The Strategic Content Learning Approach to Promoting Self-Regulated Learning: An Introduction to the Coordinated Symposium

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Running Head: The Strategic Content Learning Approach

Paper presented at the 1996 (April) meeting of American Educational Research Association in New York, New York. This research was supported in part by a Social Sciences and Humanities Research Council of Canada Research Grant awarded to the author.
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Introduction

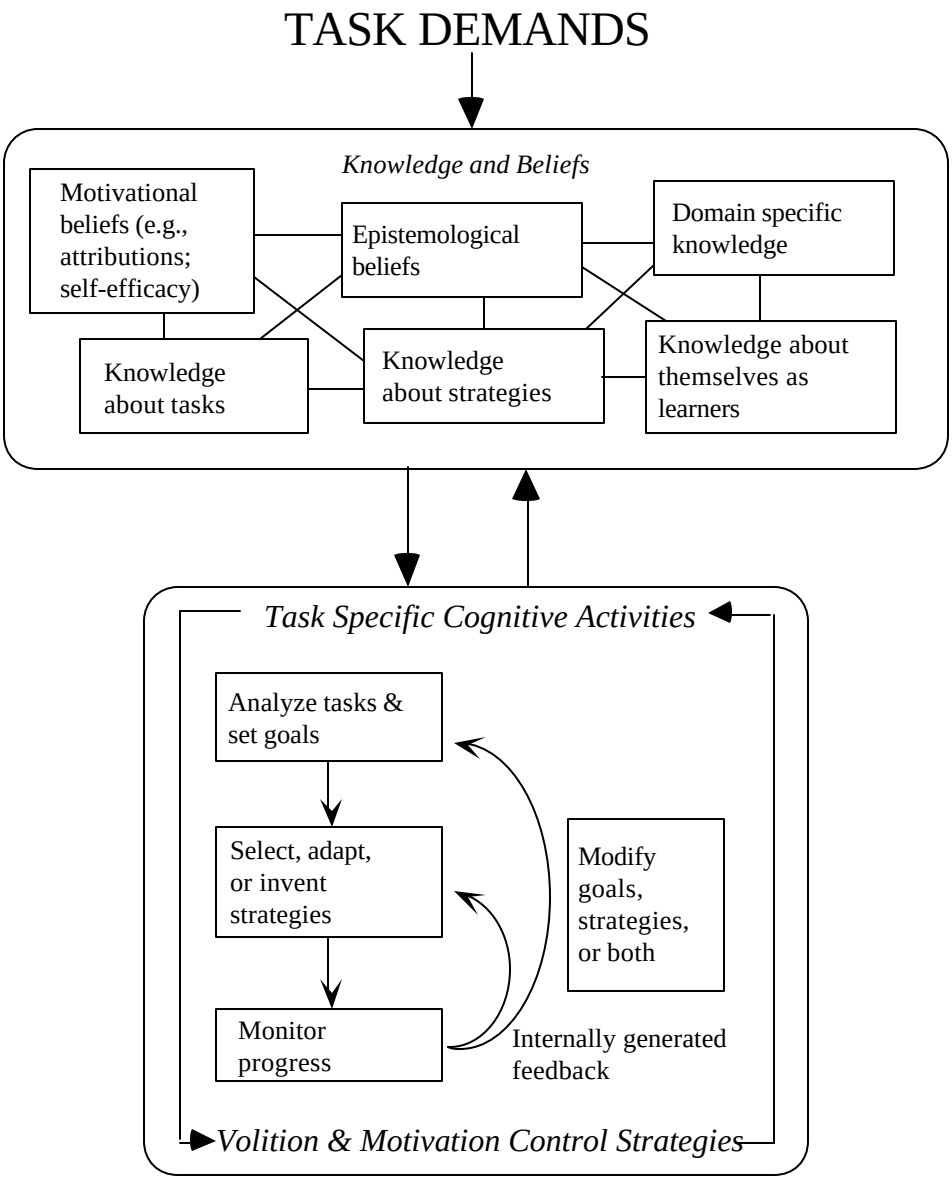
In the past decade, educational researchers have focused considerable effort on defining instructional strategies that support students to develop the knowledge and skills required to direct their own learning activities across contexts and time (e.g., Borkowski & Muthukrishna, 1992; Butler, 1993; 1994; 1995; Ellis, 1993; Graham & Harris, 1989; Palincsar & Brown, 1988; Stone, 1989; Wong, 1994). This focus is particularly evident in intervention research for students with learning disabilities, who have been variously described as deficient (Torgesen, 1977), or "actively inefficient", in their strategic approaches to tasks (Swanson, 1990, p. 51). The set of papers that comprise this coordinated symposium report on a program of research into the efficacy of one of these instructional models designed to promote the development of self-regulation by students with learning disabilities, the Strategic Content Learning approach (SCL; Butler, 1993; 1994; 1995). This first paper introduces the SCL model, describing its origins, its components, and its theoretical base. Next, three studies within which SCL was implemented in a postsecondary context are described, and a summary of results across studies is provided. Finally, topics addressed in the remaining symposium papers are outlined.

The Goals of Strategy Instruction

In order to describe the SCL approach and its relationship to other instructional models, it is necessary to review the kinds of outcomes that strategy training interventions generally seek to achieve. In each of the papers that comprise this symposium, we will employ a common model for describing instructional goals in strategy intervention research. That is, we will characterize strategic learning in terms of a model of self-regulation (Butler & Winne, 1995; Paris & Byrnes, 1989; Zimmerman, 1989). Thus, to characterize what might be *strategic* about learners approaches to tasks, we present a simplified model of self-regulation in Figure 1.

Figure 1 suggests that, when faced with an academic task, strategic learners engage in a recursive cycle of cognitive activities (Butler & Winne, 1995; Carver & Scheier, 1990; Zimmerman, 1989). They begin by analyzing the presented task and interpreting task requirements in terms of existing knowledge and beliefs. Self-regulated learners then set task specific goals, which they use as a basis for selecting, adapting, or even inventing appropriate strategies to accomplish their objectives. After implementing strategies, these students monitor their progress towards goals, thereby generating internal feedback about the success of their efforts (Butler & Winne, 1995). Finally, strategic learners adaptively adjust their approaches based on their perceptions of on-going progress (Butler & Winne, 1995; Carver & Scheier, 1990). In sum, self-regulated learners actively manage their learning activities as they engage with a task, flexibly adapting their approaches as required. Further, self-regulated learners also adaptively employ motivation and volition control strategies to keep themselves on task when they become discouraged or encounter an obstacle (Corno, 1993). Thus, a first goal of strategy intervention models is to support students' self-regulated engagement in tasks, so that students learn to manage their cognitive, motivational, and volitional processes during learning (Butler & Winne, 1995; Corno, 1993; Zimmerman, 1989).

