ABSTRACT. Writing from sources, or “discourse synthesis”, is a common but cognitively demanding reading–writing task requiring students to select, organize, and connect content from source texts as they compose their own new texts. The purpose of the present study was to investigate the effect of explicit instruction of relevant strategies and assessment criteria on the subjects’ discourse synthesis processes and products. The subjects, 24 in-service teachers enrolled in the researcher’s 1999–2000 course on “Reading and writing to learn”, were assigned the same discourse synthesis task – a review of the literature – at the beginning and at the end of the course. They were required to document their two performances of the task by means of a process log, to assess their pre and post instruction processes and products, and to discuss the differences between these. The findings obtained from a content analysis of the subjects’ process log summaries and criterial self-assessments of products indicated significant improvement in the subjects’ post instruction discourse synthesis processes and products.

KEY WORDS: discourse synthesis (or, writing-from-sources), explicit instruction, intertextual processing strategies, knowledge-telling and knowledge-transforming, literacy, reading–writing connections, self-assessment, teacher education

1. INTRODUCTION

Writing from sources, or “discourse synthesis”, 1 is a common academic task requiring students to select, organize, and connect content from source texts as they compose their own new texts (Spivey, 1997). Discourse synthesis is, then, a “hybrid task” (Bracewell, Frederiksen & Frederiksen, 1982) of reading and writing, or of comprehension and production.

Another reading–writing task that has been extensively investigated since the early 1980s is the summary. Most studies of summarizing draw on the theoretical model of Kintsch and Van Dijk (1978), which postulates that comprehension involves the production of a mental summary, or “gist”, of the text by means of three major operations: deletion of

* The paper was first presented as an in-progress study at the IAIMTE conference in Amsterdam, The Netherlands (July 11–13, 2001), and then at the SIG Writing 02 conference at Staffordshire University, the UK (July 10–13, 2002).
1 The term more frequently used in US research publications.
redundant propositions; substitution of a sequence of propositions by a more general one; and selection of the macroproposition of the text or the construction of a macroproposition when one is not explicitly stated.

The discourse synthesis task is, then, similar to the summary, but it is cognitively more demanding. When summarizing a text, students frequently replicate its structure, thus producing a miniature isomorphic version of the text (Spivey, 1997). When synthesizing, however, students are required to create their own macroproposition, or rather “superproposition”, from different – sometimes even contradictory – macropropositions of several source texts, and to organize these in a previously non-existent conceptual structure. Discourse synthesis, therefore, requires conceptual transforming and the production of personal and creative perspectives on the part of students (Schumacher & Gradwohl, 1991). Discourse synthesis is thus an act of literacy in line with the recent educational emphasis on the development of academic discourse which places special value on integrating one’s own ideas and knowledge into the written conversation with one’s sources (…). Such integration [is expected] as a move toward critical literacy and toward realizing writing’s epistemic potential to transform knowledge rather than to report knowledge (Flower, 1989: 26).

However, previous research indicated that performing discourse synthesis tasks proved too demanding for most college students. Indeed, those strategies conceived of as crucial to the successful performance of the task, namely strategies of conceptual transforming, were rarely used by the subjects in these studies (Hartman, 1995; Kantz, 1989; McGinley, 1992; Segev-Miller, 1997; Stahl, Hynd, Britton, McNish & Bosquet, 1996). In the researcher’s earlier (1997) study, all the subjects reported difficulties with the task, although the successful synthesizers used conceptual transforming and other intertextual processing strategies with significantly higher frequency and success than the unsuccessful ones. The subjects accounted for these difficulties in terms of lack of relevant knowledge (they had not been provided with explicit instruction of the task), and lack of experience (they had not previously been required to perform discourse synthesis tasks).

These findings are in line with Geisler’s (1994), Lohman’s (1993), and Perkins’ (1991) criticism leveled against schools, which do not require authentic knowledge-transforming tasks, and do not emphasize the relevant cognitive abilities which may develop by means of explicit

---

2 Data from interviews with the subjects’ instructors indicated a commonly mistaken assessment of the subjects’ ability to cope with the task as a given (see also Sternglass, 1993; Zerger, 1992).
instruction and practice. O’Flahavan, Hartman, and Pearson’s (1988) study, for example, indicated that school teachers’ questions more often require students to make intratextual rather than intertextual connections—although significant learning is believed to depend on the latter (IRA & NCTE, 1996)—possibly because professional materials (Lenski, 1998) and teacher training programs (Segev-Miller, 1990) contain very few suggestions for teachers to promote intertextual processing.

1.1. Review of the Literature

Studies in education (e.g., Guthrie, Van Meter, Hancock, Alao, Anderson & McCann, 1998; Hattie, Biggs & Purdie, 1996; Nist & Simpson, 1990) and writing (Ackerman, 1990; Williams & Colomb, 1993) indicated that explicit instruction—of metacognitive strategies in general and of cognitive strategies relevant to the performance of a specific task in particular—and practice promoted students’ learning and their ability to transfer it to other learning contexts (Butterfield & Nelson, 1991; Butler & Winne, 1995). Studies of reading (e.g., Garner, 1987), writing (e.g., Bereiter & Scramadalia, 1987), and summarizing processes (e.g., Brown, Campione & Day, 1982; Segev-Miller, 1989) have also indicated that the major differences between successful and unsuccessful learners were the formers’ more frequent and more successful use of metacognitive strategies.

