

Investigating an Application of Strategic Content Learning:

Promoting Strategy Development in Group Contexts

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Running Head: Strategy Development in Group Contexts

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Much research has focused on defining instructional approaches that support students to take ownership and control over learning and that foster the development of self-regulation (e.g., Borkowski & Muthukrishna, 1992; Ellis, 1993; Harris & Graham, 1996; Pressley et al., 1995; Schumaker & Deshler, 1992). One instructional model designed to promote self-regulated learning is the Strategic Content Learning (SCL) approach (Butler, 1993; 1995; 1998-a). SCL was designed to support students to develop, master, and implement powerful, personalized learning strategies and to use those strategies flexibly and adaptively in the context of meaningful tasks.

Recent research on SCL has demonstrated the usefulness of the model for students with learning disabilities within postsecondary settings (Butler, 1993; 1995; 1998-c; Butler, Elaschuk, Poole, MacLeod, & Syer, 1997; Butler, Poole, Elaschuk, & Novak, 1999). In a series of parallel studies, Butler and her research team have adapted SCL instructional principles for use in the three most common service delivery models employed in colleges and universities. Four studies documented SCL efficacy when applied as a model for one-on-one tutoring by learning disability specialists, teachers, or counselors (Butler 1993; 1995; 1998-c). Two studies examined SCL efficacy as a model for peer tutor training (Butler et al., 1997). Finally, one study adapted SCL for use in group-based study skills courses (Butler et al., 1999).

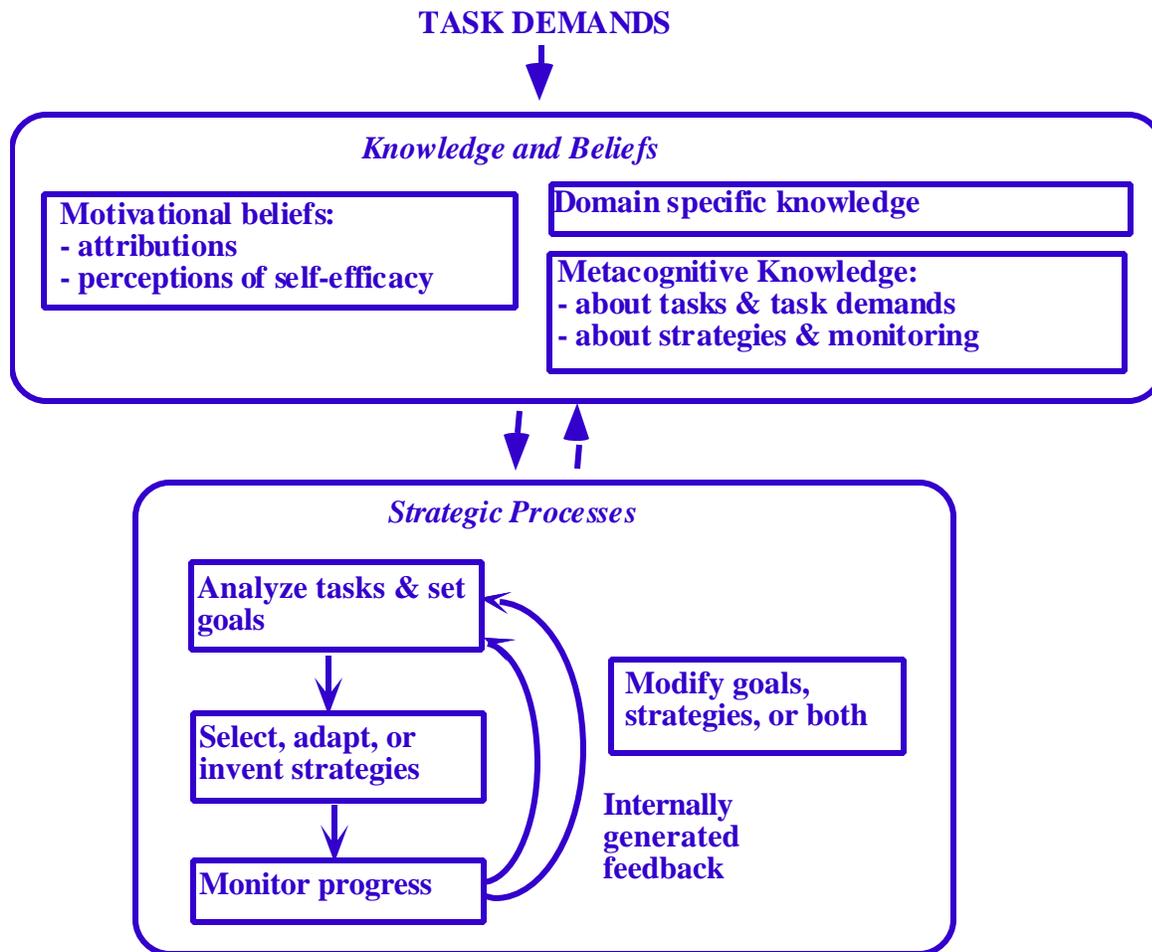
In this paper, we report findings from the most recent study in which SCL was adapted for use in group-based instructional settings. This paper (1) overviews positive outcomes associated with students' engagement in small group discussions structured according to SCL principles, (2) traces student and teacher contributions to provide a rich description of collaborative processes associated with students' construction of personalized learning strategies, and (3) summarizes implications for theory, research, and practice.

### Theoretical Base for the SCL Approach

Effective learners are self-regulating (Butler & Winne, 1995; Zimmerman, 1989; 1994). As depicted in Figure 1, self-regulated learners analyze task requirements, define criteria for successful performance, set realistic and productive goals, and then select, adapt, or even invent strategic approaches in order to achieve their objectives. Self-regulated learners also construct metacognitive knowledge and positive motivational beliefs over time, as they implement strategies across a variety of tasks, monitor progress, adaptively adjust approaches to learning, and associate success with their efforts. Thus, it appears that promoting self-regulation involves much more than just teaching strategies. Students must learn to engage in a broader cycle of cognitive activities that also includes task analysis and monitoring. And, students must be helped to construct metacognitive knowledge and motivational beliefs that "energize" strategic learning (Borkowski & Muthukrishna, 1992; Paris & Byrnes, 1989).

SCL shares many instructional characteristics with strategy training models proven successful when supporting younger students (e.g., Harris & Graham, 1996; Palincsar & Brown, 1984; Pressley et al., 1992). Instructional principles shared across models include (1) long-term and multi-dimensional instruction provided within naturalistic contexts, (2) explicit descriptions of task demands, strategies, and learning processes, and (3) opportunities for students to engage in interactive discussions about learning while engaged in meaningful tasks.

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



However, SCL research raises questions regarding the relationship between instruction and students' strategic development. At issue is the interplay between sociocultural contexts and individuals' construction of knowledge. In most strategy training models, Vygotsky's (1978) sociocultural theory of learning is interpreted to imply that students become strategic when they "internalize" cognitive processes first modeled by more competent others. Consistent with this conception of learning processes, the majority of instructional models start with direct explanation and modeling of strategies, followed by opportunities for guided, and then independent practice. Note, however, that students also are typically described as active learners who construct knowledge over time, building from current knowledge and beliefs (e.g., Harris & Pressley, 1991; Paris & Byrnes, 1989). Following from this description, most models also build in instructional components that promote active knowledge construction (e.g., opportunities for interactive discussions; applying strategies in the context of meaningful work). Nonetheless, it could be argued that the "internalizing" and "constructing" metaphors for learning processes are associated with different conceptions of learning (and correspondingly, different instructional approaches) (see Butler, 1998-b; Stone, 1998). Thus, reconciling or meaningfully integrating these two metaphors is key for enhancing theoretical understanding regarding how and why strategy training is effective, for learners in different contexts and at different ages.

SCL differs from most instructional models in that instruction does not begin with direct explanation or modeling of a set of predefined strategies. Instead, instructors provide calibrated support to students--using guiding questions--that assists them to self-regulate learning. Students are supported to analyze tasks, and then to discuss, try, and/or generate strategies to achieve desired objectives. Students try out and/or evaluate strategies they already know, monitor strategy effectiveness, maintain effective strategies, and then modify or drop strategy steps that do not work. As they refine or build strategies, students are often assisted to experience success (when instructors support students to think through tasks) and then to describe in their own words what they did that worked. Thus, in SCL, instructors do not explain or demonstrate strategies for students to internalize. Instead, instructors support students to think things through and then to describe effective cognitive activities in their own words.