Figure 1. A simplified model of self-regulated learning.



As depicted in Figure 1, the way in which students self-regulate learning is also a function of the knowledge and beliefs that they bring to the learning context (Bandura, 1993; Butler & Winne, 1995; Paris & Byrnes, 1989). For example, students' interpretation of tasks and setting of goals may be influenced by their accumulated understandings about typical task demands (Paris & Byrnes, 1989; Winne & Marx, 1982), their epistemological beliefs about learning (Schommer, 1990; 1993; Schommer, Crouse, & Rhodes, 1992), and their task-specific perceptions of self-efficacy (Bandura, 1993). Additional types of knowledge that influence students' approaches to tasks include students' domain specific understandings (Alexander & Judy, 1988), beliefs about factors responsible for successful and unsuccessful performance (i.e., attributional beliefs; Borkowski, Weyhing, & Turner, 1986; Schunk & Rice, 1986), specific and general knowledge about strategies and their usefulness in different contexts

(Borkowski, Estrada, Milstead, & Hale, 1989; Pressley, 1986), and knowledge about their strengths and weaknesses as learners (Paris & Byrnes, 1989). Therefore, a second goal of strategy training interventions is to support students to construct a range of knowledge and beliefs that support, rather than undermine, further self-regulation (Butler, 1994).

Challenges to Current Strategy Training Models

In the majority of current strategy training interventions, task approach strategies that successful learners use are observed in order to identify processing routines that should be taught to less proficient peers. Generally the steps in these strategies are outlined and then conveyed to students, either via direct or interactive instruction (Butler, 1995; Kamann & Butler, 1996). In previous papers, Butler (1993; 1994; 1995) has identified a number of difficulties that arise when strategy training efforts procede from this point of departure. A brief review of some of her points is provided below.

First, Figure 1 suggests that implementing strategies is just one of the number of processes that comprise self-regulated learning. Focusing too narrowly on strategy instruction may have two undesired effects. One is that instruction may not effectively target students' actual learning needs (Butler, in press; Butler & Winne, 1995). For example, students' task related difficulties may arise not from lack of knowledge about strategies, but rather from problems analyzing tasks and setting task goals, making judgments about task progress, or adapting approaches in the face of obstacles. A second undesired effect might be that students perceive strategies to be fixed or static routines, rather than dynamic approaches to meeting varying task demands. Thus, a first challenge to strategy training approaches is to help students situate strategy use in the cycle of self-regulating activities, and to recognize that strategy implementation is part of a flexible and adaptive process. Instructional approaches that teach students strategies via interactive dialogues during the completion of meaningful tasks are most likely to address this need (e.g., Palincsar & Brown, 1984; Englert, 1992).

Second, any given task specific strategy represents just one potentially effective approach to task completion (Swanson, 1990), and different students may find different strategies most effective for them. Although most researchers recognize the importance of personalizing instructed strategies to meet students' needs (Borkowski & Muthukrishna, 1992; Ellis, 1993; Montague, 1993; Swanson, 1990), usually the same set of strategies are taught to all students, at least in early phases of instruction. Students are generally encouraged to individualize strategies, but only after one or more specific strategies for learning have been mastered (e.g., Borkowski & Muthukrishna, 1992; Ellis, 1993). Thus, a second challenge to current strategy training models is to define efficient approaches to supporting students' development of individualized strategies that respond to their specific problems with tasks and their unique strengths and needs.

Third, there is a growing appreciation among strategy researchers that students actively construct a variety of "theories" as they engage with tasks, including theories about strategies (Borkowski, 1992; Paris & Byrnes, 1989). Thus, a third challenge to instructional models is to define means of promoting this knowledge construction. Researchers have identified a number of instructional strategies that are likely to achieve this objective. For example, both Wong (1994) and Butler (1993; 1994; 1995) have drawn on the work of Salomon and Perkins (1989) to suggest that promoting students' mindful abstraction of generalized principles based on their concrete experiences with tasks is likely to lead to construction of knowledge about strategies, and ultimately transfer. This is because, following Salomon and Perkins (1989), mindful abstraction of principles from experience results in the decontextualization of

understandings which can be applied across tasks and settings. Mindfulness is encouraged when students are required to actively discuss and articulate understandings about strategies in the context of interactive dialogues (e.g., Borkowski & Muthukrishna, 1992; Ellis, 1993; Englert, 1992; Palincsar, Brown, & Martin, 1987). Nonetheless, in many strategy training interventions, it is the teacher or instructor who observes her own[1] or others' cognitive processing, abstracts a generalized understanding, outlines the steps in a strategy, and then teaches those abstracted steps to students. Students are rarely encouraged to engage in this cognitive work for themselves.

Finally, a fundamental goal of strategy instruction approaches is to increase students' participation in the full range of cognitive activities central to self-regulation. At the same time, it is often the teacher or researcher who completes most of the steps for students, instead of supporting them to complete those steps for themselves. For example, in many cases, it is the teacher or researcher who confronts a novel task, analyzes the task, identifies associated goals, considers the types of problems students might encounter, and then defines a specific and hopefully effective routine. This "solution" is then taught directly to students. Thus, a final challenge to strategy training interventions is to engage students in the complete set of activities that comprise self-regulation, so that students learn for themselves how to analyze a task (familiar or novel), identify goals, and to brainstorm, try out, and adapt approaches. Students need to recognize that they, too, can generate strategic approaches and thus ultimately control learning outcomes.

The Strategic Content Learning Approach

The SCL model builds from the work of other researchers who have developed interventions designed to promote metacognition, strategy use, or self-regulated learning (e.g., Borkowski, 1992; Englert, 1992; Graham & Harris, 1989; Palinscar & Brown, 1984; Paris, Wixson, & Palincsar, 1986). However, in SCL, instruction is geared, not toward teaching students specific, predefined strategies, but instead, towards supporting students to generate personalized strategies for themselves as they self-regulate their engagement in tasks. At the same time, SCL is not like discovery learning, during which students are placed in situations where they might develop strategies on their own. Rather, drawing on their knowledge of the variety of ways in which tasks can be accomplished, SCL instructors provide guidance to students to develop strategies as they work through meaningful tasks.