Current definitions of metacognition emphasize both the learners’ declarative and procedural knowledge of cognitive processes (Flavell, 1977/1985) and their ability to assess and plan these processes (Baker & Brown, 1984). These include, respectively, the learners’ self-assessment and self-regulation of cognition (Paris & Winograd, 1990; Paris, 2001). Current definitions of metacognition have been expanded to include other characteristics of successful learners such as motivation. Research indicated that motivation as well as self-efficacy, i.e., confidence in their abilities to perform a task (Guthrie & Wigfield, 1997, 2000; Landis, 2002; Raedts, 2002; Zimmerman & Bandura, 1994), resulted in the subjects focusing on their performance (Miller-Cleary, 1991), taking personal responsibility for their learning, and investing cognitive effort and time in their learning (Charney, Newman & Palmquist, 1996; Pressley, Van Etten, Yokoy, Freeben & Van Meter, 1998). Motivation, then, had an effect on the subjects’ cognitive engagement, or use of appropriate cognitive and metacognitive strategies. Ertmer, Newby, and MacDougall (1996), for example, found that differences in motivation resulted in different goals and the use of different strategies, especially when coping with demanding tasks: Those who adopted product goals used “surface-level
strategies”; those who adopted process goals, on the other hand, engaged in more significant processing of the information, were more persistent and reflective, and used effective cognitive and especially metacognitive strategies.

Few discourse synthesis studies investigated the effect of explicit instruction of the task on either process or product quality.\(^3\) However, instruction in these studies consisted solely of the strategy of mapping\(^4\) – graphically representing the conceptual structure of the text (e.g., problem-solution). Murray (1993) found that explicit instruction of mapping the source texts had a significant effect on the processing of these texts, but not on the discourse synthesis process or product. Schlumberger (1992) found that such instruction had a significant effect on the process – especially with regard to the invention of a macroproposition – but not on the product. Risemberg (1993), on the other hand, found that explicit instruction of mapping had a significant effect both on the process – especially with regard to rhetorical planning – and on the quality of the product. These equivocal findings may be accounted for in terms of differences in instruction, such as mapping the source texts (Murray and Schlumberger), which requires the use of textual processing strategies, or mapping both the source texts and the product text (Risemberg),\(^5\) which requires the use of intertextual processing strategies as well.

For explicit instruction to be effective, it should consist of more than one strategy (i.e., mapping); it should consist of metacognitive strategies and cognitive strategies relevant to the performance of the task (see: p. 3), in particular “research-validated” strategies (Nist & Simpson, 2000), that is, strategies which significantly characterized successful synthesizers in previous discourse synthesis research: (1) Metacognitive strategies: Assessing, planning, and revising (McGinley, 1992; Segev-Miller, 1997); and task representation (Kantz, 1989; Nelson, 1988; Stahl et al., 1996;...
Sternglass, 1988); (2) Intertextual processing strategies: Conceptual, rhetorical, and linguistic transforming (Segev-Miller, 1997).6

Assessing strategies are especially relevant in the case of in-service teachers (as were the subjects of the present study), who are expected not only to assess their students but also to help them assess themselves in light of educational reforms encouraging students to gradually take more responsibility for their own learning (e.g., Calfee, 1997; Pearson & Fielding, 1996). Although Falchikov and Goldfinch (2002: 288) argued that “the primary benefit of involving students in assessment resides in the improvement in learning which can result”, hardly any of the studies reviewed in their meta-analysis took account of the learning benefits of self-assessment. Only two discourse synthesis studies7 investigated the issue of self-assessment: Ackerman (1989) and Sullivan and Hall (1997) found a relatively low rate of agreement (37% and 44%, respectively) between college students’ and their raters’ assessments, and students’ over-estimation of their performance. However, like the studies in the above meta-analysis, they focused on the assessment of products, and neither involved explicit instruction of the assessment criteria.

1.2. Purpose of the Present Study

The purpose of the present study, then, was to elaborate on previous discourse synthesis exploratory studies which focused either on the subjects’ ability to assess their products without any explicit instruction (Ackerman, 1989; Sullivan & Hall, 1997), or on the effect of the explicit instruction of a single strategy (i.e., mapping) on the subjects’ products and processes (Murray, 1993; Risemberg, 1993; Schlumberger, 1992), by providing a more comprehensive framework of instruction including both strategies and assessment criteria relevant to the performance of the task. Underlying this purpose was also a concern for improving the subjects’ learning and quality of instruction. The present study, therefore, set to answer the following research questions:

(1) What were the differences between the subjects’ self-assessments of their pre and post instruction discourse synthesis processes?
(2) What were the differences between the subjects’ self-assessment scores of their pre and post instruction discourse synthesis products?

---

6 These are actually categories of strategies, consisting each of several strategies. They will, however, be referred to in the present paper as strategies (for a list of these, see Appendix A; for a complete list of discourse synthesis strategies see: Segev-Miller, 1997, in press).