Thus, the finding that SCL has been shown to effectively promote strategic learning and transfer, at least for postsecondary students with learning disabilities, challenges the notion that students must “internalize” task-specific strategies to develop better approaches to self-regulation. It could be argued that, in SCL, students “internalize” the kind of questioning modeled by instructors as they learn to self-regulate performance. This would suggest that, in SCL, social influences on the development of self-regulation include modeling as well as facilitative questioning. However, it also is clear that, in SCL, students do not have an opportunity to “internalize” strategy steps first explained and modeled by others. Thus, SCL efficacy suggests further inquiry is needed into the interplay between knowledge construction and internalization in the development of self-regulated performance. Again, the metaphors used to describe learning activities have powerful implications for instructional practice (Butler, 1998-b; Stone, 1998).

### Instructional Approaches in Postsecondary Settings

In postsecondary settings, two instructional strategies are commonly used to support students with learning challenges. Both provide support to students as an adjunct to regular classroom instruction. In one, students receive content area tutoring, where a peer or instructor provides explanations or descriptions of important concepts or skills. The second approach is the provision of study skills courses, which generally present a strategies curriculum. Each of these approaches has unique strengths, as well as limitations. The SCL model was designed to maintain the best elements of these models, while avoiding difficulties associated with each. SCL also incorporates instructional components found to be successful with school-age children (e.g., Harris & Graham, 1996; Palincsar & Brown, 1984; Pressley et al. 1992).

On one hand, the benefits of content area tutoring include that instruction is immediately relevant to students and assists them to complete important tasks. For example, a content tutor can clarify a key concept for a student who is studying for an impending exam. One limitation in this approach, however, is that it does not foster independence. For example, when students confront conceptual difficulties, they do not learn how to figure out the concept themselves. As a result, students may start to believe that, to be successful, they must rely on support from others. Further, students may not truly understand concepts or master skills if they are not provided with opportunities to work actively with the material and/or to construct understandings themselves.

On the other hand, study skills courses have the advantage that they focus on learning processes and trying to help students learn *how to learn*. However, when strategies are taught as a separate curriculum, a number of difficulties may arise. First, a strategies course diverts time and resources from students' attention to substantive courses. And, if strategy use is not directly related to students' other course work, the students may not perceive the strategies' relevance, know how to contextualize

strategies, or take ownership over strategy use. To avoid this difficulty, current models of strategy training (more prevalent in the K-12 school system) are careful to embed strategy instruction in the context of meaningful work and/or explicitly build in generalization activities (see Harris & Graham, 1996; Palincsar & Brown, 1988; Pressley et al., 1992). However, these instructional features rarely appear in postsecondary study skills courses. A second problem with study skills courses is that that instruction can be inefficient. While a given strategy may be effective for some individuals, it is unlikely to benefit all students (Swanson, 1990; Wong & Jones, 1982). Thus, in a study skills course, students may waste valuable time learning strategies that fail to meet their needs. A related problem is that the strategies taught in study skills courses are not individualized. Students, especially students with learning challenges, need strategies applicable to immediate tasks that are consistent with their strengths and address their particular challenges (Swanson, 1990; Wong, 1991).

Third, in many approaches to strategy training, exemplified by study skills courses, it is possible to question *who* is being strategic. Usually, it is the instructor and/or researcher who defines task requirements, identifies potentially effective strategies, outlines strategies as a series of steps (often with mnemonic devices), and then teaches these strategies to students. In this case, the teacher or researcher analyzes tasks and identifies potential strategies, while students are essentially excluded from the problem-solving process that is so central to strategic learning. As a result, students may not understand where strategies “come from”, or learn how to adapt and/or create strategies when faced with new or varying tasks (see Butler, 1995).

A final problem in study skills courses is the exclusive focus on teaching *strategies*. But, as noted earlier, strategic learning comprises a set of related activities, including not only strategy use, but also task analysis and monitoring. In fact, in a recent analysis, Butler (1999) found that 88% of students with learning disabilities (across 7 studies) had difficulties at pretest with analyzing task demands and/or articulating criteria for judging performance. She argued that, for these students, self-regulation was undermined, not only by problems in identifying and implementing strategies, but more fundamentally, by their misperceptions about task demands. She questioned how students can possibly self-direct learning activities if they are not sure what they are trying to do. Butler’s work suggests that strategy instruction alone is not sufficient, and that explicit attention to task analysis and monitoring are necessary to promoting self-regulation (see also Butler & Winne, 1995; Harris & Graham, 1996).

To redress these potential difficulties, and in light of the theoretical issues described earlier, SCL presents an alternative conception of instructional processes that leads to a de-emphasis on direct instruction of predefined strategies. In SCL, it is presumed that students construct idiosyncratic understandings about learning based on contextualized experiences with meaningful tasks, rather than “internalizing” abstracted understandings of strategies explained or modeled by others. At the same time, sociocultural contexts are thought to shape or set boundaries on the understandings students develop. Students make use of language and “tools” in sociocultural contexts as they struggle to make sense of experiences (Stone, 1998; Vygotsky, 1978). Further, it is presumed that, when students engage in instruction, they are not “self-regulating blank slates” (Butler & Winne, 1995). Rather, instructors work to shape students’ extant problem-solving approaches to construct better approaches to learning. To this end, instructors support students to identify or generate strategies designed to achieve specific and meaningful goals, based on an analysis of task demands. Instructors assist students to analyze task requirements, evaluate current approaches to learning, select, adapt, or even invent strategies that might meet task demands, monitor the efficacy of the strategies they choose, and to modify strategies adaptively. Over time, students are supported to construct, describe, and use personalized strategies that meet their individual needs. A brief summary of instructors’ roles in SCL is presented in Figure 2. More detailed descriptions are available elsewhere (see Butler 1993; 1995).

In this manner, SCL instruction is designed to merge students' learning of content with their development of strategies. As a result, SCL maintains the best of tutoring and study skills approaches while avoiding problems associated with each. Specifically, because students develop strategies while working through authentic tasks, SCL provides support that is immediately helpful and efficient. Students develop personalized strategies that are focused on required tasks, address their individual needs, and build on their strengths and successes. Students are supported to build knowledge about strategies when they are assisted to think through tasks (rather than being told what to do), when they participate in the process of strategy development, and when they abstract personalized understandings about strategies in the context of their actual work (Butler, 1995; 1998-c). Transfer is promoted by actively engaging students in strategy development and monitoring. This assists students to feel ownership over strategies (that they select or generate), perceive the relevance of strategies in immediate work, and associate positive outcomes with strategy use (see Butler, 1995). Finally, in SCL, students are placed in the position where it is they who must be strategic. Instructors support students to problem-solve strategies based on an analysis of task demands.

