

Bringing a Learning Strategies Project to Scale in a First-Year Seminar

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Abstract: This paper describes the impact of a learning strategies intervention conducted in first-year seminar courses that, 1) disaggregated components of academic skills into meaningful components for first-year students, 2) taught students academic skills within an authentic context, and 3) scaled-up the intervention for implementation at a programmatic level. This work is grounded in research on metacognition, self-regulation, and motivation, as well as literature on the academic transition to college. Results reinforced earlier findings indicating significant improved use of metacognitive learning strategies, even when the intervention was expanded to include multiple instructors in multiple course sections. Further research is needed to determine the precise factors precipitating improvement when the project was brought to scale.

Keywords: first-year seminar, metacognition, self-regulated learning, learning strategies

Teaching academic skills in a first-year seminar has been an established practice for several years. In the National Resource Center's 2012-2013 National Survey of First-Year Seminars (NSFYS), developing academic skills was reported as the third most common course objective after developing a connection to an institution and orienting students to campus resources (Young & Hopp, 2014). A precise description of what is meant by "academic skills," however, varies tremendously, depending on the course characteristics and institution type. Four-year colleges often include critical thinking skills, motivation, time management, oral communication, and faculty-student communication as academic skills. Two-year colleges might include the development of study skills, academic planning, grammar, and note-taking (Young & Hopp, 2014). Acquiring these skills is important for college success; however, designing adequate curricula is challenging for first-year seminar programs given the vast range of learning skills and study habits of beginning college students (Balduf, 2009).

The present paper presents the results of an implementation of a learning strategies project in a three-credit hour, letter-graded first-year seminar conducted first as a pilot study and then scaled-up for implementation in several course sections, with an eventual goal of implementation in an entire First-Year Seminar Program. The Strategy Project assignment (see Appendix) is unique in that it disaggregates "academic skills" into component parts that enable the first-year student to understand the differences and relationships between time management, motivation, study skills, and metacognition. Furthermore, the Strategy Project is context-specific: to complete the project, students plan, study, and reflect on their

planning for and execution of an exam taken in another course, thus providing learners with an authentic context for developing specific academic skills. The research study described herein was guided by the question: Does the Strategy Project impact first-year students' self-regulation and metacognition strategies as measured by the Motivated Strategies for Learning Questionnaire (MSLQ) and self-reported strategy use when brought to scale for a large first-year seminar program?

Literature Review

Research on self-regulated learning has a long history in the educational psychology literature, originating from work by Zimmerman, Schunk, Pressley, and others on goal setting, motivation, and strategy use (Zimmerman, 2008). As Zimmerman (2008) notes, a self-regulated learner is one who is motivated, reflective, and proactive in his use of learning strategies. For college students, self-regulation of learning strategies involves taking the initiative to learn and implement appropriate strategies for the task, set goals for learning, and reflect on one's approach, modifying it for the next task if necessary. Metacognition, most commonly defined as the knowledge and regulation of one's own cognition, is closely related to self-regulation in that a metacognitive student is aware of what she does and does not know, and plans for, monitors, and reflects on the acquisition of that knowledge. Students exhibit good metacognitive behaviors when they choose and use appropriate learning strategies for the task at hand and reflect on the results of their efforts.

Self-regulating and metacognitive behaviors are proven predictors of academic success (Pintrich & DeGroot, 1990). However, many first-year students have not yet developed metacognitive and self-regulated learning strategies that are sufficient for success in their new academic environment. In college, learning strategies that go beyond memorization and passive knowledge acquisition are essential, as students who use higher-level metacognitive strategies tend to be more successful in their courses (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2013; Kitsantas, 2002). For example, students who are taught to monitor their comprehension and evaluate their learning as they read show deeper processing of the material and better retention than students who passively read the text (Nash-Ditzel, 2010). In addition, first-year students who successfully manage their time and seek out existing resources show greater achievement in the first year (Thibodeaux, Deutsch, Kitsantis, & Winsler, 2017; Tuckman, 2003).