7 Not included in the meta-analysis.
2. Methodology

2.1. Subjects

The subjects were 24 elementary education in-service teachers enrolled in the researcher’s 1999–2000 course on “Reading and writing to learn”. The class met once a week for 2 academic hours (90 minutes). The course was offered within the framework of a two-year B.Ed. program for experienced teachers who graduated from college before it was entitled in 1985 by the Council of Higher Education to grant academic degrees. Data pertaining to the subjects’ (1) background (major, teaching experience, etc.), and (2) self-assessment of reading and writing proficiency, were collected over the first two weeks of the course by means of two questionnaires.

2.2. Task

The subjects were assigned the same discourse synthesis task – a review of the literature – at the beginning and at the end of the academic year. They were required to process a collection of articles on the topic of the relationships between reading and writing (see Appendix B), and to use these to write the review. The task in the present study differed from tasks in previous discourse synthesis studies in three major respects:

1. **Number and nature of source texts**: In contrast with previous studies where the subjects were usually assigned 2–3 short informative (sometimes contrived) texts, the source texts in this study were numerous, longer, and conceptually and rhetorically more complex authentic articles.

2. **Authenticity of task**: Brown, Collins, and Duguid (1989) argued that since all knowledge and learning are situated in context, explicit instruction of writing must take place in an authentic learning context. McGinley and Tierney (1989) maintained that writing (with reading or other learning tasks) will not “invite” learning unless the learner is engaged with the task and topic. In the present study, the task was expected to be relevant and to engage the subjects: First, the topic of the collection of the source texts was also the title of the course. Second, the immediate purpose of the course and the task was to prepare the subjects for similar tasks in other courses. Finally, the subjects were allowed, in fact encouraged, to use the review for the research requirements in their second year of studies.

3. **Time on task**: Although intensive writing courses had a positive effect on students’ attitudes to writing (Hilgers, Bayer, Stitt-Bergh &
Taniguchi, 1995), no similar effect on the quality of their processes and products was indicated (Jenson, 1992). Ackerman (1993: 359) argued that “time and practice are major variables in learning”. Similarly, Perfetti, Britt, and Georgi (1995: 161) argued that

Learning, including school-based learning, is often an event stretched out over time and instructional events, in contrast to the brief times available for learning experiments (...) What is missing in short experimental studies of learning (...) is the opportunity for increased learning (...) Obviously, this is what ordinary learning is really about: an extended opportunity to acquire information from multiple sources.9

Indeed, time on task was found to have a significant effect on the quality of subjects’ written processes and products (e.g., Rijlaarsdam & Van den Bergh, 1996; Segev-Miller, 1997). In contrast with previous studies, then, where explicit instruction of the discourse synthesis task took place over a brief period (usually 1–2 sessions), explicit instruction in the present study took place over the second semester (15 sessions).10 The subjects were assigned three weeks for the performance of each task.

2.3. Instruments

2.3.1. Process Log
The subjects were required to document their two performances of the task by means of a process log. They were provided with instructions with regard to conducting the process log: To document on a daily basis thoughts and actions related to the performance of the task, to be candid and elaborate, not to erase anything from the log, etc. The subjects were also required to enclose all their by-products (marked photocopies and summaries of the source texts, notes, and drafts) to the process log.

Very few discourse synthesis studies used the process log as a research instrument. The subjects in these studies were required to retrospectively report in their process logs the strategies they employed in the process (Nelson, 1988; Segev-Miller, 1996, 1997; Sternglass, 1988), or the time they devoted to performing the task (Greene, 1993).11 Greene and Higgins (1994: 118) pointed out that

Because retrospective accounts allow researchers to get a glimpse into writers’ strategies and decisions after the fact, they have the advantage of allowing writers to explain and reflect on their decisions without interfering directly with their attention to the task; freeing a writer from the ‘cognitive load’ (Afflerbach & Johnston, 1984) that the concurrent verbalization of a think-aloud would require.

9 Italics not in original text.

10 In the first semester explicit instruction focused on processing and summarizing strategies of single texts in preparation for the discourse synthesis task.

2.3.2. **Assessment Criteria**

The subjects were also required to assess their products using a modified version of an assessment model developed and validated elsewhere (Segev-Miller, 1990, 1991), and to verbally account for the scores on each criterion.

Falchikov and Boud (1989) suggested that explicitness of criteria and familiarity with criteria probably enhance student-teacher agreement, and that students should be able to discuss assessment criteria with their teachers and agree on them, to have a greater sense of “ownership” of these. Falchikov and Goldfinch (2002: 315) also suggested that “assessment using many individual dimensions seems more difficult than assessment using (...) few dimensions”. The subjects in the present study were considered “partners” in the process and as such were in a position to negotiate the number of the criteria (only 8 of the original list of criteria presented in class) and their weights (equal points allotted, a total of 8 points). These criteria pertain partly to the requirements of the discourse synthesis task – e.g., criteria (1) and (2), which require conceptual transforming; and partly to the requirements of all academic tasks – e.g., criteria (3) and (5). The assessment criteria were:

1. topic
2. macroproposition
3. elaboration
4. appropriate rhetorical structure
5. explicit cohesion
6. linguistic transformation
7. interpretation
8. citations

2.3.3. **Process Log Summary**

Finally, the subjects were required to compare (1) their two processes or performances of the task documented in their process logs; and (2) their products, i.e., both their criterial scores and verbal assessments of their products; and to discuss the differences between their pre and post instruction processes and products in their process log summaries. The subjects were required to be as comprehensive as possible in their discussion.