Figure 2. Instructors' Roles in SCL Instruction

† †	Engage students in collaborative problem-solving
† †	Assist students to select task exemplars based on meaningful work
† †	Support students to approach tasks <i>strategically</i> and to learn how to <i>independently</i>
?	? analyze task requirements
?	? select, adapt, or even invent strategies
?	? evaluate strategies
?	? revise strategies that aren't working
† †	Help students identify strategies that are practical, match their preferred ways of learning, and build from what they do well
† †	Help students think things through (rather than "telling them what to do")
† †	Actively guide students by asking questions
† †	Ask students to articulate and document strategies in their own words

### Adapting SCL for Group Settings

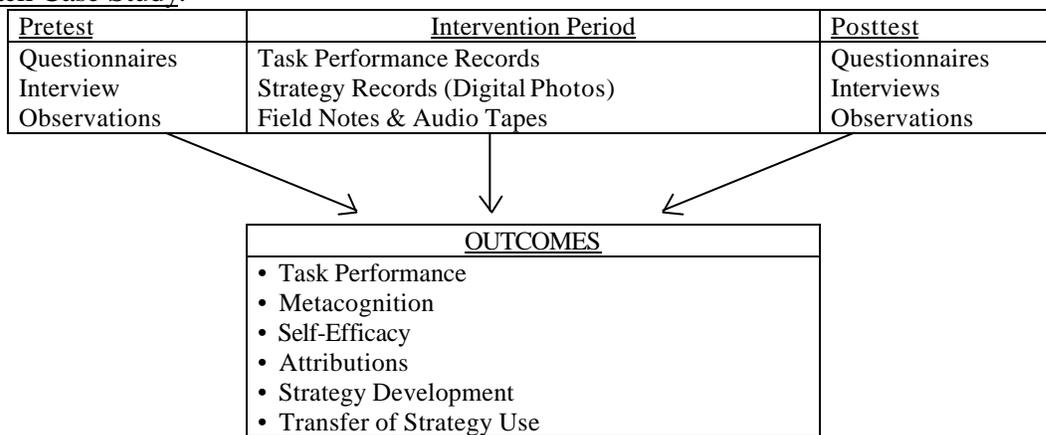
In initial studies, SCL was implemented as a model for one-on-one tutoring by counselors, teachers, or peers. In one-on-one tutoring sessions, instructors provided calibrated support to help students flexibly and adaptively self-regulate performance in the context of a variety of tasks (i.e., reading and studying, writing, or math). Each student selected one or more tasks to work on and brought actual assignments to sessions. Instructors engaged students in interactive dialogues focused alternately on task completion (e.g., writing an essay) and on the process of completing the task (e.g., task demands, writing strategies). Students also were consistently asked to articulate developing knowledge, about tasks, strategies, and all facets of learning, that would help them on subsequent tasks and across learning contexts (i.e., transfer).

Application of SCL principles in group contexts was similar but allowed students to capitalize on the benefits of both peer and instructor mediation. For this study, SCL was implemented in eight

small-group settings consisting of two to four students and one or two instructors. Within each group, students identified a common focus (e.g., building strategies for reading and studying more effectively), and task exemplars were drawn from group members' courses. As in the one-on-one tutoring sessions, discussion was structured around the complete cycle of self-regulated processes (e.g., starting with analyzing tasks, then selecting strategies that might be effective, building from students' extant approaches). An added dimension in small group contexts, however, was the opportunity for students to compare ideas with and support one another. Data were gathered to document both outcomes associated with participation in group sessions and to describe how strategic activity was co-constructed by the students and instructors in the groups.

Figure 3. Study Design: Multiple Parallel Case Studies Across Studies

Each Case Study:



The research questions addressed in this paper are the following: (1) What outcomes could be associated with students' participation in small groups structured using SCL instructional principles? (2) How did the instructional process work? In particular, how did students and teachers contribute in collaborative discussions to students' construction of personalized learning strategies? (3) How did students' strategy development build from what they already knew and respond to their individual needs? (4) Did students take an active role in developing strategies for themselves? Did students transfer strategy use across contexts or across tasks? (5) What did students think about the intervention, including what they gained in the process, the nature of SCL instruction, and the benefits and limitations of working with other students?

## Method

### Design and Procedures

In each study on SCL efficacy, a common research design has been employed (see Figure 3). First, to trace the relationship between instructional activities and students' development of self-regulation, in-depth case study data were collected for each participant (Merriam, 1988; Yin, 1994), and in this case, for each group. At the same time, multiple case studies were embedded within a pre-

post design. During pre- and posttest sessions, parallel questionnaires, observations, and interviews were employed to measure common effects across students (see Butler, 1993, 1995, 1998-c).

### Participants and Group Composition

Participants were recruited by advertising a “study skills” course at one University and an associated college in an urban area. The majority of participants were enrolled in academic courses at one of these two institutions (one participant was taking courses through distance education). In some instances, students from the college and university participated together.

Participants were assigned to one of 8 groups. Two to four students participated in each group. Seven groups focused on reading and studying ( $n = 21$ ). Note that one individual participated in two consecutive groups (so that the total number of “group members” was 22). The eighth group focused on writing. The three students in this group had all participated in reading and studying groups in previous semesters. Thus, there were 21 unique individuals who participated in the study, (but a total of 25 “group members”, counting individuals in more than one group). Eleven participants were female and 10 were male. Participants’ median age was 32 years old (ages ranged from 19 to 55 years). All participants provided evidence of long-standing academic difficulties, most frequently associated with learning disabilities.

In each session, task examples were drawn from participants’ actual work. At each meeting, students prioritized assignments based on course requirements, and SCL tutors provided calibrated assistance in that context. Instructors generally met with students twice per week (for two to four hours per week) over the course of a single semester. The study was conducted across four consecutive semesters. Across groups, the median number of sessions attended by students was 13 (and ranged from 3 to 19 sessions). The median time spent in intervention sessions was 19.50 hours (and ranged from 5.00 to 28.50 hours). Support was provided following the instructional principles outlined earlier.

### Measures

Outcome measures assessed students’ metacognitive knowledge about tasks, strategies, and monitoring, general and task-specific self-efficacy, attributions for successful and unsuccessful performance, and reading comprehension (for the seven reading and studying groups). Approaches to data collection for outcome measures are detailed below.

Metacognitive Knowledge. Students’ metacognitive knowledge was assessed using a Metacognitive Questionnaire (adapted from Graham & Harris, 1989; Wong, Wong, & Blenkinsop, 1989; see Butler, 1995) and evaluated across five dimensions: (a) task description (students’ conceptions of task requirements), (b) task quality (students’ criteria for judging task completion or task quality), (c) strategy description (the clarity of students’ descriptions of task-specific strategies), (d) strategy focus (the degree to which described strategies were focused, personalized, and *connected to task demands*), and (e) monitoring (students’ descriptions of how they self-evaluate progress and manage learning activities accordingly).

Self-Efficacy. Two questionnaires were used to assess students’ perceptions of self-efficacy. The Self-Efficacy Questionnaire (adapted from Graham & Harris, 1989; Wong et al., 1989; see Butler, 1995, 1998-c) contained scales that assessed students’: (1) perceptions of global self-efficacy (e.g., “I am a self-reliant person”); (2) confidence in their ability to complete task-specific skills (e.g., the ability to find main ideas while reading); and (3) self-perceptions of competence on task-specific skills (i.e., how easy or difficult they found task-specific skills). The Self-Efficacy Across Tasks Questionnaire

asked students to rate (1) how much difficulty they experienced with the primary task targeted for intervention; and (2) how much difficulty they experienced with a range of other academic tasks. Finally, one item on the Metacognitive Questionnaire assessed students' perceptions of self-competence. This item asked students to rate their ability on their targeted task.

Attributions. Students' attributions for successful and unsuccessful performance were assessed using a questionnaire with two sections. Students were asked to think of "the last time" they were successful (or, in the next section, unsuccessful) at completing targeted tasks, and to rate the relative importance of various factors to their level of performance: ability, strategy use, effort, relying on help provided by others vs. strategic help seeking, and luck (Groteluschen, Borkowski, & Hale, 1990; Relich, Debus, & Walker, 1986; Schunk & Rice, 1986; Weiner, 1974).

Reading Comprehension. Reading comprehension was assessed at pretest and posttest by means of reading comprehension probes. These probes each consisted of two comprehension passages (written at the grade 9 and 12 levels, respectively), each paired with 10 questions. The questions were parallel for each passage, included multiple-choice and short answer items, and targeted literal and inferential understanding. Comparability and internal consistency of the pre- and posttest probes were established in a pilot study.

During the intervention, data also were gathered to document instructional processes and students' strategy development. Data collection strategies were as follows:

Attendance Records & Group Summary Sheets. Records were maintained of student attendance and the duration of each session. The overall focus of each intervention also was recorded (e.g., administering pretests, introduction to the project, collaborative strategy development, administering posttests).

Strategy Development. At pretest and posttest, students participated in a strategy interview during which they were asked to describe task goals (what they were trying to do when approaching the task), criteria and strategies for judging desired performance, and the methods they used for accomplishing reading and studying (or writing) tasks. Immediately following the interview, students were observed completing an example task (drawn from their coursework) "as they normally would" while thinking aloud. Interviewers described observed strategies in field notes, and all oral responses were tape-recorded and transcribed.

