi (Ed.), *Writing in real time: Modelling production processes* (pp. 224–253). Norwood, NJ: Ablex.
- Carter, M. (1990). The idea of expertise: An exploration of cognitive and social dimensions of writing. *College Composition and Communication*, 41, 265–286.
- Chalmers, D., & Lawrence, J. A. (1993). Investigating the effects of planning AIDS on adults and adolescents organisation of a complex task. *International Journal of Behavioral Development*, 16(2), 191–214.
- De Beaugrande, R. (1987). Writing and meaning: Contexts of research. In A. Matsuhashi (Ed.), *Writing in real time: Modelling production processes* (pp. 1–33). Norwood, NJ: Ablex.
- Dolz, J., & Schneuwly, B. (1989). *Communicative planning in different text types written by children aged 10 and 14*. Communication in the *Third European Conference for Research on Learning and Instruction*. Madrid, 4–7 September.
- Durst, R. (1989). Monitoring processes in analytic and summary writing. *Written Communication*, 6, 340–363.
- Eigler, G., Jechle, T., Merziger, G., & Winter, A. (1991). Writing and knowledge: Effects and re-effects. *European Journal of Psychology of Education*, 6(2), 225–232.
- Espéret, E., & Piolat, A., (1990). Production: Planning and control. In G. Denhière & J. P. Rossi (Eds.), *Texts and text processing* (pp. 317–331). Amsterdam: North-Holland.
- Faigley, L., Cherry, R. D., Jolliffe, D. A., & Skinner, A. M. (1985). *Assessing writer's knowledge and processes of composing*. Norwood, NJ: Ablex.
- Fayol, M. (1991). From sentence production to text production: Investigating fundamental processes. *European Journal of Psychology of Education*, 6, 99–117.

- Fitzgerald, J. (1987). Research on revision in writing. *Review of Educational Research*, 57, 481–506.
- Flower, L., Schriver, K., Carey, L., Haas, C., & Hayes, J. R. (1989). *Planning in writing: The cognition of a constructive process* (pp. 1–50). Pittsburgh, PA: Carnegie-Mellon University.
- Galbraith, D. (1992). Conditions for discovery through writing. In M. Sharples (Ed.), *Computers and writing. Issues and implementations* (pp. 45–72). Dordrecht: Kluwer Academic Publishers.
- Gebhardt, R. C. (1982). Initial plans and spontaneous composition: Toward a comprehensive theory of the writing process. *College English*, 44, 620–627.
- Hay, L. (1993). *Les manuscrits des écrivains [Writers' manuscripts]*. Paris: CNRS Edition, Hachette.
- Hayes, J. R., & Flower, L. S. (1980). The dynamics of composing: Making plans and juggling constraints. In L. W. Gregg & E. R. Steinberg (Eds.), *Cognitive processes in writing* (pp. 31–50). Hillsdale, NJ: Erlbaum.
- Hayes, J. R., & Flower, L. S. (1983). Uncovering cognitive processes in writing: An introduction to protocol analysis. In P. Mosenenthal, L. Tamor & S. A. Walmsley (Eds.), *Research on writing. Principles and methods* (pp. 206–220). New York: Longman.
- Higgins, L., Flower, L., & Petraglia, J. (1992). Planning text together: The role of critical reflection in student collaboration. *Written Communication*, 9(1), 48–84.
- Isnard, N., & Piolat, A. (1993). The effects of different types of planning on the writing of argumentative text. In G. Eigler & T. Jechle (Eds.), *Writing. Current trends in European research* (pp. 121–132). Freiburg, Germany: Hochschul Verlag.
- Kellogg, R. T. (1987a). Writing performance: Effect of cognitive strategies. *Written Communication*, 4, 269–298.
- Kellogg, R. T. (1987b). Effects of topic knowledge on the allocation of processing time and cognitive effort to writing processes. *Memory and Cognition*, 15(3), 256–266.
- Kellogg, R. T. (1988). Attentional overload and writing performance: Effects of rough draft and outline strategies. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 14(2), 355–365.
- Kellogg, R. T. (1990). Effectiveness of prewriting strategies as a function of task demands. *American Journal of Psychology*, 103(3), 327–342.
- Levelt, J. M. (1982). Linearization in describing spatial networks. In S. Peters & E. Saarinen (Eds.), *Processes, beliefs and questions* (pp. 199–220). Dordrecht: Reidel.
- Levelt, J. M. (1989). *Speaking*. Cambridge, MA: M.I.T. Press.
- Matsuhashi, A. (1987). Revising the plan and altering the text. In A. Matsuhashi (Ed.), *Writing in real time: Modelling production processes* (pp. 197–223). Norwood, NJ.: Ablex.
- McCutchen, D. (1986). Domain knowledge and linguistic knowledge in the development of writing ability. *Journal of Memory and Language*, 25, 431–444.
- Newell, G. E., & Macadam, P. (1987). Examining the source of writers' problems. An instrument for measuring writers' topic specific knowledge. *Written Communication*, 4, 156–174.
- Piolat, A., & Roussey, J. Y. (1992a). Rédaction de texte. Eléments de psychologie cognitive [Text writing. Elements of cognitive psychology]. *Languages*, 106, 106–125.
- Piolat, A., & Roussey, J. Y. (1992b). A propos de l'expression "stratégie de révision" de texte en psychologie cognitive [About "text revision strategy" in cognitive psychology]. *Texte en main. Lis tes ratures*, 10/11, 51–64.
- Raphaël, T., Englert, C., & Kirchner, B. (1990). Students' metacognitive knowledge about writing. *Research in the Teaching of English*, 23, 343–379.
- Roussey, J. Y., & Piolat, A. (1991). Stratégies expertes de contrôle rédactionnel et définition du but [Expert strategies over writing control and goal definition]. In J. P. Jaffré & H. Romian (Eds.), *Savoir écrire, évaluer, réécrire en classe. Repères*, 4, 79–92.
- Roussey, J. Y., Piolat, A., & Guercin, F. (1990). Revising strategies for different text types. *Language and Education*, 4(1), 51–65.
- Scardamalia, M., & Bereiter, C. (1987). Knowledge telling and knowledge transforming in written composition. In S. Rosenberg (Ed.), *Advances in applied psycholinguistics. Vol. 1* (pp. 142–174). Cambridge: Cambridge University Press.
- Scardamalia, M., & Bereiter, C. (1991). Literate expertise. In K. A. Ericsson & J. Smith (Eds.), *Toward a general theory of expertise* (pp. 172–194). Cambridge: Cambridge University Press.
- Sharples, M., & Pemberton, L. (1988). Representing writing: An account of the writing process with regard to the writer's external representations. Cognitive Science Research Paper 119, University of Sussex.
- Sharples, M., & Pemberton, L. (1990). Starting from the writer: Guidelines for the design of user-centred document processors. *Computer Assisted Language Learning*, 2, 37–57.
- Smagorinsky, P., & Smith, M. W. (1992). The nature of knowledge in composition and literary understanding: The question of specificity. *Review of Educational Research*, 62(3), 279–305.
- Spencer, S. L., & Fitzgerald, J. (1993). Validity and structure, coherence, and quality measure in writing. *Journal of Reading Behavior*, 25(2), 209–231.
- Torrance, M., Thomas, G. V., & Robinson, E. J. (1993). Training in thesis writing. An evaluation of three conceptual orientations. *British Journal of Educational Psychology*, 63, 170–184.