2.4. **Procedures**

2.4.1. **Presentation of the Requirements**

The subjects were informed of the purpose of the study and of the significance of the process log. They were provided with oral and written
instructions with regard to conducting the process log (see p. 11). The presentation of the discourse synthesis task – a review of the literature – included an explanation of the function of the review and a sample review from an article on the course reading list.

2.4.2. Explicit Instruction
Studies in writing (e.g., Brown, Collins & Duguid, 1989: 39) indicated that teachers who adopted the approach of explicit instruction, or “cognitive apprenticeship” promote learning, first by making explicit their tacit knowledge or by modeling their strategies for students in authentic activity. Then, teachers and colleagues support students’ attempts at doing the task. And finally they empower the students to continue independently.

Instruction in the present study consisted accordingly of the following methods: Presentation and explanation of strategies (one at a time and accumulatively); demonstration and practice (from guided to independent) of strategy use (mostly by means of think-aloud) while processing source texts (from collections of 2–3 short texts to collections of numerous and longer texts) and while writing a discourse synthesis text; weekly assignments (from completion of products begun in class to more independent ones); and evaluation of products using the assessment criteria.

2.5. Data Analysis
In order to answer research question (1) with regard to the differences between the subjects’ self-assessments of their pre and post instruction processes, a content analysis12 of the subjects’ process log summaries was carried out for the purpose of identifying major assessment categories. The process log summaries were systematically compared with the subjects’ process logs, as well as with all their by-products and verbal assessments of their products, for the purpose of establishing the reliability of the process log summaries. In order to answer research question (2) with regard to the subjects’ self-assessments of their pre and post instruction products, t-tests for the average differences between these assessments were carried out. The researcher also assessed the post instruction products13 for the purpose

---

12 Following Strauss and Corbin’s (1990) model, according to which “data are broken down into discrete parts, closely examined, compared for similarities and difference” (p. 62). These units are further conceptualized (i.e., named) and grouped in categories and subcategories which emerge from the data.

13 The researcher’s scores on the subjects’ pre instruction products were so low a joint decision was made to leave them out.
of calculating the agreement rate between hers and the subjects’ assessments. All 24 post instruction products were also assessed by another expert researcher. Inter-rater agreement was almost 90%.

3. FINDINGS AND DISCUSSION

In this section the findings pertaining to each of the research questions are presented and discussed.

3.1. Research Question (1) Was: What Were the Differences between the Subjects’ Self-Assessments of Their Pre and Post Instruction Processes?

A content analysis of the subjects’ process-log summaries in which the subjects discussed the differences between their pre and post instruction processes yielded three major categories of assessment: (1) knowledge; (2) motivation; and (3) self-reassessment.

3.1.1. Knowledge

The subjects reported that by the time they set out to perform Task B towards the end of the course, they had acquired both the declarative and procedural knowledge relevant to the performance of the task. This knowledge related to their evolving task representation, the strategies they now engaged in, and the assessment criteria they applied to evaluate and revise Product B.

3.1.1.1. Task Representation. Task representation has been defined as an interpretive process which translates the rhetorical situation – as a writer reads it – into the act of composing. As such it is the major bridge which links the public context of writing with the private process of an individual writer (…). The task as students represent it to themselves is, by definition, the one they perform, but that representation is subject to many influences and may evolve in surprising ways during writing (Flower, 1987: 1–2).

A task representation of knowledge-telling characterized most of the subjects in Process A. This finding is in line with studies of writing in schools (see pp. 6–7) and in academic institutions (e.g., Bereiter & Scardamalia, 1987; Bridgeman & Carlson, 1984), which indicated a common representation of knowledge-telling rather than the more complex and cognitively demanding representation of knowledge-transforming. However, the subjects’ initial task representation had, by the time they were assigned Task B, evolved into one of knowledge-transforming:
I’ve come a long way (…) Today I’m aware of the requirements of the task [Elinor].14
The second time I was more aware of the need to make connections [Goldie].

3.1.1.2. Strategies. The subjects referred to the strategies they acquired in the course as “tools”:

At the beginning of the year I didn’t have the tools and the ways to process the texts: I read them. I marked important ideas, but I couldn’t synthesize them [Esther].

The strategies that the subjects acquired were both the transforming strategies relevant to the discourse synthesis task and the metacognitive strategies of assessing and revising:

I felt that I was making progress from step to step: selecting, organizing, connecting, inventing a topic, drafting, monitoring, assessing myself all the time [Oprah].

The subjects found the strategy of mapping both the source texts and the product text, which required both textual and intertextual processing of the source texts (cf. Risemberg, 1993), especially helpful:

The second time I knew what I was going to do I mapped each of the texts, compared the maps to establish connections among them, I could actually “see” these connections with my eyes and put them in one map [Naomi].

Mapping also helped me find out the connections between the ideas in the texts I failed to see the first time [Ada].