During early intervention sessions, and when new tasks were encountered, students were asked to describe known strategies and were observed completing tasks before assistance was provided. This allowed instructors and students to identify students' strengths, problem areas, and current approaches to tasks. Then, as students developed strategies, they were asked to write down strategies in their own words. Students produced "strategy sheets" that served as records of strategy development and comprised advice to themselves about what they should do the next time they encountered a similar task. Thus, during interventions, data collected on students' strategy development included: copies or digital photographs of students' strategy sheets, traces of students' strategy use within and across session (e.g., notes, outlines, highlighted text), and instructors notes based on discussions about strategies as well as their observations of students' strategy use (on meeting record forms, see below).

Documenting Collaborative Processes. In each session, instructors used a common "meeting record form" to detail notes on the intervention in a series of categories. These included: task worked on (and from which student), records of task performance provided (e.g., quiz grades), a description of the process of strategy development (where students' strategies came from, who suggested ideas to

whom), and evidence for students' active use or development of strategies (within or outside of the session). When students developed strategy steps (recorded on their strategy sheets), not only did instructors take copies, but they also transcribed the steps onto a separate page and coded them as either emerging out of collaborative discussions (with a detailing of who assisted in that collaboration), or as having been developed independently by students (without assistance or input from other students or the instructor). Finally, instructors also made note of the difficulties students encountered (as observed by instructors or reported by students), as well as how the strategies were developed to target students' areas of need. Data available for analysis derived from instructors' field notes (i.e., on meeting record forms) and tapes of each intervention session.

Student Attitudes. Student attitudes towards SCL sessions were documented in two ways. First, instructors recorded comments students made during sessions on their meeting record forms. They also made note of students' apparent attitudes based on observations during sessions (e.g., this student seemed distracted today and did not actively participate in the session). Second, students participated in an exit interview where they answered four questions: (1) What do you think you gained by being part of this study? (2) Did you meet the goals you had at the start of the study? Why or why not? (3) How would you describe the process of intervention (how students and instructors worked together)? and (4) If you were to give us advice for the next time we run this program, what should we do again? What could we change? Students' responses to final interview questions were tape-recorded and transcribed.

### Data Analyses

Outcome Data (Reading Comprehension Probes & Questionnaires). Outcome data are reported for students in the reading and studying groups only. (There were not enough students in the writing group to make meaningful comparisons). Two scorers blind to students' identity and time of test (pretest/posttest) independently scored all short answer responses (to the Metacognitive Questionnaire and Reading Comprehension Passages) following criteria established in previous studies (see Butler, 1995; Poole & Butler, 1999). Metacognitive knowledge was assessed across five dimensions (see above) on a scale from 0 to 3. Scores on the reading comprehension probes were represented as a percentage correct, for short answer and multiple choice questions, separately. Interrater agreement was 88% and 86%, for the metacognitive questionnaire and reading comprehension probes, respectively.

Thematic Analyses: Attitudes, Strategy Development, Student-Instructor Interactions, and Transfer. All students were included in the thematic analyses (total  $N = 25$ ). Qualitative analyses were conducted to address research questions related to students' attitudes about SCL sessions, the process of students' strategy development, the quality of student-student and student-instructor interactions, and students' transfer of strategy use. All of these analyses involved a comprehensive and systematic review of attendance and session records, instructor field notes, traces of students' strategy use, and students' strategy records. Subsequent analyses of final interview transcripts provided additional evidence as well.

Review of Intervention Records. Qualitative analyses of session records, field notes, and strategy development data proceeded in three stages. In the first stage, three researchers were assigned to chronicle individuals' strategy development across time. For each student, one researcher pulled together a descriptive summary of the strategies students articulated at pretest, evolutions in strategies in each session, including the origin of each strategy step, and the final version of strategies. The researcher also provided an interpretive annotation for each session that described salient events. These strategy descriptions and annotations were systematically cross-checked and revised by a second researcher. Then, the chronicle of each student's strategies became an additional data source entered into the second phase of analysis.

In the second phase of analysis, one researcher was assigned to each group and charged with tabulating descriptive data. Evidence from the multiple sources outlined above was sorted into cells within a series of tables. The first three columns were the same in each table: The first column listed session numbers, so that scanning down a single column (across rows) presented a chronology of events. The second column listed the group members present at the given session, while the third column described the work addressed during that session (which student's work? what kind of task?). The remaining columns varied across tables, and were used to sort evidence into categories. Data were sorted into the following columns (with corresponding table numbers): Articulated attitudes, including attitudes towards working together, towards SCL sessions, or towards the instructional process (Table I); Collaborative Processes, including student/instructor relationships & processes, and student/student relationships and processes (Table II); Strategy Development, including a column for each group member, detailing students' goals, needs and problems, the evolution of pretest strategy steps, and the development of additional strategies (in Tables IIIa, b, and c, respectively); and evidence of strategy transfer (Table IV). One group's data served as the basis for development of this set of categories. Based on trial sorting of data for this one group across researchers, a list of criteria was developed to ensure consistency in data sorting. Then, once a first researcher completed tabulating the data for a group, a second researcher systematically reviewed the original data, confirmed the accuracy of table entries, and revised entries as necessary. This ensured that each table was constructed and reviewed by at least two researchers.

In addition to the tabulated evidence, the first researcher also constructed (and the second reviewed) a figure summarizing key information to provide an overview of patterns within each group (see Figure 4 for an example). This figure was cross-referenced with the tables and represented the following information visually (for each of the students within the group): sessions at which a student was present, sessions in which strategies were developed, strategy steps developed collaboratively or independently, including contributions of the students and instructor to each other's strategy development, and sessions with evidence of strategy transfer. Comparing these figures across groups facilitated identification of cross-case themes and patterns.

In the final phase of analysis, four researchers reviewed the tabulated data to identify themes that captured the data. To focus attention when constructing themes, the researchers examined data with an eye to answering four questions (linked to the research questions): (1) How did the instructional process work? How did students and teachers contribute in collaborative discussions to students' construction of personalized learning strategies? (2) How did students' strategy development build from what they already knew and respond to their individual needs? (3) Were students actively involved in strategy development? Did students transfer strategy use across contexts or across tasks?, and (4) What did students think about the intervention, including what they gained in the process, the nature of SCL instruction, and the benefits and limitations of working with other students?

To accomplish this, a first researcher reviewed the complete set of data and identified themes that answered all four research questions. As she identified themes, she associated each piece of evidence with those themes in a series of Excel tables. During this process, she completed a final (and independent) cross-check of the phase 2 table entries, and their correspondence to information in the figures. She provided feedback to the phase 2 researchers, who completed a final revision (so that the tables & figures were scrutinized three times in the end).

Concurrently with this first researcher, three other researchers were assigned to complete thematic analyses for questions 1, 2, or 3/4, respectively. Thematic analyses from the first researcher were then compared to those completed by the remaining researchers. To accomplish this, three researchers sat down together to critically evaluate the consistency between categories developed across researchers, the link between evidence and themes, and possibilities for collapsing or

differentiating categories. From this, they produced a set of themes and a list of associated evidence. As a final step, all four researchers reviewed the full set of themes for conceptual clarity and relationships and to develop the final set of categories. In the end, this three-phased, systematic, and laborious process enabled the researchers to develop a set of themes that were empirically validated, to evaluate the prevalence (distribution) of each theme, and to systematically relate each finding to the evidence on which it was based.

*Final Interviews.* Evidence for students' attitudes were derived from the thematic analysis (see above). In addition, these findings were triangulated (corroborated) with evidence from the final interviews. To analyze final interview transcripts, categories for coding student statements were derived from a review of the transcripts (in consideration of the research questions). Based on a subset of transcripts, two coders established coding criteria and established interrater reliability. These raters then independently coded the remaining transcripts (interrater agreement on transcripts coded independently was 84%).

Table 1. Changes in Metacognitive Knowledge for Reading and Studying Tasks.