During SCL instruction, students are ultimately responsible for making decisions and judgments regarding their task performance, regarding what goals to set, what strategies to use, how effectively they are progressing towards goals, and how to adapt strategies accordingly. The instructor's job is to (a) help students make effective decisions or judgments by directing their attention to ideas or cues they may have overlooked, (b) support students to identify what they currently do well (and to keep that), and which of their current strategies aren't working (and to modify those), thereby starting from students' initial understandings to build strategies and to support their construction of knowledge; (c) ask students to reflect on their learning processes, (d) require students to articulate their task approach strategies in their own words, thereby supporting them to abstract generalized understandings based on their experiences with the task, and (e) direct students' attention to the link between their actions during learning, their success on the task, and their perceptions of control and competence. Thus, rather than teaching strategies, SCL instructors provide calibrated support so that students effectively engage in the complete cycle of cognitive activities central to self-regulation. Students learn how

to select, adapt, or invent strategies as part of that general activity. (For further explication of the SCL model, see Butler (1993, 1994; 1995) and Kamann & Butler (1996)).

How does the SCL approach address the challenges outlined earlier? First, students' strategy development is embedded in the complex cycle of cognitive activities that comprise self-regulation. Students' strategies evolve as they face task demands, so that the flexible and fluid character of strategic approaches is emphasized. Second, students' strategies are individualized, because students develop routines that are effective specifically for them, considering their unique processing strengths and weaknesses. Third, through interactive dialogues, students are assisted to construct understandings, about tasks, strategies, the role of effort and strategy use in learning, and of their own strengths and weaknesses as learners. Finally, students are ultimately responsible for the problem solving process that is at the heart of self-regulation, thereby exercising control over their own learning. They learn that they, too, can develop strategies in face of new or varying task demands. Our model of self-regulation (Figure 1) suggests that it is this competence that is effectively strategic, not the automatic implementation of learned strategies in the context of familiar tasks.

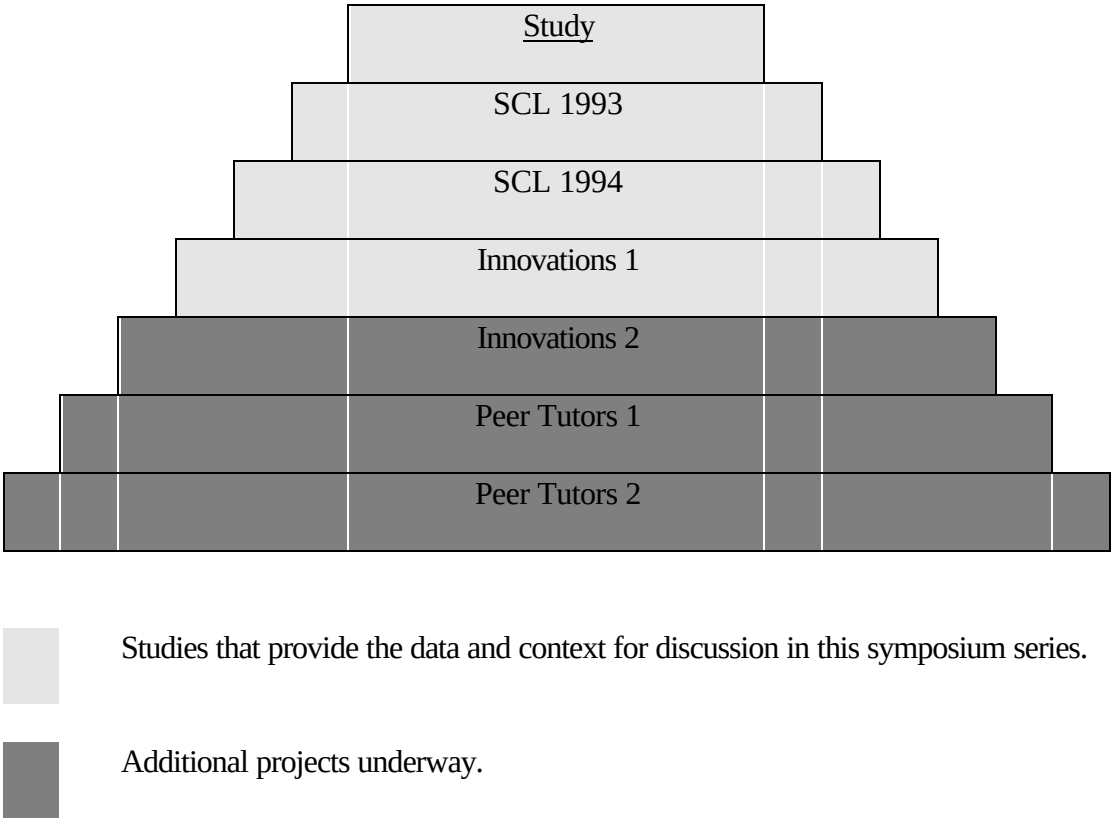
Research on SCL Effectiveness

For her first implementation of the SCL model, Butler (1993; 1994; 1995) chose to evaluate the benefits of the approach for postsecondary students with learning disabilities. She chose this area, first, because she felt that SCL would be an appropriate intervention for student with learning disabilities generally, who are less likely to employ effective strategies for learning or to develop effective strategies for themselves (Swanson, 1990; Wong, 1986). Second, she thought that SCL might also be a valuable intervention strategy for *adults* with learning disabilities, who often report persistent difficulties across community, vocational, personal, and academic domains (Adelman & Vogel, 1991; Gerber & Reiff, 1991; Polloway, Smith, & Patton, 1988). For example, postsecondary students with learning disabilities have been found to have continuing problems with reading, writing, math, and spelling (Adelman, O'Connell, Konrad, & Vogel, 1993; Adelman & Vogel, 1990; Vogel & Moran, 1982). They report lower self-esteem, personal-emotional adjustment, and adjustment to academic life than do their non-disabled peers (Saracoglu, Minden, & Wilchesky, 1989). Finally, postsecondary students with learning disabilities, like their younger counterparts, often lack effective task approach strategies (Bursuck & Jayanthi, 1993; Deshler, Schumaker, Alley, Warner, & Clark, 1982), and intervention approaches designed to support postsecondary students, like school based interventions for younger students, stress the importance of developing self-regulation and metacognition (Bursuck & Jayanthi, 1993; Deshler et al., 1982; Policastro, 1993). Thus, given the needs of these students, and the paucity of available research into effective intervention strategies, Butler decided that applying SCL instruction to help postsecondary students with LD's would be an important first area for research.