Mapping helped the subjects to either deliberately “establish connections” or “to find out the connections between the ideas in the texts” as a result of discovery. Discovery has usually been associated in the literature with the conception of writing as a means to promote students’ knowledge-transforming and learning (Galbraith, 1992, 1996, 1999). It has often been observed to be “sudden”, “unexpected”, or “surprising” [see McGinley (1992), Segev-Miller (1997), and Sternglass (1988), whose successful synthesizers’ processes were determined to a large extent by such discoveries rather than by deliberate planning].

In the present study, however, the subjects attributed their discoveries to the strategies they acquired, which helped them to “actually see” what they

14 Italics in this quote and in the following quotes not in original process logs. The subjects’ names have been replaced by pseudonyms.
“failed to see the first time”, a metaphor often used by the subjects to refer to their discoveries. The subjects also used the phrase “(be) aware” often to refer to their evolving metacognitive strategies. This was in contrast with their first performance of the task, which they carried out “mechanically” and “automatically”. In addition to these, they often used the strategy of self-questioning, another metacognitive strategy, which was not explicitly taught, to cope with difficulties in their second performance of the task:

The first time I did it very mechanically (…) The second time I kept asking myself questions [Mira].

This finding is in line with recent studies (Harpaz & Lefstein, 2000; King, 1995; Spires & Donely, 1998) which indicated that student-generated questions improved textual processing and comprehension.

3.1.1.3. Assessment Criteria. The subjects found the product assessment criteria as helpful as the process strategies and reported an interaction between these. For example, as a result of applying the assessment criteria, they used different revision strategies:

I feel I went through a significant process because the second time I devoted more attention and thinking with the help of the criteria to the way I wrote or rewrote [Hilary].

This time I had criteria I could use (…) unlike the first time when I worked on my “gut feeling” (…). The second time I imagined a dialog with a future reader of my text. At one point, for example, when I realized I hadn’t defined some basic concepts vital to understanding the main idea, I revised my text accordingly [Naomi].

Significant revision has been defined as conceptual and rhetorical rather than as linguistic, i.e., revision at the word or sentence level (Fitzgerald, 1987; Flower, Hayes, Carey, Schriver & Stratman, 1986). Unlike previous studies of writing processes (e.g., Yagelsky, 1995) and of discourse synthesis processes (e.g., Nelson, 1990), which indicated that students rarely engaged in significant revision strategies, the present study indicated that most of the subjects “rewrote” and “revised” their products significantly. These findings may be accounted for in terms of the effect of the explicit instruction of assessment and revision strategies and of the assessment criteria. These findings may also be accounted for in terms of the context of the task: the long period over which the performance of the task extended, and the motivation of the subjects (see section 3.1.2.) to invest cognitive effort in a task they considered to be significant and relevant to their learning. Falchikov and Goldfinch (2002) argued that hardly any of
the studies they reviewed took account of the learning benefits of self-assessment. The subjects in the present study, however, attributed a major part of their “significant learning process(es)” to their ability to assess their processes and products, and eventually to assess, or rather reassess, themselves (see section 3.1.3.).

3.1.2. Motivation
Having acquired the knowledge relevant to the performance of the task did not make the task less demanding. For some of the subjects it was just the other way round, but they were confident in their ability to perform the task successfully and motivated:

The second time wasn’t easy and maybe it was more difficult, but I am confident in my abilities [Elinor].

I was more motivated to perform the second task, I was eager to apply what we learnt in the course [Oprah].

Some reported having actually enjoyed performing the task:

I enjoyed this time because I knew what I was doing and how to do it [Goldie].

All the subjects reported that the topic of the collection of the source texts they had to process was relevant to their learning:

I also liked the idea that the contents of the texts were relevant to what we were asked to do [Oprah].

It was only fitting that the contents of the texts on reading & writing-from-reading we read for the task related to the task [Jane].

The subjects’ motivation was realized in their management of the task and in their ability to transfer their learning from the course to other contexts.

3.1.2.1. Task Management.¹⁵ The subjects reported that in Process A they did not manage the task successfully:

When I approached the task the first time I didn’t plan it in advance [Shirley].

The first time was spontaneous and emotional writing, somewhat literary, guided by my associations or brainstorming like an ameba spreading in all directions, sometimes digressing from the main point (…) it may be more interesting but it is less efficient [Sarah].

¹⁵ More often referred to as self-regulation (see p. 7).
In Process B, however, the subjects invested more time and cognitive effort in assessing, planning, and revising multiple drafts:

I invested more time and work this time (…) putting in time and thinking, struggling with myself [Nelly].

I worked harder the second time and it took me more time: more than two weeks cf. with one day the first time (!); 9 drafts on paper (plus more drafts on the computer) cf. with one draft the first time [Louise].

These findings are in line with the findings of studies (e.g., Guthrie & Wigfield, 1997, 2000), which indicated that confidence in their abilities, as well as motivation, had an effect on the subjects’ cognitive engagement.

3.1.2.2. Transfer. The subjects in the present study transferred their learning from the course to other contexts:

(1) Other courses, especially with regard to performing similar tasks:

I rewrote the review of a seminar paper I had to submit in another course [Oprah].

When writing a seminar paper later this year for another course I was more aware of my responsibility for the communication with my audience, my reader (…) when I read a text now I know what I’m going to do to get the most out of it [Jane].