Measure	n <sup>1</sup>	Pretest Means (SD)	Posttest Means (SD)	<u>t</u>	p< <sup>2</sup>	Effect Size
<u>Reading Tasks</u>						
Task Description	<b>20</b>	<b>1.45 (.89)</b>	<b>1.90 (.85)</b>	<b>-2.27</b>	<b>.02</b>	.51
Task Quality	<b>20</b>	<b>1.60 (1.05)</b>	<b>2.40 (.50)</b>	<b>-3.24</b>	<b>.002</b>	.76
Strategy Description	20	1.90 (.91)	2.20 (.95)	-1.30	.11	.32 <sub>∞</sub>
Strategy Focus	20	1.70 (.87)	2.00 (1.08)	-1.45	.08	.31 <sub>∞</sub>
Monitoring	20	1.90 (.64)	1.95 (.76)	-.25	.40	.07 <sub>∞</sub>
Average Rating	<b>20</b>	<b>1.66 (.53)</b>	<b>2.02 (.54)</b>	<b>-4.98</b>	<b>.000</b>	.68
<u>Studying Tasks</u>						
Task Description	<b>20</b>	<b>1.30 (.73)</b>	<b>2.10 (.97)</b>	<b>-5.14</b>	<b>.00</b>	.85 <sub>∞</sub>
Task Quality	<b>20</b>	<b>1.15 (.81)</b>	<b>1.85 (.88)</b>	<b>-2.57</b>	<b>.01</b>	.77 <sub>∞</sub>
Strategy Description	<b>20</b>	<b>1.55 (.95)</b>	<b>2.10 (.79)</b>	<b>-2.34</b>	<b>.02</b>	.58
Strategy Focus	<b>20</b>	<b>1.45 (.95)</b>	<b>1.90 (.91)</b>	<b>-1.83</b>	<b>.04</b>	.47
Monitoring	20	1.75 (.72)	1.80 (.83)	-.290	.37	.07 <sub>∞</sub>
Average Rating	<b>20</b>	<b>1.41 (.48)</b>	<b>1.88 (.57)</b>	<b>-3.95</b>	<b>.001</b>	.81 <sub>∞</sub>

<sup>1</sup> some data were missing, which accounts for differences in n's; <sup>2</sup> one-tailed; <sub>∞</sub> ES calculated using pooled SD

## Results & Discussion

Outcome Data (Reading Comprehension Probes & Questionnaires). Mean scores and standard deviations from outcome measures are presented in Tables 1 to 4. These data suggest that students' metacognitive knowledge about reading and studying increased between pre- and posttesting (see Table 1). Significantly, for both kinds of tasks, students gained in their ability to articulate task requirements and criteria for judging performance. Since effective task analysis is vital to successful performance, this

finding is practically important. Further, for studying tasks, students also increased in their knowledge about strategies and how to target strategies to task demands. Given that participants were older students with long-standing academic difficulties, it is encouraging that improvements in metacognition could be effected in a relatively short intervention.

Few consistent changes in attributional patterns were observed (see Table 2). The exception was that, at posttest, students were more likely to attribute successful performance to strategy use than they had been at pretest. Consistent with the metacognitive data, this suggests that students perceived the usefulness of strategies in the successful completion of tasks. Another finding, consistent with findings in previous research where SCL was used as a model for individualized tutoring (see Butler, 1995; 1998-a), was that students' perceptions of self-efficacy improved between pre- and posttesting, across a range of tasks (see Table 3). Finally, students' reading comprehension improved, as indicated by an improvement in responses to short answer questions (see Table 4).

Taken together, these data suggest that participation in SCL tutoring in a group-based instructional context could be associated with a number of positive and interrelated outcomes. Students appeared to construct knowledge and beliefs that have been shown to be supportive of effective learning processes (Borkowski & Muthukrishna, 1992; Paris & Byrnes, 1989), including metacognitive knowledge about tasks and strategies as well as more productive motivational beliefs (attributions and self-efficacy). Improvements in task performance could be conceptually related to positive changes in students' metacognition, self-efficacy, and attributions.

Table 2. Changes in Causal Attributions for Successful and Unsuccessful Performance.

Measure	n	Pretest Means (SD)	Posttest Means (SD)	t	p<1	Effect Size
<u>For Successful Performance</u>						
Ability	22	2.36 (1.05)	2.61(.93)	-1.21	.12	.24
Effort	22	4.18 (1.22)	4.23 (.61)	-.20	.42	.04
Help	22	3.14 (1.32)	3.02 (1.35)	.36	.36	.09 <sub>z</sub>
Luck	22	1.68 (1.17)	1.68 (1.00)	.00	.50	.00
Other	22	2.34 (1.15)	2.73 (1.28)	-1.31	.10	.32 <sub>z</sub>
Strategy	<b>22</b>	<b>2.76 (1.18)</b>	<b>3.33 (1.07)</b>	<b>-2.43</b>	<b>.005</b>	<b>.48</b>
<u>For Unsuccessful Performance</u>						
Ability	22	3.41 (1.22)	3.00 (1.07)	1.57	.07	.34
Effort	22	2.75 (1.40)	2.58 (1.29)	.25	.40	.12
Help	22	2.41 (1.47)	2.75 (1.41)	-1.10	.14	.23
Luck	22	1.41 (.85)	1.50 (1.01)	-.35	.37	.10 <sub>z</sub>
Other	22	2.57 (1.33)	2.62 (1.28)	-.14	.45	.04
Strategy	22	3.68 (1.43)	3.20 (1.24)	1.38	.09	.34

Table 3. Changes in Self-Efficacy for Reading and Studying Tasks.

Measure	n <sup>1</sup>	Pretest Means (SD)	Posttest Means (SD)	<u>t</u>	p< <sup>2</sup>	Effect Size
<b>READING TASKS</b>						
<u>Self-Efficacy Questionnaire</u>						
Global	22	3.22 (.74)	3.37 (.74)	-1.36	.09	.20
Task Specific Confidence	<b>20</b>	<b>2.68 (.74)</b>	<b>3.16 (.74)</b>	<b>-2.84</b>	<b>.005</b>	<b>.65</b>
Ratings of Task Ease	<b>20</b>	<b>2.57 (.59)</b>	<b>2.89 (.62)</b>	<b>-2.01</b>	<b>.03</b>	<b>.52</b> $\approx$
Ability Rating	22	2.45 (.91)	2.77 (.75)	-1.50	.07	.35
<u>Self-Efficacy Across Tasks</u>						
Own Task	<b>22</b>	<b>2.33 (.69)</b>	<b>3.09 (.77)</b>	<b>-3.46</b>	<b>.001</b>	<b>.93</b> $\approx$
Other Task	<b>22</b>	<b>2.22 (.59)</b>	<b>2.59 (.70)</b>	<b>-2.92</b>	<b>.004</b>	<b>.55</b> $\approx$
Total	<b>22</b>	<b>2.24 (.51)</b>	<b>2.72 (.67)</b>	<b>-3.41</b>	<b>.002</b>	<b>.75</b> $\approx$
<b>STUDYING TASKS</b>						
<u>Self-Efficacy Questionnaire</u>						
Global	22	3.22 (.74)	3.37 (.74)	-1.36	.09	.20
Task Specific Confidence	<b>20</b>	<b>2.64 (.72)</b>	<b>2.95 (.82)</b>	<b>-1.81</b>	<b>.04</b>	<b>.40</b> $\approx$
Ratings of Task Ease	<b>20</b>	<b>2.42 (.64)</b>	<b>2.81 (.61)</b>	<b>-2.54</b>	<b>.01</b>	<b>.61</b>
Ability Rating	22	2.45 (.91)	2.77 (.75)	-1.50	.07	.35
<u>Self-Efficacy Across Tasks</u>						
Own Task	<b>22</b>	<b>2.33 (.69)</b>	<b>3.09 (.77)</b>	<b>-3.46</b>	<b>.001</b>	<b>.93</b> $\approx$
Other Task	<b>22</b>	<b>2.22 (.59)</b>	<b>2.59 (.70)</b>	<b>-2.92</b>	<b>.004</b>	<b>.55</b> $\approx$
Total	<b>22</b>	<b>2.24 (.51)</b>	<b>2.72 (.67)</b>	<b>-3.41</b>	<b>.002</b>	<b>.75</b> $\approx$

<sup>1</sup> some data were missing, which accounts for differences in n's; <sup>2</sup> one-tailed;  $\approx$  ES calculated using pooled SD

Table 4. Changes in Task Performance (Reading Comprehension).