Many students enter college believing that they are prepared for this challenge due to their success in high school (Balduf, 2009). However, because learning tasks at the college level require different skills and greater personal responsibility for managing those skills, many high school students begin to show deficits in these abilities once they reach the college level (Cohen, 2012). This is not limited to poor performing students. While some students may have better self-regulation strategies than their peers in middle and high school (e.g., Zimmerman & Martinez-Pons, 1990) those same students may reach the ceiling of their strategic ability in college where deeper processing is required (Balduf, 2009). This suggests the teaching of self-regulating and metacognitive learning strategies is important for

college students of all achievement levels. Furthermore, when strategies are embedded in or taught alongside a content area, students are better able to transfer the strategies to future tasks and reflect on the outcome of that transfer (Tuckman, 2003).

Ample evidence shows that self-regulated learning strategies, as primary contributors to academic success (Pintrich & DeGroot, 1990), *can* and *should* be taught (Cohen, 2012; Paris & Paris, 2001; Weinstein, Tomberlin, Julie, & Kim, 2004; Tuckman, 2003), yet faculty attempting to teach them face many challenges. For example, many students are reluctant to change the learning strategies with which they were successful in high school (Dembo & Seli, 2004; Dunlosky et al., 2013). Many students also are unable to judge whether or not they are actually learning—a key aspect of metacognition—which can lead to overconfidence (Koriat & Bjork, 2005). The intervention presented in this paper encourages students to practice confronting their existing habits, monitor their knowledge acquisition, and reflect on outcomes of learning. Motivation theory suggests that students are more likely to engage in activities for which there is a high degree of personal value and little cost (Barron & Hulleman, 2015). The Strategy Project assignment attempts to maximize value and minimize cost by engaging students in activities that will help them achieve a higher grade in a class in which they are currently enrolled.

Method and Findings

Both studies described in this paper seek to answer the question: Are first-year seminar students more likely to show evidence of metacognition and self-regulation after completing the Strategy Project assignment? In this section, we will describe the methods and findings for a pilot study, in which one member of the research team measured the effects of the Strategy Project on her own students, and for the current study, in which this intervention was brought to scale for a group of trained instructors who used the Strategy Project in their first-year seminar courses and were compared to a matched group of instructors who did not use the Strategy Project. Both Institutional Review Board-approved studies were conducted with students at a large, public university in suburban Atlanta, Georgia, where a first-year seminar is required for all first-time, full-time students in their first semester of college.

Strategy Project Assignment

The Strategy Project assignment (see Appendix) is a multistep project requiring students to plan, monitor, and evaluate their newly learned strategies as they prepare for a test in a course in which they are currently enrolled. Each step in the process is meant to disaggregate “learning skills” into meaningful components that students are empowered to integrate for their individual purpose. In this assignment, students are directed to complete the following activities related to an exam in another course that they have chosen for the project. Students must: 1) create a plan for their study time; 2) interact one-on-one with the instructor of their chosen course; 3) use active reading and/or active note-taking strategies as they learn new material; 4) implement additional active learning strategies that are

appropriate for the content area, such as self-quizzing or concept mapping; and 5) reflect on their exam performance in a final paper.

Students receive instruction on the use of self-regulated learning strategies as well as research-based evidence on why the strategies work. This lesson is extended to a discussion on metacognition and the benefits of deep cognitive processing. After instruction in the various strategies, students identify a test in a course for which they have ample time to prepare and reflect. Typically, this is the second or third test in a semester-long course. When given the option to choose their own course for the project, choices can vary widely, from Psychology to Math to Chemistry; however, most students choose a course in which they feel less confident and prepared. Students meet briefly with the first-year seminar instructor to review the requirements and determine if any substitutions should be made.