To define a specific method for SCL implementation, Butler examined the models of support delivery that were available across postsecondary campuses. Based on this informal survey, she identified three primary models for support: (1) specialized one on one tutoring/instruction provided by trained professionals (e.g., counselors or learning disability specialists), usually operating through a student services or counseling department; (2) peer tutor support services, where peer tutors provided either strategy instruction or one on one tutoring in specific academic areas; and (3) group-based study skills programs. She then designed a series of studies in which SCL was to be implemented within each type of service delivery system. Figure 2 provides a graphic depiction of the studies that have been undertaken to date. This

paper summarizes results from the first three of these studies, each of which assessed SCL's efficacy in the first service delivery model. That is, in each, students were provided with one to one support by a teacher with a background in learning disabilities. As Figure 2 indicates, studies where peer tutors have been trained to implement the SCL approach are currently underway.

Figure 2. Studies assessing SCL effectiveness for postsecondary students with learning disabilities.



In the first SCL study (SCL 1993), Butler herself served as a tutor to 6 postsecondary students attending three different campuses. Results from this study have been described elsewhere (Butler, 1993; 1994; 1995). In the second study (SCL 1994), Butler trained two additional tutors, so that three instructors provided support to an additional 13 students. Finally, in the third study (Innovations, Year 1), SCL instruction was provided as one component within a comprehensive support program (which also included basic skills remediation, as well as personal and vocational counselling). Instructors in this third study were four graduate students in education (with previous teaching or counseling experience) who worked with 11 students. Overall, 7 tutors and 30 students were involved in the first three studies, implemented across 4 different postsecondary campuses.

In each of these studies, postsecondary students with learning disabilities were provided with individualized support once or twice per week over at least one semester. An overview of the study participants, including the number of students in each study, student's age and gender, and the amount of intervention provided (e.g., the number of sessions and the total time spent) is

provided in Table 1. Parallel to what would happen in actual support programs, each student selected a course and a task with which he would like assistance, and support was provided to help the student develop effective approaches for that task. The tasks selected across students in the three studies, most often reading and studying (expository or narrative materials), writing (paragraphs or essays), and math, are summarized in Table 2. The exact nature of the tasks varied for each student, however, and were based on the specific requirements of each student's actual coursework.

Table 1. Overview of participants and interventions in the three SCL studies.

Study	n	Age Median (min-max)	Gender Male	 Female	Number of Sessions Median (min-max)	Total Time Median (min-max)
First SCL Study 1993	6	24.50 (18 - 36)	1	5	11.50 (8 - 15)	15.73 (11 - 28.42)
SCL 1994	13	32.00 (21 - 45)	3	10	15.00 (8 - 19)	17.00 (8.5 - 25.75)
INNOVATIONS Year 1	11	32.00 (22 - 46)	4	7	17.00 (11 - 26)	18.00 (12.25 - 28.75)
TOTAL	30	31.00 (18 - 46)	8	22	15.00 (8 - 26)	17.11 (8.5 - 28.75)

Table 2. Tasks selected by participants in the three SCL studies.

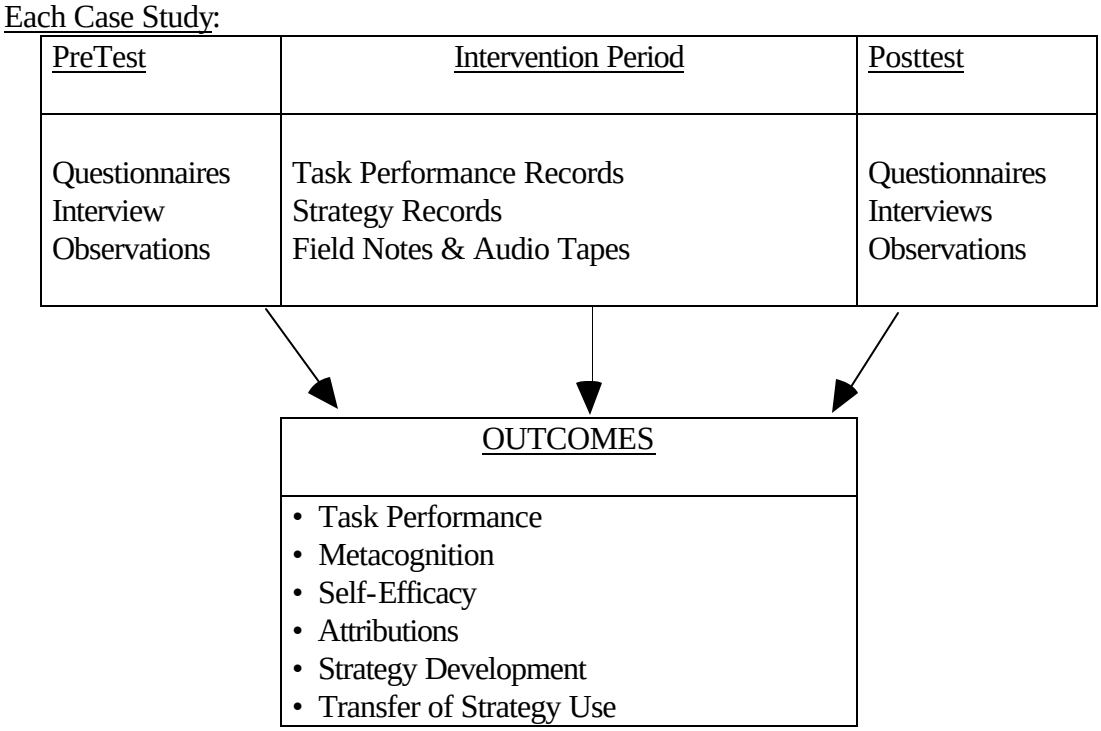
Study Task	SCL 1993	SCL 1994	Innovations Year 1	TOTAL
Learning Math Math Problem Solving	1	4	3	8
Reading & Studying Expository or Narrative	2	2	5	9
Writing	3	4	5	12
Computers / Problem Solving	0	1	0	1
TOTAL (n)	6	11	13	30

Participants

Participants were postsecondary students between the ages of 18 and 46. Each had been assessed, through a battery of standardized tests, as having a learning disability. Note that the academic background of students participating in the studies was varied. A subset of the students attended University, one of whom was in graduate school, and these students brought to the intervention considerable background and skill. At the same time, another subset of students were enrolled in university transfer or diploma programs at local colleges. Finally, a last subset of students, the majority of whom had not completed high school, were in academic

upgrading or vocationally oriented programs. In their pasts, these latter students had generally experienced little academic success.