Passage	n <sup>1</sup>	Pretest Means (SD)	Posttest Means (SD)	<u>t</u>	p< <sup>2</sup>	Effect Size
Passage 1 (grade 9 level)	<b>18</b>	<b>11.22</b> (3.04)	<b>12.50</b> (3.09)	<b>-2.54</b>	<b>.01</b>	<b>.41</b> $\approx$
Passage 2 (grade 12 level)	18	10.06 (2.88)	11.39 (3.43)	-1.45	.08	.42 $\approx$
TOTAL	<b>18</b>	<b>21.28</b> (4.54)	<b>23.89</b> (6.01)	<b>-2.59</b>	<b>.009</b>	<b>.48</b> $\approx$
Short Answer Questions	<b>18</b>	<b>1.58</b> (.468)	<b>1.98</b> (.663)	<b>-3.80</b>	<b>.0005</b>	<b>.67</b> $\approx$
Multiple Choice Questions	18	.72 (.115)	.68 (.171)	.96	.17	-.27 $\approx$

<sup>1</sup> some data were missing, which accounts for differences in n's; <sup>2</sup> one-tailed;  $\approx$  ES calculated using pooled SD

Thematic Analyses: Attitudes, Strategy Development, Student-Instructor Interactions, and Transfer. Results from the thematic analyses are presented in Tables 5 to 8, each of which answers one of the main questions addressed in this study. These tables include a listing of main themes, as well as an indication of the theme's prevalence (i.e., the number of students who expressed an idea, the number of groups in which the idea was expressed, and the number of pieces of evidence sorted under that theme). Examination of these tables suggests several important conclusions. Below, key results will be summarized for each research question separately. Illustrative evidence is also included to clarify main findings.

*How did the instructional process work? In particular, how did students and teachers contribute in collaborative discussions to students' construction of personalized learning strategies?*

Table 5 presents a summary of themes describing the process of SCL intervention. Results showed that students in collaborative groups frequently provided support to one another while completing authentic tasks and developing strategies in that context. Students supported each other by asking questions, offering suggestions, and exchanging ideas equally. Students also were observed to share strategy steps and to actively adapt others' strategies to meet their own needs. Prevalence data showed that, out of 393 pieces of evidence extracted from field notes and strategy records that related to the process of SCL intervention (detailing instructor and student interactions), 203 (52%) documented ways in which students assisted one another. Mutually supportive interactions were experienced by every student and within every group.

A related finding was that students often developed strategies while working on others' tasks. For example, in session 6, both Kevin<sup>2</sup> and Lily (group 6) developed strategies for themselves while collaboratively working on one of Leanne's assignments. Students also reported that they benefited from watching others complete tasks, and that helping others led to improvement in their own strategies. Finally, students sometimes developed new strategies for themselves while working to meet others' immediate needs (e.g., for time management).

Evidence also suggested that instructors played several roles in promoting students' strategy development. Most frequently, instructors actively collaborated with students during task completion and strategy development. Instructors assisted in the generation of ideas (most often by asking questions). Instructors sometimes transcribed students' strategies, if students chose not to write themselves. On rare occasions, instructors also worked one-on-one with students (following SCL instructional principles), generally when only one group member came to class. Alternative roles played by instructors, less frequently, included structuring discussions or setting hypothetical tasks (if no one brought task examples to class).

Table 5. Thematic Analysis: Strategic Content Learning (SCL) Process.

Themes	Groups n=8		Participants n=25		Instances n=393	
<p><b>1) STUDENTS SUPPORTED EACH OTHERS' STRATEGY DEVELOPMENT</b></p> <ul style="list-style-type: none"> <li><i>☞</i> Students asked each other questions</li> <li><i>☞</i> Students offered each other suggestions about strategies and task ideas</li> <li><i>☞</i> Students shared ideas equally</li> <li><i>☞</i> Students shared personal experiences</li> <li><i>☞</i> Students worked through tasks together</li> <li><i>☞</i> Students actively adapted another's strategy</li> </ul>	8	100%	25	100%	203	52%
<p><b>2) INSTRUCTOR COLLABORATED IN THE DEVELOPMENT OF STRATEGIES</b></p> <ul style="list-style-type: none"> <li><i>☞</i> Instructor assisted in generating ideas for tasks or strategies</li> <li><i>☞</i> Instructor asked questions that contributed to strategy development</li> <li><i>☞</i> Instructor helped students record effective strategies</li> <li><i>☞</i> Instructor sometimes provided one-on-one support</li> </ul>	8	100%	24	96%	122	31%
<p><b>3) STUDENTS DEVELOPED STRATEGIES WHILE WORKING ON OTHER'S TASKS</b></p> <ul style="list-style-type: none"> <li><i>☞</i> Students benefited from watching others</li> <li><i>☞</i> Students helping others led to improvement of their own strategies</li> <li><i>☞</i> Students developed strategies because of other students' needs</li> </ul>	8	100%	18	72%	45	12%
<p><b>4) GROUP PROCESS WAS FACILITATIVE WITHIN A "CARING" CONTEXT</b></p> <ul style="list-style-type: none"> <li><i>☞</i> Students had opportunity to show competence/strengths</li> <li><i>☞</i> Students were open to sharing problems</li> <li><i>☞</i> Students supported each other through stress and anxiety</li> <li><i>☞</i> Students congratulated each others' accomplishments</li> <li><i>☞</i> Instructor congratulated students' accomplishments</li> </ul>	4	50%	6	24%	9	2%
<p><b>5) INSTRUCTORS SOMETIMES TOOK ON ALTERNATE ROLES</b></p> <ul style="list-style-type: none"> <li><i>☞</i> Instructor contributed by structuring discussion</li> <li><i>☞</i> Instructor set tasks</li> <li><i>☞</i> Students were sometimes helped more by the instructor than others</li> </ul>	6	75%	4	16%	9	2%
<p><b>6) STUDENTS WERE SOMETIMES NOT ENGAGED IN COLLABORATIVE PROCESS</b></p> <ul style="list-style-type: none"> <li><i>☞</i> Students did not always take others' suggestions</li> <li><i>☞</i> Students did not provide suggestions to others</li> <li><i>☞</i> Strategy development process sometimes was not reciprocal</li> </ul>	3	37%	3	12%	5	1%

Although the bulk of evidence pointed to positive interactions between students, group dynamics were variable. In some groups, students' contributions to one another were frequent and reciprocal (in groups 1, 4, 5, 7, & 8, particularly). Perhaps the best rapport was developed in group 5. In the last part of the semester (the last 5 sessions), students in that group developed strategies together without assistance from the instructor. However, in a few groups, individual conflicts and personal styles interfered with effective collaboration. For example, in group 2, three of the students (Perry, Angela, and Marc) worked very well together, while the last student (Lionel) was more withdrawn. Although Lionel sometimes contributed ideas that helped other students, he rarely accepted ideas suggested by others. In the end, his strategies were refined or created either independently or with the instructor. In group 6, one student (Kevin) had mixed feelings about group participation. In some sessions he was very positive and appeared to cooperate readily with others. In other sessions, he appeared impatient or distracted when taking time to complete others' work (or to deal with their misunderstandings). Finally, the dynamics in group 2 were perhaps the most strained. Two of the three students actively disliked one another (substantiated in posttest interviews) and did not work together effectively. As a result, even when students in this group shared ideas, suggestions rarely appeared in formal strategy descriptions. In contrast, steps developed with instructors frequently were incorporated. Figure 4 presents an example of one of the figures developed to summarize group interactions. This data illustrates how instructors and students worked together across sessions in group 8.