Next, the student meets with the instructor of the course they have chosen for the project. This is a significant piece of the Strategy Project, as it allows students not only to gain knowledge about how to succeed in the course but also to build a relationship with a faculty member, an important part of the transition to college (Goodman, Baxter Magolda, Seifert, & King, 2011). Requiring this interaction as part of the Strategy Project may help ease the initial discomfort that many new college students feel in speaking with their professors.

Students then plan their approach to the Strategy Project by mapping out a time- and task-specific "plan of study." As an essential component of self-regulation for college students (Kitsantas, Winsler, & Huie, 2008; Tuckman, 2003), time management is another important piece of the assignment. With increased task demands and more responsibility for allocating their time, college students must be taught strategies for managing their study time.

Specific learning strategies are the next components of the Strategy Project. The active reading portion allows for practice of textbook annotation, an active strategy that promotes deep processing and engagement with the material (Simpson & Nist, 1990). In the notetaking portion, students are instructed to take notes for the duration of the exam-preparation time using the Cornell method of note-taking (Pauk, 1962) or a similar active note-taking method. Finally, students are directed to choose two additional strategies from among those discussed that are appropriate for test preparation in their course. Evidence of good quality textbook annotations, class notes, and study strategies are presented as a portion of the final Strategy Project.

Finally, students reflect on the results of their Strategy Project through a written assignment and oral presentation. Both of these final products empower students to analyze critically the efficacy of each portion of the project. By sharing these reflections with classmates, students share peer-driven models of self-regulation and co-develop discipline-specific strategies that may help their fellow students succeed in other courses.

Pilot Study

To determine whether the MSLQ (Pintrich, Smith, Garcia, & McKeachie, 1991), described below, revealed any changes in metacognition and self-regulation after completion of the Strategy Project assignment, a pilot study was conducted with fifty-two students recruited from two sections of the first author's first-year seminar. Just under 54% percent of the students identified as female and about 42% identified as male. When asked to choose the best description of their ethnicity, 65% of students indicated White (Caucasian), 12% African-American, 12% Hispanic, 4% Asian, and 2% other. The students' median age was 18 years. The study did not include data from students younger than 18.

Pilot Study Procedures. An online pre- and post-test version of the MSLQ (Pintrich et al., 1991) was distributed via the learning management system during Weeks 2 (prior to the introduction of the assignment) and 14 (well after the assignment had been completed) of a 16-week semester. Completion of each survey counted for 1% of the course grade, respectively. The study was explained to students before obtaining their consent, and during each survey administration an alternative assignment was offered to students who were under 18 or who did not wish to participate in the study.

Measurement Instrument. The MSLQ has been widely used for decades to investigate cognitive and metacognitive strategies, motivation, and self-regulation. In both studies described in this paper, the full 81-item version of the MSLQ, containing fifteen subscales, was used. The subscales included: Intrinsic Goal Orientation, Extrinsic Goal Orientation, Task Value, Control of Learning Beliefs, Self-Efficacy for Learning Performance, Test Anxiety, Rehearsal, Elaboration, Organization, Critical Thinking, Metacognitive Self-Regulation, Time and Study Environment Management, Effort Regulation, Peer Learning, and Help Seeking.

Participants were instructed to answer the questions based on the course they chose for their Strategy Project. The survey also included a section where participants were asked to indicate which strategies they currently used to study for the chosen course. Participants indicated that they completed one or more of the following strategies during their study time for the chosen course: read the textbook; took notes on the textbook; took notes in class; read over class notes; made flashcards; created a chart, diagram, or concept map; studied with a group; completed practice problems; or engaged in self-quizzing. In addition, the survey included questions to gather demographic data, including age, gender, and ethnicity.

Pilot Study Results. Following recommendations from Jamieson (2004) and others who suggest Likert scale data be treated as ordinal-level data, non-parametric statistics were used in the analysis. A Wilcoxon Signed Rank test revealed a statistically significant pre- and post-Strategy Project difference on the total scores of the MSLQ subscale pertaining to Metacognitive Self-Regulated Learning, $z = -2.757$, $p < .01$, with a fairly large effect size ($r = .40$). The median

score on the subscale increased from pre-project ($Md = 17.5$) to post-project ($Md = 18.0$). None of the other subscales showed significant differences.