Figure 3. Study Design: Multiple Parallel Case Studies Across Three Studies (n = 30)



Research Design

Figure 3 depicts the overall structure of the intervention studies, each of which comprised a set of parallel case studies embedded within a pre-post design. The case study methodology provided an in-depth view of each student's progress and a record of the process of intervention. As such, it allowed for an explicit tracing of the relationships between instruction and outcomes. At the same time, the pre-post design allowed for systematic assessment of key outcomes and facilitated comparison across students. The combination of designs allowed collection of both qualitative and quantitative data on the effectiveness of the SCL approach.

General Procedure

Procedures were parallel within each of the three studies. At an introductory meeting, each student selected a task of immediate importance in current academic work. At the next one or two meetings, students participated in pretest sessions, where they responded to interview questions and completed questionnaires. Note that, across students, questions on pre- and posttest sessions were parallel, but not identical. Each student's questions referenced his or her chosen task. Instruction was then provided once or twice per week, for approximately one hour per session, over approximately one semester. Postests were completed at the end of the

intervention period. At posttest, students completed the same instruments they had completed at pretest.

Data Collection Strategies

In each study, a series of outcomes were targeted for assessment, within and across cases. These expected outcomes were identified based on our analysis of the goals underlying strategy instruction (see Figure 1). Expected outcomes included (a) improved task performace, (b) development of metacognitive knowledge about tasks and strategies, (c) improvements in perceptions of task specific self-efficacy, (d) shifts in causal attributions for performance to more controllable factors, (e) increases in students' active involvement in developing and implementing strategies, and (f) transfer of strategy use across contexts, across time, and *across tasks*. We hypothesized that cross tasks changes in strategic processing would indicate that students had started to approach a variety of tasks strategically.

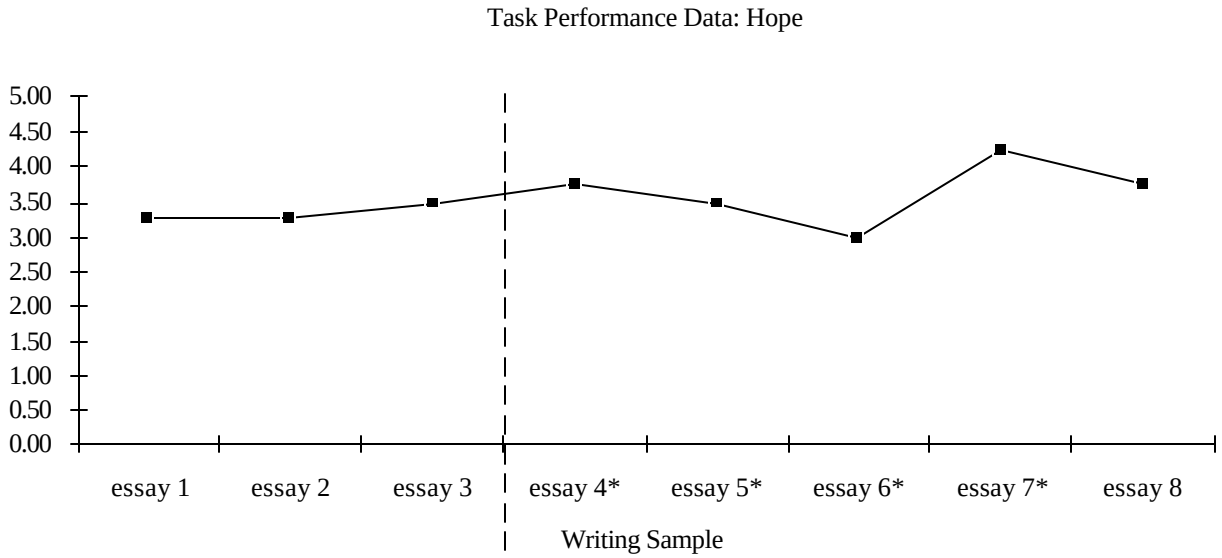
Pre- and Posttests. Pre- and posttest measures assessed students' (a) metacognitive knowledge about tasks and strategies, (b) perceptions of self-efficacy, and (c) attributions for successful and unsuccessful performance. Because more complete descriptions of the measures are reported elsewhere (Butler, 1995; MacLeod, Butler, & Syer, 1996), only a brief summary is provided here.

Students' metacognitive knowledge about tasks and strategies was assessed in two ways. First, students responded in writing to a questionnaire requiring short written answers (Butler, 1995; Wong, Wong, & Blenkinsop, 1989; Graham & Harris, 1989). Note, however, that in a couple of cases, students expressed their answers orally. These oral responses were tape recorded and transribed. Second, students responded to two interview questions asking them to describe (a) task goals, and (b) methods they used for accomplishing the task. Answers to this strategy interview were also tape recorded and transcribed. Students' responses to these measures were evaluated on a series of dimensions (each scored on a scale from 0 to 3) and then summed to obtain a composite score (ranging from 0 to 12). More information about our strategies for measuring metacognition are reported in another of the papers comprising this symposium (MacLeod et al., 1996).

Changes in students' perceptions of self-efficacy were assessed using a variety of questionnaires. In the first two studies (SCL 1993 & SCL 1994), a task-specific self-efficacy questionnaire included two sections, one which assessed students' feelings of competence in their chosen task and another which assessed task preference. Questions were scored on a scale from 1 to 5, where higher scores corresponded to more positive feelings of self-efficacy. Three separate scores were then obtained by averaging across the 10 questions on perceived competence, across the 6 questions on task preference, and across all 16 questions. In the third study (Innovations Year 1), the self-efficacy questionnaire was modified. The items assessing feelings of competence remained the same, but the task preference section was dropped. A set of 6 questions assessing general self-efficacy was added, as was a section that assesed students' confidence in ther ability to perform aspects of their selected tasks. As with the previous questionnaire, scores ranged from 1 to 5, and separate scores were calculated, for general self-efficacy, task specific confidence, perceptions of competence, and a total across all questions. Across all three studies, self-efficacy was also measured by a single item on the metacognitive questionnaire that asked students to rate how well they performed their task on a

scale from 1 (very below average) to 5 (very above average). Finally, in the latter two studies (SCL 1994 & Innovations Year 1), students also responded to a questionnaire assessing their perceptions of self-efficacy across a variety of tasks.

Figure 4. Examples of changes in task performance for writing, reading, and math.
(a) Average rating for a writing student in the SCL 1994 study across four dimensions (clarity, idea flow, organization, & thematic salience).