(2) Their teaching:

I teach 7th and 8th Special Education grades: I’m already planning how to rewrite a course in RC for them based on what I learnt in this course [Oprah].

In my teaching reading to Special Ed kids I see how what I learnt serves me as great practical tools to promote my students’ reading and writing [Jane].

(3) Their personal lives with regard to acting as more critical readers and writers:

The course contributed to my personal and professional life – I even read the newspaper differently now [Mira].

I am also more critical of my own writing and others’ today – I know that not every text that is published is coherent [Caroline].

These findings are in line with the findings of studies (e.g., Butterfield & Nelson, 1994) which indicated the significant effect of metacognitive strategies on subjects’ learning and on their ability to transfer it to other
learning contexts. The subjects in the present study also expressed their belief in their ability to transfer their learning to future learning contexts:

Now I have more tools at hand that will help me with any academic task [Tammy].

What I learnt will serve me in the future [Caroline].

3.1.3. Self-Reassessment
For many of the subjects the course was not only a process of learning, but also a process of self-discovery, or revelation (Ford & Ford, 1992), especially with regard to their reassessment of themselves as learners:

I thought that on account of the positive feedback I used to get in the past on my papers that I knew how to, but I realized that my writing was pretty bad and that I improved tremendously in the course of this year [Oprah].

I always thought I was very good at writing, I was sure that I automatically did what needs to be done, but in this course I found out things about myself I didn’t know before [Hilary].

The subjects assessed themselves at the beginning of the course as “good” to “very good” readers and writers based on their previous experiences both at school and at college, as data obtained from the second questionnaire indeed indicated. They discovered, however, that their self-assessments were inaccurate. The subjects’ evolving ability to assess, or rather re-assess, themselves more accurately is in line with current definitions of metacognition and with the findings of studies (e.g., Hattie et al., 1996), which indicated that students’ metacognitive strategies gradually improved over time with explicit instruction.

3.2. Research Question (2) Was: What Were the Differences between the Subjects’ Self-Assessment scores of Their Pre and Post Instruction Products?

The average score for Product A for all the subjects together was 4.72 (SD 0.91) of a total of 8 points (see p. 12), that is, 58.87%, or below the passing grade of 60% at college; the average score for Product B was 7.13 (SD 0.50), that is, 89.12%.

Figure 1 represents the subjects’ individual self-assessments of their pre and post instruction discourse synthesis products (Product A and B, respectively). A t-test for the average differences between these scores indicated that these differences were significant (t = 12.11; DF = 23; P = 0.00 (9.09137E-12)). The subjects, then, assessed their Product B to
be of higher quality than Product A. Judging by their assessments, then, explicit instruction of the performance of the discourse synthesis task had a significant effect on their final products. These findings are in line with the subjects’ process log summaries, particularly their comments attributing their learning to the instruction they received in the course:

I feel that I was able to cope with the task well on account of the course which was organized according to the theories – it offered the students scaffolds and opportunities to slowly try out on their own and become independent [Oprah].

The second time as a result of the course and learning from one week to the next, I knew how to approach the texts, what to look for first, I evaluated them in terms of the criteria. This helped me process the texts and locate the writers’ arguments [Tammy].

The subjects also described their learning in the course:

There has been a development in my ability to process texts [Esther]. I feel that the whole year was building up towards the final task. It has been a long and very significant process; from mapping one text to mapping multiple texts, multiple drafts (…) crystallizing the criteria of evaluation which reflect the process I went through [Nelly].

The subjects conceived of their learning as a process that takes time. They also noticed that instruction put into practice the learning theories they read about in the course: It offered “guidelines”, “scaffolds and opportunities”, “examples” and “practice” – all in all, the constituents of cognitive
apprenticeship, which explicit instruction in the course had been planned to include for the purpose of helping the subjects “to try out on their own and become independent”. These findings are in line with Ackerman’s (1993) and Perfetti et al.’s (1995) arguments, that time and practice are necessary conditions for learning; and with the findings of studies (e.g., Rijlaarsdam & Van den Bergh, 1996; Segev-Miller, 1997), which indicated that time on task had a significant effect on the quality of the subjects’ writing processes and products.

Figure 2 represents the average differences between the subjects’ criterial self-assessments of their pre and post instruction products. According to these assessments, the subjects’ major instruction gains related to the following criteria: Inventing a macroproposition (an average difference of 0.48 points), organizing the information previously selected in an appropriate rhetorical structure, and linguistically transforming the information (an average difference of 0.32 points in each case). Altogether, these differences accounted for 46.47%, or almost half of the total difference between the average scores on Products A and B. That is, the subjects attributed a major part of the improvement in their final products to the intertextual processing strategies they acquired: Conceptual, rhetorical, and linguistic transforming, respectively.

3.2.1. Conceptual Transforming
The majority of the subjects assessed Product A to be unsuccessful with regard to the crucial requirement of the task to invent a macroproposition:

(1) 20% of the subjects with regard to the absence of a macroproposition:
I didn’t write a macroproposition for the first product [Mira].

There was no macroproposition for all the texts and therefore no focus [Ada].

(2) 75% of the subjects with regard to an unsuccessfully formulated one:

Macroproposition 1 (…) does not represent all the texts I read nor is it general enough [Elinor].