A series of related-samples McNemar's Tests revealed statistically significant increases for the use of several self-reported strategies (see Table 1), including active reading, using flashcards, creating charts/diagrams/concept maps, group studying, and self-quizzing. No significant differences were found for textbook reading (passive reading), re-reading class notes (also a passive strategy), completing practice problems, or taking notes in class.

Table 1

Results of McNemar's Tests on Study 1 Participants' (n=52) Use of Study Strategies over Time

| Strategies Used | Pre-Strategy Project | | Post-Strategy Project | |
|---|----------------------|------------|-----------------------|------------|
| | <i>n</i> | % of group | <i>n</i> | % of group |
| Read textbook | 23 | 44% | 26 | 50% |
| Took notes on textbook* | 10 | 19% | 17 | 33% |
| Read over class notes | 39 | 75% | 36 | 69% |
| Made flashcards*** | 2 | 15% | 29 | 56% |
| Created chart, diagram or concept map** | 2 | 4% | 11 | 21% |
| Group study | 12 | 23% | 20 | 39% |
| Completed practice problems | 23 | 44% | 28 | 60% |
| Took notes in class | 42 | 81% | 45 | 87% |
| Engaged in self-quizzing** | 16 | 31% | 30 | 64% |

* pre- to post-project change is significant at $p < .05$

** pre- to post-project change is significant at $p < .01$

*** pre- to post-project change is significant at $p < .001$

Note: Students in this group significantly increased their use of textbook annotations, flashcards, charts/diagrams/concept maps, and self-quizzing. There were no significant decreases in strategy use.

Current Study

The current study sought to investigate whether the Strategy Project could be scaled up by providing targeted faculty development to a select group of instructors who used the Strategy Project in their first-year seminar courses. These instructors were matched with a group of instructors who had not previously used the Strategy Project in their courses.

Participants. Five hundred eight students in thirty-three sections of a first-year seminar participated in the study. Close to fifty-seven percent of the students identified as female and 43% as male. When asked to choose the best description of their ethnicity, 57% of students indicated White (Caucasian), 23% African-

American, 8% Hispanic, 6% Asian, and 6% other. The students' median age was 18 years. The study did not include data from students younger than 18.

Procedures. Instructors teaching first-year seminar were recruited to participate in the study via emails describing the Strategy Project and associated faculty-training workshop. The ten instructors who responded and agreed to attend the workshop were assigned to the treatment group and were matched on three variables—years of experience, number of course sections taught, and educational background—to a comparison group of instructors who also participated in the study. Both groups included full- and part-time instructors from a variety of disciplinary backgrounds.

Instructor training. Instructors in the treatment group attended a four-hour workshop conducted by the researchers on the use of the Strategy Project. During this workshop, instructors received an overview and background information about the project, discussed instructional content related to the project including a timeline and assessment practices, and engaged in individual course planning. After the workshop, the research team continued to reach out to treatment group instructors for individual consultations and held multiple drop-in sessions for instructors to ask questions about the project. Instructors in the comparison group were told that their students would be taking surveys about their use of learning strategies but were not given any special direction in curriculum planning.

Strategy Project intervention. The Strategy Project, described above, was assigned in each of the sections taught by instructors in the treatment group. Twenty-five percent of the semester grade was allotted to the project in each section. Instructors used four class periods early in the semester for Strategy Project-related instruction, following the protocol given during the training workshop.

Survey implementation. An online version of the MSLQ was distributed via the learning management system as a pre-test to all students in both groups during Weeks 2-3 of the semester. A member of the research team made a brief visit to each course section in both groups to encourage students to complete the survey. As in the pilot study, completion of the survey counted for 1% of the course grade. For grading purposes, a member of the research team sent frequent updates to instructors noting which of their students had completed the survey. In Week 14 of the semester, a post-test version of the MSLQ was given to all students in both groups. This survey also contributed to 1% of the course grade. During each survey administration, an alternative assignment was offered to students who were under 18 or who did not wish to participate in the survey.