* Essays worked on collaboratively during the intervention

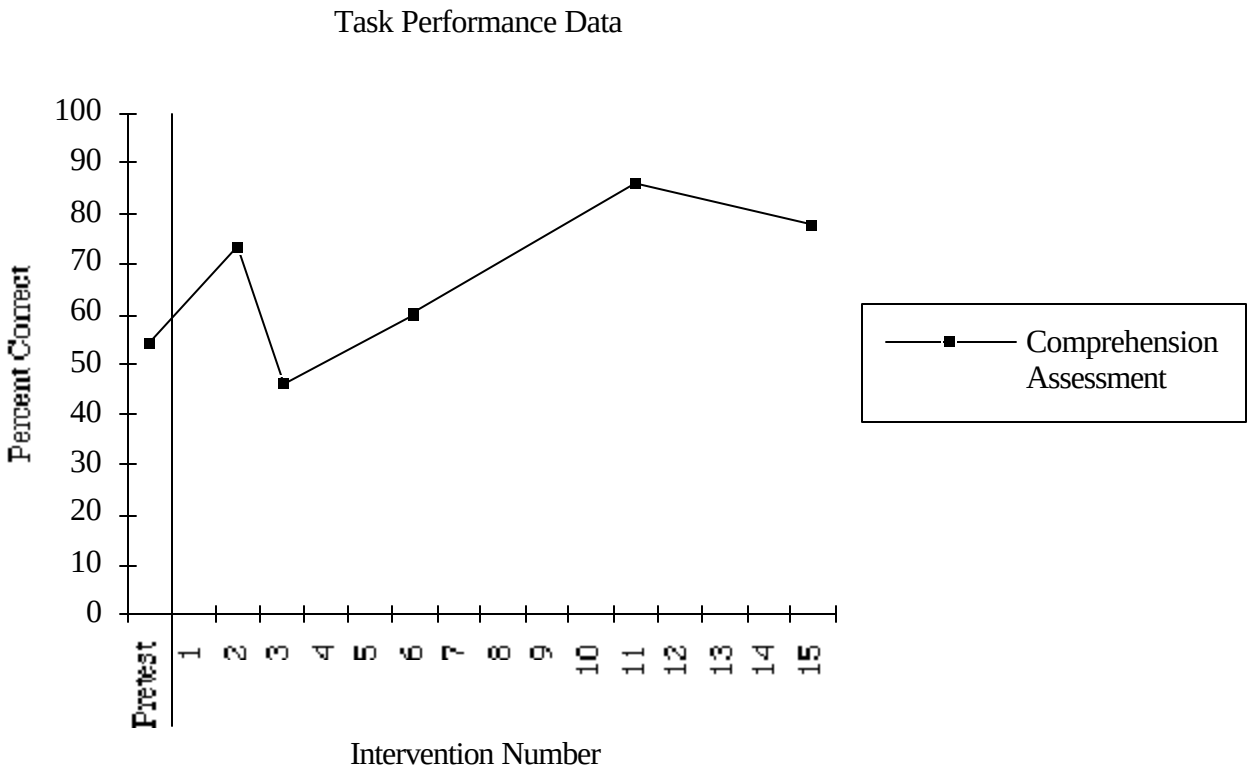
To assess causal explanations (attributions) for performance, students estimated the influence of each of 10 factors on successful and unsuccessful task performance, respectively. Each factor was given a rating from 1 ("not a reason") to 5 ("a major reason"). Six internal factors (ability, effort, strategy use, mood, interest in the task, motivation) and four external factors (help from others, luck, task ease, conditions in the environment) were included based on factors identified as important in previous research (Relich, Debus, & Walker, 1986; Schunk & Rice, 1986; Weiner, 1974).

Measures during the Intervention. During the intervention period data were gathered on an on-going basis to measure both changes in students' task performance and in their strategic approach to tasks. For each student, strategies for assessing changes in task performance were individualized. These strategies included rating students' written assignments for writing quality (for writing students), collecting course marks (often for math students), and evaluating scores on quizzes or tasks set by the researcher (often for reading comprehension students). Task performance changes for each individual were graphically depicted for observation of trends.

To assess strategy use during task completion, physical traces of the implementation of strategy steps were collected, both for tasks completed during training and for those performed outside of the intervention context. Further, frequently during the intervention period, students were asked to articulate their task goals and/or strategies in their own words, and these

descriptions were tape-recorded and transcribed. Some students also produced written records of their strategies as they evolved across sessions. Changes in each students' strategies and students' roles in strategy development were traced across time. Finally, during sessions, whenever students described adaptation of strategies for use across contexts or tasks, the researcher described the comments in field notes. These notes guided later review of session transcripts, from which all incidences of such strategy transfer were extracted.

Figure 4. Examples of changes in task performance for writing, reading, and math (cont'd).
(b) Percentage correct on Cathy's comprehension assessments over time.



Comprehension Assessments = The accuracy of Carol's oral responses to comprehension questions or summaries of reading passages. Reliability during scoring: 89%