One of the subjects circumvented the difficulty by selecting the macroproposition of one source text and imposing it as a “superproposition” on the other source texts:

Macroproposition 1 is from one text and does not include all the other texts; that is, it is not one central sentence [Goldie].

This strategy is similar to the one used by some of the subjects in the researcher’s earlier (1997) study, and referred to by them as a “by default” strategy. Several subjects circumvented the difficulty by not relating to all the source texts:

Then I looked for connections but found it difficult, esp. with one of the texts, so I left it out which turned out to be a mistake [Tammy].

Most subjects assessed their macropropositions in Product B to be an improvement also in terms of syntax or accessibility:

Macroproposition 1 looks more like a title [a noun phrase]. Macroproposition 2 is syntactically a complete sentence: subject, predicate [Lily].

Macroproposition 1 is too short and presented abruptly (…) Macroproposition 2 is preceded by old information, introduced by BUT and includes the organizing elements of my text [Sarah].

3.2.2. Rhetorical Transforming
In Product A the subjects often replicated the original rhetorical structures of the source texts:

What I found useful was the rhetorical structure of the original texts which I used in my text [Michelle].

They also used other “by default” strategies such as “focusing on the authors rather than on the ideas”, and consequently producing a text which looked like a “shopping list”, a metaphor many of the subjects used to describe Product A:
The first product is pretty bad, each paragraph relating to a different idea; all in all it looks like a shopping list – a collection of different things that different people said; the second product has a much better rhetorical structure [Oprah].

Product 1 text is not well organized – leaps from one idea to another with no overall structure; product 2 is very explicit [Shirley]. The subjects, then, assessed Product A to be unsuccessful with regard to this criterion, with “no overall structure” and “no real synthesis”. Listing – a knowledge-telling strategy requiring no conceptual transforming – has been found to be the most frequent structure subjects used in previous discourse synthesis studies. McCarthy Young and Leinhardt (1998), for example, found that their subjects used listing in 85% of their products.

Improvement consisted in some cases of presenting the structure of Product A more explicitly in Product B:

The rhetorical structure of the first product is unclear (…), it isn’t presented from the beginning and makes comprehension of the text difficult; but in the second product the explicit rhetorical structure of problem-solution already appears in the advance organizer [Louise].

More often, improvement consisted of replacing the structure in Product A with a more appropriate one in Product B. This time the subjects used a variety of rhetorical structures, such as problem-solution, cause and effect, comparison, and contrast. The subjects also reported using a rhetorical structure of their own rather than replicating those of the source texts:

There’s rhetorical restructuring, in that the rhetorical structure is different from that of the source texts [Jane].

I see great improvement in my ability to reorganize the text. I made my own changes in the original structures [Gillian].

3.2.3. Linguistic Transforming
The subjects reported that writing Product A was a matter of “simply reading and marking”, “mechanically copying and quoting”. These findings are in line with other discourse synthesis studies which also found that subjects engaged in extensive copying (Horowitz, Kennedy & Cole, 1997; Kennedy, 1985; Mani, Fyfe, Lewis & Mitchell, 1996; Nelson, 1988, 1990; Raphael & Boyd, 1991). Greene (1993) found that his subjects often quoted as a substitute, rather than as support, for their own texts. Campbell (1990) argued that copying, paraphrasing, and summarizing reflected different “depths” of textual processing. Indeed, linguistic transforming proved very difficult to the subjects:
The most difficult part, however, was linguistic transformation: I could not get away from the language of the texts, so I talked to myself and tried to say what I read without looking at the texts [Sharon].

I know now that I have to sum up the texts, etc., rather than copy parts of texts (…) And I realized that to summarize a text you really need to understand it: select and reorganize. This has been very significant learning for me [Caroline].

Significant linguistic transforming, then, like rhetorical transforming, was closely related to conceptual transforming and reflected “deep” textual processing. Significant linguistic transforming was also related to the subjects’ “authorship” (see: Greene, 1995; Spivey, 1997) of their textual products:

I was surprised to find out that most of my product 1 was quoting from the texts, how text-based I was (…) the second time it was very difficult to write in my own words but most of the text is mine this time [Goldie].

It was very important to me to write with my own words this time, to present the authors’ ideas in my own way [Jane].

Overall, the subjects’ average assessment scores for Product B were higher than the researcher’s: 7.13 (SD 0.50), or 89.12%, and 5.54 (SD 1.07), or 69.25%, respectively. The agreement rate between the subjects’ and the researcher’s scores was 41.66%. These findings seem to be in line with the findings of Ackerman (1989) and Sullivan and Hall (1997), which also indicated a low rate of agreement between college students’ and their raters’ assessments, and students’ overestimation of their performance. However, the criteria used in the two studies were fewer (five different criteria in each vs. eight in the present study), were hardly directly relevant to the discourse synthesis task (e.g., Sullivan and Hall’s “selectivity” was an exception), and related to fewer dimensions (e.g., Ackerman’s mostly to rhetorical planning). Falchikov and Goldfinch (2002) argued that assessment is more difficult when more dimensions are used, as was the case in the present study. The low agreement rate in the present study, then, may be accounted for in terms of the more demanding assessment criteria. Indeed, the subjects expressed the need for more practice of the assessment criteria:

It still does not come easy to me (…) I wish we had one more year to expand our knowledge (…) especially with regard to the criteria [Esther].
4. Conclusion

The findings of the present study indicated that, according to the subjects’ self-assessments, explicit instruction of the performance of the discourse synthesis task had a significant effect both on their processes and on their products. First, the subjects attributed the improvement in their post instruction processes to the effect of explicit instruction in terms of three major categories: (1) knowledge of task representation as knowledge-transforming, of metacognitive and cognitive strategies relevant to the performance of the task, and of assessment criteria; (2) motivation and self-efficacy, which resulted in the subjects’ ability to manage the task and to transfer their learning from the course to other contexts; and (3) self-reassessment as learners. Second, the subjects assessed their post instruction products to be of higher quality than their pre instruction products, especially with regard to three criteria: Inventing a macroproposition, organizing the information previously selected in an appropriate rhetorical structure, and linguistically transforming the information. These criteria corresponded to the intertextual processing strategies emphasized in the course.

Although they made significant progress, the subjects found discourse synthesis to be a highly demanding task, and concluded that the course was only the beginning of a personal learning process [Jane].

I still feel that I have so much more to learn [Louise].

Sternglass’ (1993) suggestion that “supportive” guidance throughout their college years of study be offered to students, should, therefore, be adopted. Two further suggestions are implied by the findings of the present study: First, that explicit instruction be as authentic and relevant as possible. The failures of present introductory writing courses (e.g., Chenoweth, Hayes, Gripp, Littleton, Steinberg & Van Every, 1999) may be accounted for in terms of the lack of “situated” or authentic instruction. It has already been argued (Greene, 2001: 562) that “Whether disciplinary courses in writing provide a coherent – read authentic – alternative to the space general writing skills courses currently occupy is an argument yet to be made”. Certainly, disciplinary courses which provide no writing instruction (e.g., McCarthy Young & Leinhardt, 1998) or very little writing instruction (e.g., Greene, 2001), with an emphasis on the product rather than on the process, have not been very helpful.

Second, that students would be required to conduct a process log in which they relate to their learning (Segev-Miller, 1996) and to their self-assessment of their task performance (Evans, 2001; O’Neill, 1998), and be
provided with feedback (i.e., assessment) on a regular basis. The process log would also enable the lecturer to gain insight into the dynamic development of her students’ strategy use over time, provide her with information with regard to the students’ individual difficulties, and allow her to adapt her instruction accordingly.

Underlying the present study was also the hope that the subjects – all in-service elementary education teachers – would adopt an intertextual approach in their teaching, which, as mentioned earlier (see pp. 6–7), is not prevalent at schools. Indeed, some of the subjects reported immediate transfer of their learning to their teaching (see pp. 18–19). Future research may investigate the extent to which the subjects of the present study have adopted an intertextual approach in their teaching. Since all significant learning involves synthesis (see p. 7), it would be appropriate to start the instruction of discourse synthesis tasks at an early age (Harvey, McAuliffe, Benson, Cameron, Kempton, Lusche, Miller, Schroeder & Weaver, 1996; Jongsma, 1991; Lipson, Valencia, Wixon & Peters, 1993; Moss, Leone & Dipillo, 1997; Oyler & Barry, 1996). This instruction would be in line with the curricular changes recently being introduced into elementary schools with an integrative perspective on learning (e.g., Barab & Landa, 1997).

Appendix A

**Intertextual Processing, or Transforming, Strategies**

2. **Transforming**
   2.1. **Conceptual transforming**
      2.1.1. detecting the conceptual connection among source texts
      2.1.2. formulating the conceptual connection
      2.1.2.1. creating (“inventing”) a superproposition
      2.1.2.2. using an existing proposition
         2.1.2.2.1. detecting the macroproposition in one text and imposing it as a superproposition on other texts
         2.1.2.2.2. selecting a proposition that is not a macroproposition in one text and imposing it as a super-proposition on other texts
         2.1.2.2.3. selecting a proposition that is not a macroproposition but appears across all texts and imposing it as a superproposition on all texts

---

16 Other advocates of explicit instruction of synthesis at school with an emphasis on reading are Afflerbach and Vansledright (2001); Hartman and Hartman (1995); and Hynd (1999).

17 Similar changes have been suggested by the Israeli Ministry of Education (see Kaspi, 1992).
2.1.3. categorizing
2.1.3.1. creating categories previously non-existent in source texts
2.1.3.2. collapsing existing categories
2.2. Rhetorical transforming
2.2.1. summarizing one text
2.2.2. using one text as a frame to incorporate other texts
2.2.3. listing texts by author
2.2.4. decomposing and recomposing texts
2.2.5. synthesizing
2.3. Linguistic transforming
2.3.1. speech acts
2.3.2. lexical repetition

APPENDIX B

Collection of Source Texts for the Discourse Synthesis Task


REFERENCES


Segev-Miller, R. (2000). Retrospective and on-line verbal reporting as instruments of research into reading and writing processes. The Annual UTELI (University Teachers of the English Language in Israel) Conference, 1 February, University of Haifa.


Kibbutzim College of Education
The English Department and The Center of Academic Literacy
149 Namir Road
Tel Aviv 62507
Israel
E-mail: aki@macam.ac.il