*How did students' strategy development build from what they already knew and respond to their individual needs?*

Themes related to this research question are presented in Table 6. Thematic analyses suggested, first, that pretest assessments and group discussions were helpful in targeting individuals' goals, strengths, and needs. Evidence for this conclusion derived both from instructor observations and students' descriptions of their own learning processes (during pretest interviews and subsequent sessions). In some cases, students' strengths were revealed when they helped other students. For example, Lionel (group 2) revealed his strengths in math and physics when helping others in those areas. Susie (group 8) drew on her science background to help Joanne with her biology. Similarly, Alex (group 4) shared his strengths in time management with other members of his group. Students also recognized their strengths over time as they started to experience learning successes. For example, in session 4, Scott (group 8) was pleased to report that he could better understand the meaning of paragraphs. In session 14, Lily (group 6) was pleased with her improvements in comprehension. In many cases group interactions served to highlight areas where students needed improvement. This focus on difficulties was constructive in the collaborative group context, however, because uncovering students' problems allowed for construction of strategies that responded to their individual and immediate needs.

Results also showed that all students were able to articulate at least some strategy steps at pretest, even if they judged their strategies to be inadequate (which was what motivated them to join the study). This finding supports the conclusion that students were not self-regulating "blank slates" prior to intervention (Butler & Winne, 1995). Students offered many ideas regarding how to approach tasks, what worked best for them, and where they needed improvement. At the same time, as noted above, participating in collaborative group discussions often helped students fine tune their understandings of just where their strengths and difficulties lay.

Another conclusion supported by the thematic analysis was that during the intervention, students built strategies from what they already knew. Tracing the fate of students' pretest strategies over time showed that students retained the majority of their strategy steps, although students were likely to extend their strategies so as to render them more effective. In a smaller number of cases, students refined extant steps to make them more focused, specific, or clear. In only a few cases did students

completely abandon initial strategies and adopt a superior approach. One example of this type of change came from Sheila (group 1), who replaced her strategy for reading poetry with one that allowed her to better extract themes. Similarly, Alex (group 4) judged his pretest strategies to be “hasty” and changed how he approached reading tasks. Finally Kevin (group 6), who initially approached reading tasks by skimming for bolded words (only), revised his strategy to include reading the introduction and finding the main idea in each paragraph. Nonetheless, for the most part, students’ pretest strategies were either refined (e.g., made more specific or focused) or extended (i.e., by adding steps to what was already there), thereby building from, rather than overwriting, strategies that they already knew.

Table 6. Thematic Analysis: Process of Strategy Development.

Themes	Groups n=8		Participants n=25		Instances n=571	
<b>1) DISCUSSION IN THE GROUP CONTEXT TARGETED INDIVIDUALS’ NEEDS</b> <i>☞☞ Targeted students’ areas of strength</i> <i>☞☞ Targeted students’ areas of difficulty</i> <i>☞☞ Fostered students’ awareness of their own strengths, needs, and task demands</i>	8	100%	25	100%	141	25%
<b>2) STUDENTS HAD “PRE-INTERVENTION” STRATEGIES THEY OFTEN RECOGNIZED AS LIMITED</b> <i>☞☞ Students articulated strategy steps at pretest</i> <i>☞☞ Students kept pretest strategy steps that worked</i> <i>☞☞ Students modified some pretest strategies</i> <i>☞☞ Students extended some pretest strategies by adding steps</i>	8	100%	24	96%	90	16%
<b>3) STUDENTS DEVELOPED STRATEGIES IN VARIOUS AREAS ADDITIONAL TO THEIR CHOSEN TASKS</b>	7	88%	20	80%	91	16%
<b>4) ON AN ONGOING BASIS, STUDENTS JUDGED THE EFFECTIVENESS OF THEIR OWN STRATEGIES, LINKED STRATEGIES TO OUTCOMES, AND MADE CHANGES AS NEEDED</b>	7	88%	14	56%	35	6%

*FURTHER THEMATIC ANALYSES CROSS-REFERENCING INDIVIDUAL NEEDS TO STRATEGY DEVELOPMENT REVEALED....*

**STRATEGY DEVELOPMENT WAS LINKED TO STUDENTS’ PERCEIVED DIFFICULTIES AND NEEDS:**

- ☞☞ Students refined articulated pretest strategies*
- ☞☞ Students developed strategies to match task demands*

During sessions, students constructed a variety of strategies (not just limited to strategies for chosen tasks). For example, students in groups focused primarily on reading and studying still had to write papers, and instructors assisted students to develop strategies for completing pressing assignments. Another common issue of concern to many students was time management and organization. In 7 out of the 8 groups, attention focused on developing strategies for work and time management. These findings suggest, again, that SCL was responsive to participants' needs. Not only were strategies responsive to students' learning difficulties, but they also were tailored for individuals to meet their course demands.

Observations suggested that, central to students development of strategies was the key cognitive activity of monitoring (see Figure 1). Students were observed to judge the effectiveness of strategies, to link strategy use to outcomes, and to determine the need for strategy adjustments. For example, in session 20, Garry (group 1) judged his poetry re-reading strategy to be helpful. In session 3, Alex (group 4) recognized that his previous strategies led him off track. In session 17, Haley (group 5) associated her "A" grade on an English assignment with her use of her task analysis strategy. Similarly, in session 17, Joanne (group 7) credited her writing strategy for upping her marks "by a full grade". This evidence suggests that students monitored outcomes associated with strategy use, were pleased when outcomes were positive, but recognized the need to change strategies when outcomes were not as planned.

A last step in the thematic analyses for this question was to cross reference the list of students' goals, strengths, and needs with the strategies they actually developed. This analysis was necessary to evaluate whether and how the strategies developed met individual needs. Results suggested that all students did revise or build strategies responsive to their areas of difficulty and task requirements. For example, Warren (group 1) was observed as early as pretest to have difficulty interpreting instructions to word problems. To redress this problem area, Warren's revised reading and studying strategies included steps focused on interpreting quiz/homework questions. Similarly, Sheila's goal at pretest was to understand the themes in poetry. Correspondingly, many of Sheila's new strategy steps helped her analyze poems "as a whole" rather than as a series of fragmented sentences.

*Did students take an active role in developing strategies for themselves? Did students transfer strategy use across contexts or across tasks?*

Table 7 reports findings related to students' active use and transfer of strategies. Thematic analyses showed that 68% of students independently employed previously developed strategies in the context of subsequent sessions. Further, at least 32% of students transferred strategy use across contexts (i.e., at home, in other classes). Finally, 88% of students independently generated strategy steps and/or adapted others' strategies for use in their own work. Taken together, these data document students' involvement in strategy development. Students were actively involved in selecting and/or generating strategies and used strategies across contexts and time.

Nonetheless, it would probably be inaccurate to suggest that students learned *how to self-regulate* during SCL intervention. As noted earlier, students brought strategies to the intervention context and had some sense of their usefulness. Further, evidence shows that students started to generate strategies steps early in a semester. It is unlikely that students learned *how to generate strategies* by the second or third session. In contrast, evidence is supportive of the conclusion that SCL assisted students to focus strategic efforts more effectively. Students were assisted to judge extant strategies by monitoring outcomes (in light of task demands) and to fine tune strategies accordingly.

Table 7. Thematic Analysis: Strategy Use and Transfer.

Themes	Groups n=8		Participants n=25		Instances n=128	
<b>1) STUDENTS ACTIVELY USED PREVIOUSLY DEVELOPED STRATEGIES WITHIN CURRENT SESSIONS</b>	8	100%	17	68%	59	46%
<b>2) STUDENTS ACTIVELY AND INDEPENDENTLY CONSTRUCTED STRATEGIES</b> <i>☞ Students independently generated strategy steps</i> <i>☞ Students actively and independently adapted another's strategies</i>	8	100%	22	88%	58	45%
<b>3) STUDENTS ACTIVELY USED STRATEGIES THEY DEVELOPED ACROSS CONTEXTS AND OVER TIME</b>	3	38%	8	32%	11	9%

*What did students think about the intervention, including what they gained in the process, the nature of SCL instruction, and the benefits and limitations of working with other students?*

Thematic analyses of student attitudes suggested that, in general, students were positive about participating in sessions (see Table 8). Most students were happy with outcomes observed (e.g., improved test scores) and with strategies that they developed. Students also described enjoying sessions and working collaboratively with other students. They felt they benefited from working together, sometimes because they learned from others, sometimes because they themselves helped someone else. Finally, students sometimes enjoyed sharing their personal experiences and realizing that they weren't alone. Several of these themes are reflected in the following quotes, extracted from transcripts of students' final interviews:

We'd all study together and help each other out by giving opinions on how to approach the work... it's like everybody's own opinions on how to conquer the subjects and assignments... it's good to see other people who have trouble too... it made me see I'm not just by myself (Angela, group 2).