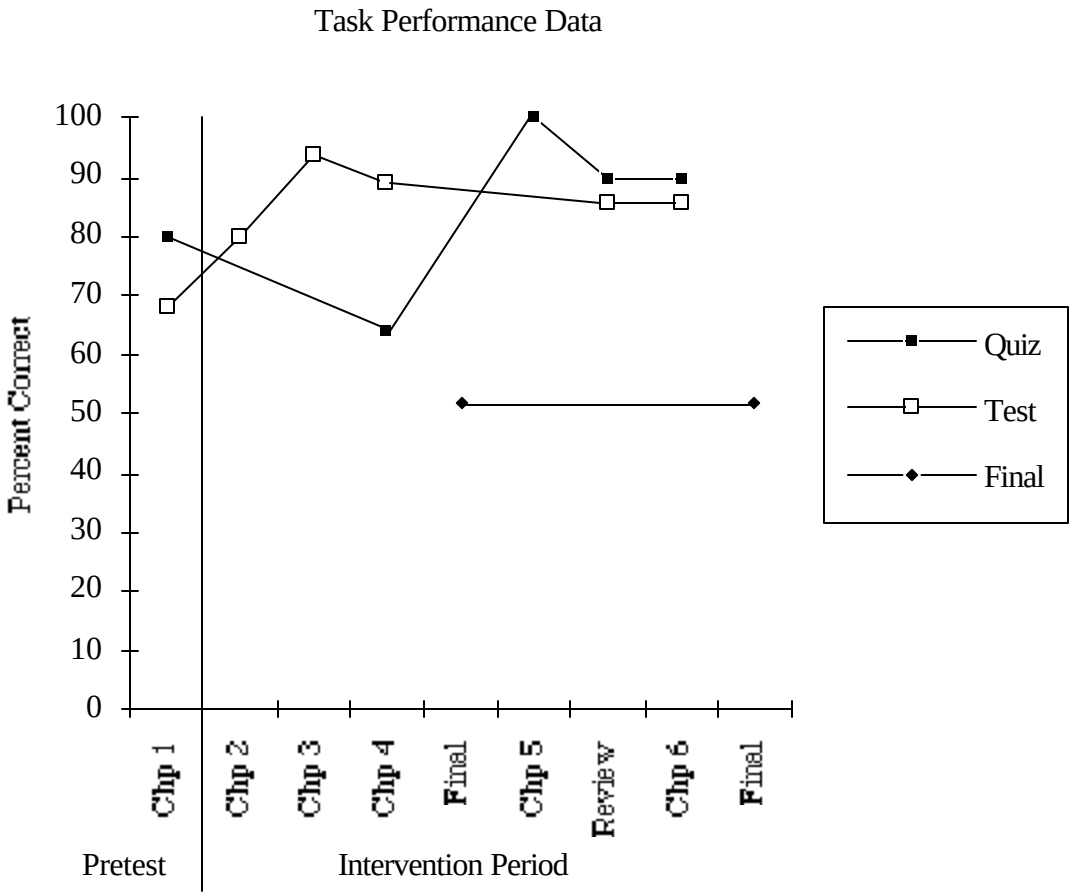
Results

A complete report of all of the results for all three studies would be prohibitively lengthy. Therefore, in this paper overall results across all three studies will be summarized. Specific findings from the SCL 1993 study will be alluded to, but not reported, as those have appeared elsewhere (Butler, 1993; 1995). General trends will be illustrated by specific data from the SCL 1994 or Innovations Year 1 studies.

Task Performance. For 30 students across three studies, data pertaining to improvements in task performance were collected. Data from the SCL 1993 and SCL 1994 studies generally reflected task performance gains associated with participation in SCL instruction. Butler (1993; 1995) presents task performance data for each of the SCL 1993

participants. In this paper, changes in task performance for three students from the SCL 1994 study are included as examples (see Figure 4). These examples were selected to represent changes across reading, writing, and mathematics tasks. Finally, task performance data from the Innovations Year 1 study have yet to be analyzed, but initial inspection of task performance records suggests that these effects will be observed in that study as well.

Figure 4. Examples of changes in task performance for writing, reading, and math (cont'd).
(c) Percentage correct on Leslie's quizzes, chapter tests, and final exams prior to and during the intervention period.



Quiz = Short quizzes taken to practice skills in a chapter; Test = Formal chapter or review tests taken to test comprehension of an entire chapter's material; Final = Final exam taken in each of two sequential courses. Reliability during scoring: Used course marks as a measure of task performance gains.

Self-Efficacy. Consistent across all three studies are findings of statistically reliable gains in students' task specific perceptions of self-efficacy (see Butler (1993; 1995) for the SCL 1993 data). To illustrate patterns common across the studies, data from the SCL 1994 (n = 13) study are presented here (see Table 3). These data indicate that with the exception of ratings of task preference ($p < .07$) and self-efficacy on other tasks ($p > .05$), all of the self-rating measures revealed significant gains across students from pre- to posttest. Effect sizes on the significant measures ranged from .61 to 1.28. Although these patterns were similar in the

Innovations Year 1 study, pre-post changes in general self-efficacy and on students' ability ratings were not statistically reliable ($p > .01$). However, for the small number of cases where data were available ($n = 7$), ratings of self-efficacy across tasks did improve ($p < .05$). These data suggest that SCL supports students to feel more confident and competent about learning, at least in their instructed tasks. Transfer of gains to general self-efficacy or self-efficacy across tasks have not been consistently observed.

Table 3. Changes in Self-Efficacy and Metacognition from Pre- to Posttest: SCL 1994.

Measure	n	Pretest	Posttest	t	p<[1]	Effect size[2]
Self-efficacy						
Self perceptions (max = 5)	13	2.23 (.58)	2.70 (.62)	-2.81	.01	.81
Task preference (max = 5)	13	2.96 (.79)	3.33 (.56)	-1.61	.07	.46
Total (max = 5)	13	2.50 (.61)	2.94 (.52)	-2.35	.02	.72
Ability rating (max = 5)	12	2.17 (.75)	2.63 (.86)	-2.56	.03	.61
Self-efficacy across tasks						
Own task (max = 5)	13	1.90 (.81)	2.94 (1.04)	-4.30	.001	1.28
Other tasks (max = 5)	13	2.52 (.65)	2.68 (.84)	-.84	n.s.	.25
Overall	13	2.44 (.56)	2.85 (.81)	-2.55	.01	.73
Metacognition						
Metacognitive questionnaire (max = 12)	13	6.92 (1.89)	8.46 (1.81)	-3.33	.01	.81
Strategy Interview (max = 12)	8	7.13 (2.03)	9.13 (2.03)	-2.31	.03	.99

1 one-tailed test

2 Effect size calculated using the pretest standard deviation as an estimate of variance prior to the intervention.

Metacognition. Another significant finding across all three studies is a gain in students' metacognitive knowledge about strategies and tasks. Again, findings from the SCL 1993 study have been presented elsewhere (Butler, 1993; 1995). Composite scores for the SCL 1994 study from both the metacognitive questionnaire and the strategy interview are included in Table 3. Effect sizes for these significant measures were .81 and .99, for the metacognitive questionnaire and strategy interview, respectively. Finally, pooled data showing significant metacognitive gains across SCL 1994 and Innovations Year 1 participants are presented later in this symposium (MacLeod et al., 1996).

Table 4. Independent strategy development and transfer: Summary across studies.

Study	n*	Independent strategy use & development across contexts		Adaptation of strategies across tasks	
		%	#	%	#
SCL 1993	6	100%	(6)	83%	(5)
SCL 1994	13	100%	(13)	62%	(8)
Innovations Year 1	8	100%	(8)	75%	(6)
TOTAL	27	100%	(27)	70%	(19)

* Number of cases analyzed for strategy development and transfer to date.

Attributions. In her original study, Butler (1993; 1995) found consistent shifts in students' attributions from pre- to posttest. Specifically, she found that, at posttest, students were more likely to attribute successful performance to ability, effort, strategy use, motivation, or mood. They were less likely to attribute successful performance to help from others. Finally, they were less likely to attribute poor performance to a lack of ability or to task ease. These patterns have not been replicated in the two subsequent studies. While individual students often dramatically shifted in their attributions from pre- to posttest, no consistent trends in these changes were apparent across students.

Active Strategy Development and Transfer. Table 4 describes the number of students across studies who were actively involved in developing and implementing strategies across tasks. Note that all students were actively involved in trying out developed strategies across contexts (e.g., at home when studying). This activity was a requirement of participating in SCL, because students were sent off to apply and report back on strategies between intervention sessions. This basic activity is not reflected in the data in Table 4. Rather, the first column represents the percentage of students who actively and independently *monitored* and *modified* or even *invented* task specific strategies at some point during the intervention period. This table

indicates that every student for whom data was available (some of the Innovations Year 1 students' data are in computer files that could not be accessed in time for this meeting) was active in strategy development at this level. One example is provided in Figure 5. This is a strategy developed independently by a student between intervention sessions. Some of the points that she includes in the top portion of her strategy were drawn from ideas discussed during intervention sessions. On the other hand, in the bottom section, the student describes action control strategies she developed for herself. The strategy reproduced in Figure 5 is typed rather than handwritten, but otherwise as closely as possible matches the student's own format and is expressed in the student's own words.

Figure 5. Hope's strategies for reading.

Strategies for reading

active reading

— ask yourself questions
  — do I understand?
  — what am I going to get out of this?
  — what is its point?
— look at key words — patterns — structure
  underline or highlight

Note

whell
— picture the idea ~~white~~ reading

look up words if you don't know them

— constant Review
  — go back ask questions

— read more
  — look at examples
— do you understand the meaning?
  (in your minds eye)

— remember other information
— take them out and review them too!
— use the strategies listed here
— take one step at a time
— don't go ahead of yourself
— take your time
— give yourself time to understand what you read.
— on a scrap of paer ~~wh~~ write down questions
  While you are reviewing
— reread (cup your ear so you could hear yourself)
  aloud {then go over the list once again}

As noted earlier, whenever students explicitly described adapting or inventing strategies for use in different tasks, a note was made on the tutor's meeting record form. At the end of the study, these notes were reviewed and the tape segments where the transfer was reported were accessed and transcribed. The percentage of students across the three studies who, at some point during the intervention, made this leap are reported in the right hand column of Table 4. These data suggest that 70% of SCL students developed strategic approaches across tasks. More detailed discussion of these trends in strategy development and use are reported in the fifth paper in this symposium series (Butler, Kamann, Poole, Elaschuk, MacLeod, & Syer, 1996, Table 5).

Summary and Conclusions

This first paper in our coordinated symposium has served to introduce the Strategic Content Learning approach to strategy instruction. The paper describes the SCL approach, its relationship to other strategy training models, and its theoretical base. Further, results from three SCL studies are outlined. These results suggest that the SCL approach to promoting self-regulation is a promising intervention strategy, at least for postsecondary students with learning disabilities. Notable results are consistent gains in task performance, perceptions of task-specific self-efficacy, and metacognitive awareness about tasks and strategies. Also important are the findings that all students were actively involved in developing task-specific strategies for themselves, and that the majority of students reported adapting strategic approaches for use across tasks. These data suggest that, during SCL participation, students assume a strategic attitude towards tasks.

There are a number of limitations to the present studies, however, that should be noted. First, a pre-post design is not optimal for ruling out alternative hypotheses for study results and, by itself, represents a weak study design. However, it is my hope that the in-depth case study data, tracing student's active development of strategies in relation to other gains, helps to establish internal validity. Now that more information is available about how SCL works (e.g., see the instructional analysis by Kamann & Butler, 1996), intensive case study designs should not be as necessary. Future research will examine SCL effectiveness using alternative designs.

Second, the three studies described here all used one on one tutoring to support students. While the actual time spent with students over the course of a semester was not prohibitive (e.g., from 8.5 to 28.75 hours), one on one support from learning disability specialists is not always available to students. Two parallel studies currently underway are investigating the benefits of teaching peer tutors to employ the SCL approach. If this approach is successful, it may define a more efficient means of providing support to students with learning disabilities in postsecondary settings. Further, possible implementations of SCL in group based instruction have yet to be examined. Extensions of the research are also required to assess SCL's effectiveness for younger students. Nonetheless, it is our view that the SCL approach warrants further investigation. We are encouraged by the consistent results we have achieved across 30 cases, with students with a wide range of abilities and difficulties, and across a number of different tasks. The diversity of students and tasks in these SCL studies bodes well for the robustness of the approach across students and models of support.

Issues Addressed in the Remaining Symposium Papers

Four papers follow this one in this coordinated symposium. First, Kamann and Butler (1996) present a more specific instructional analysis of the SCL approach. In this paper, they present results from a qualitative study of the roles SCL tutors play in guiding students to self-regulate learning. Their aims are to (1) advance theoretical understanding regarding the relationship between interactive instruction and students' development of self-regulation; (2) check on the consistency between the theoretical framework underlying SCL and SCL as implemented in practice; and (3) provide specific information about how SCL works for future training and dissemination efforts.

The next paper, by Allyson Hadwin (Hadwin, 1996) presents a description of the relationships between SCL and another instructional model designed to promote self-regulation in group based settings, Problem Based Learning (PBL). She describes how SCL and PBL are similar, but also what one approach can learn from research on the other. More specifically, she suggests that SCL implementations in group settings might draw from ideas in PBL, while the role of the tutor in supporting self-regulation during PBL could be informed by research on SCL.

In the third paper, MacLeod, Butler, & Syer (1996) take a look at methodological issues related to measuring outcomes in strategy training research. First, they argue that neither task performance nor students' mastery of specific strategy knowledge is enough to infer gains in metacognition or strategic processing. These, they suggest, are necessary but not sufficient outcomes of strategy interventions. They then turn their attention to analyzing approaches for assessing metacognition and strategy development more specifically. Based on a review of the literature and their experiences in SCL studies, they provide a list of guidelines for metacognitive measurement. They then provide a more specific description of the strategies for measuring metacognition developed as part of the SCL studies, their successes and limitations, and directions for future efforts.

Finally, in the last paper of this series, Butler and her research team (Butler et al., 1996) look more specifically at patterns of strategic processing for individual students, and explore whether there are individual characteristics that mediate students' successful participation in SCL. Because this last paper is based on an analysis of data from the studies described in this paper, we did not craft a completely independent paper. Instead, we build on the discussion provided already and attach an abbreviated paper below.

Notes

1 To avoid gender bias in descriptions in this paper, the pronouns "her" and "his" are used alternately.

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