I think they [other group members] learned from me. Like, when I gave Joanne an idea, she flew with it. And I saw that I benefited someone and that was rewarding. Getting feedback on how to solve things was even better (Susie, group 8).

We'd be reading Scott's stuff and I'd get it right away and he wouldn't. That would help me reflect on why I got it and they didn't... I liked it when on my stuff people didn't understand and I had to explain it. (Joanne, group 8).

However, students sometimes had reservations while participating in group sessions. At times, students felt awkward about exposing their problem areas. For example, one student said "I was so desperate and I think everyone around me knew that and knew that I needed a lot of help." In other cases, students expressed uncertainty about their progress or ability to complete tasks. For example, in session 6, Hannah (group 3) worried that she was still missing important information while reading. In session 21, Margaret (group 3) recognized that some of her strategies were not working and that she

needed to modify them. In session 6, Kevin (group 6) was discouraged when trying to find main ideas. In session 8, Lily (group 6) was concerned that she would slip back into her old, less effective, study habits. Thus, it appears that, during sessions, students struggled with their approaches to learning. They were keenly aware of their learning difficulties and histories and needed to build confidence in their new approaches to tasks.

Table 8. Thematic Analysis: Students' Attitudes and Perceptions.

Themes	Groups n=8		Participants n=25		Instances n=86	
<b>1) STUDENTS MOST OFTEN WERE POSITIVE ABOUT PARTICIPATING IN THE GROUP SESSIONS</b> <i>✍✍</i> Students were positive about the outcomes associated with the intervention <i>✍✍</i> Students were positive about the process in class and/or the discussion <i>✍✍</i> Students were positive about working with others <i>✍✍</i> Students were positive about sharing personal experiences	8	100%	16	64%	55	64%
<b>2) STUDENTS SOMETIMES EXPRESSED AMBIVALENCE ABOUT PARTICIPATING IN THE SESSIONS AND OUTCOMES OF THE PROCESS</b> <i>✍✍</i> Students expressed uncertainty about the outcomes and/or their progress <i>✍✍</i> Students sometimes expressed ambivalence about working with others	6	75%	10	40%	25	29%
<b>3) STUDENTS WERE SOMETIMES NEGATIVE ABOUT THE PROCESS AND ABOUT WORKING WITH OTHERS IN THE GROUP SESSIONS</b>	4	50%	4	25%	25	29%
<b>4) STUDENTS' ATTITUDES SOMETIMES SHIFTED ACROSS SESSIONS</b>	1	13%	2	8%	3	4%

Finally, four students responded negatively to working with others in groups. For example, Kevin (group 6) often seemed impatient when waiting for Lily, while Lionel (group 2) was reluctant to work with other students. Leanne (group 6) stopped attending sessions half-way through the semester because she felt sessions were not focused enough on her needs. However, it should be noted that even these students, who were at times negative about participating, also recognized benefits of working in groups. For example, although Kevin often appeared restless when working slowly for Lily, in session 5, he described how useful it was to develop strategies while working on others' materials. Similarly, although Leanne dropped out after session 7, she worked positively with other students during previous sessions.

Thus, it appears that most students enjoyed working in groups and felt they gained from the experience. At the same time, in the fast paced semesters common in university and college environments, students continued to be hard-pressed to keep up with demands. Students' frustration and anxiety often appeared within sessions, especially during exam periods. Finally, group collaboration is not always without problems, and students recognized difficulties in sessions. Group 3 students

experienced personality conflicts that interfered with their learning. Other students, like Kevin, found it hard to be patient with others. Students also sometimes became discouraged if their grades did not improve as quickly as they hoped or they continued to struggle at the end of the term.

### Conclusions and Implications

Results presented in this paper suggest that the SCL provides a viable model for supporting students with learning challenges in postsecondary settings. Participants experienced positive outcomes that could be associated with intervention. These included improvements in task performance, metacognitive knowledge about tasks and strategies, perceptions of self-efficacy, and attributions for successful academic performance. Students also were observed to be actively involved in strategy development and to use strategies independently. Thus, it appears that SCL builds on the best of content tutoring and study skills training to support students' development of self-regulation. Further, SCL appears to be adaptable to varying service delivery structures commonly used in colleges and universities. Previous research demonstrated SCL efficacy when used during one-on-one tutoring, as an alternative to content tutoring (Butler 1993; 1995; 1998-c). This study documents SCL efficacy when used to reframe activities in study skills courses.

Thus, evidence gathered as part of this study suggests that SCL is effective. Note that, in this study, internal validity was established by associating outcomes with the intervention, rather than by comparing outcomes across groups of students. For example, in any given case, it was possible to trace the relationship between pretest strategies and task performance, students' understandings about their strengths and needs, evolutions of strategy steps, applications of strategies, and shifting outcomes associated with strategy use. Nonetheless, it could be argued that other variables accounted for some of the outcomes observed. Thus, it would be beneficial to complement this study with additional research employing alternative designs.

SCL instructional principles are theoretically linked to those undergirding empirically validated instructional models more prevalent in the K to 12 school system, such as Self-Regulated Strategies Development (Harris & Graham, 1996), Reciprocal Teaching (see Palincsar & Brown, 1988), or Transactional Strategies Instruction (Pressley et al., 1992). These models share with SCL a focus on helping students build and apply strategies flexibly in the context of meaningful work, recognition of the importance of interactive dialogue in students' mastery of task-approach strategies, and attention to ways in which students construct understandings about tasks, strategies, factors responsible for successful performance, and their self-competence as learners. This study adds to a substantial body of evidence suggesting that these instructional features can be effective in promoting students' self-regulated processing.

At the same time, SCL is unique among these models in that direct explanation and modeling of strategies are not central to instruction. In SCL, students are viewed as active constructors of knowledge and skill in the pursuit of meaningful goals. Teachers and peers are thought to support students' construction of improved knowledge and skill by offering language for making sense of experience, as well as ideas regarding tasks or strategies that might help during task performance. However, students are considered to construct idiosyncratic understandings of others' contributions as they make sense of their own learning experiences. Previous SCL research provided some evidence for these instructional mechanisms (see Butler, 1993; 1995). Thematic analyses presented in this paper provided a general view of how SCL worked in group-based instructional settings. While previous research had documented SCL efficacy when used by instructors one-on-one (Butler, 1993; 1995; 1998-c), this study describes how adding peers to the mix positively supported students' strategy development. In spite of the challenges that arise when students must work together collaboratively, overall, students appeared to share ideas productively and to enjoy interacting with one another.

Other findings from thematic analyses presented here either supported assumptions underlying the SCL model and/or showed how activities in sessions conformed to SCL instructional principles. For example, consistent with expectations, students did come to the study with pretest strategies, as well as knowledge and beliefs regarding learning processes. This suggests that students were not blank slates, who needed to start over in developing strategies. Further, students were observed to construct strategies that built from extant approaches and strengths while responding to their areas of difficulty. This suggests that sessions served to foster students' construction of personalized strategies that met their individual needs. Students were actively involved in generating strategies, which is definitional of SCL. Students also were engaged in monitoring strategies against outcomes as they generated better approaches to tasks.

In conclusion, it could be argued that results from this study have implications for both practitioners and researchers. Practically speaking, the study adds to an accumulating body of evidence documenting SCL efficacy in postsecondary settings. SCL also appears adaptable to instruction in varying service delivery models common in colleges and universities (e.g., one-on-one or small group instruction). Theoretically speaking, this research contributes to the continuing discussion regarding essential qualities of strategies instruction. Findings of SCL efficacy highlight the need to scrutinize further mechanisms underlying instructors' and peers' contributions to students' development of self-regulation.

### Notes

<sup>1</sup> When a student participated in more than one group, data included their age at the beginning of the first semester and the average number of sessions and time spent across the two studies.

<sup>2</sup> All names are fictional.

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