Instrument. As in the pilot study, the full 81-item version of the MSLQ, containing fifteen subscales (see description above), was used. Participants were advised to answer the questions based on the course they chose for their Strategy Project (treatment group) or to answer the questions based on a course they were currently taking (comparison group). As in the pilot study, treatment and comparison group surveys also included a section where participants were asked to

indicate which strategies they currently used to study for the chosen course (see Table 3 for a list of strategies). In addition, the survey included questions to gather demographic data, including age, gender, and ethnicity.

Current Study Results. To compare changes on the MSLQ pre- to post-project between the two groups, change variables were computed for each subscale by subtracting pre-test subscale scores from post-test subscale scores. As with the pilot study, a conservative approach was taken with the Likert scale data in the use of non-parametric statistics, and estimated effect size is labeled as “*r*” and interpreted using Cohen’s (1988) criteria.

A series of Mann-Whitney U Tests revealed significantly greater change for the treatment group as compared to the comparison group on the total scores of four MSLQ subscales: Task Value, Metacognition and Self-Regulated Learning, Time and Study Environment Management, and Peer Learning (see Table 2). Effect sizes were small, ranging from $r = .10$ to $r = .16$.

Table 2

Results of Mann-Whitney U Tests Comparing Treatment and Comparison Groups on Each MSLQ Subscale

| MSLQ Subscales | <i>n</i> (T) | <i>n</i> (C) | <i>Md</i> (T) | <i>Md</i> (C) | <i>U</i> | <i>z</i> | <i>p</i> | <i>r</i> |
|---|-----------------|-----------------|------------------|------------------|----------|----------|----------|----------|
| Internal Goal Orientation | 252 | 251 | .333 | .333 | 31052.5 | -3.53 | .724 | ns |
| External Goal Orientation | 252 | 252 | -.250 | -.250 | 30480 | -.781 | .435 | ns |
| Task Value | 252 | 252 | -.250 | -.167 | 28178.5 | -2.189 | *.029 | .10 |
| Control of Learning Beliefs | 252 | 252 | .000 | .000 | 30671.5 | -.663 | .507 | ns |
| Self-Efficacy | 252 | 252 | -.125 | -.125 | 28556.5 | -1.956 | .050 | ns |
| Test Anxiety | 252 | 252 | -.200 | -.200 | 31246 | -.310 | .757 | ns |
| Rehearsal | 251 | 248 | .250 | .000 | 28186 | -1.830 | .067 | ns |
| Elaboration | 251 | 248 | .167 | .000 | 29635 | -9.26 | .354 | ns |
| Organization | 251 | 249 | .000 | .000 | 30292.5 | -.594 | .553 | ns |
| Critical Thinking | 251 | 248 | .000 | .200 | 29266.5 | -1.155 | .248 | ns |
| Metacognition and Self-Regulated Learning | 251 | 249 | .083 | -.083 | 27311 | -2.44 | *.015 | .11 |
| Time and Study Environment Management | 251 | 249 | .000 | -.250 | 25496.5 | -3.565 | ** .000 | .16 |
| Effort Regulation | 251 | 248 | -.250 | -.250 | 29160.5 | -1.223 | .221 | ns |
| Peer Learning | 251 | 248 | .333 | .000 | 27696.5 | -2.136 | *.033 | .10 |
| Help Seeking | 255 | 251 | .000 | .000 | 31693.5 | -.189 | .850 | ns |

* significant at $p < .05$

** significant at $p < .001$

Note: (T) indicates treatment group; (C) indicates comparison group. Estimated effect sizes were listed for those subscales with significant results; when non-significant, "ns" was noted.

Finally, a series of McNemar's tests examining the pre- to post-change of self-reported strategies between the treatment and comparison groups revealed several significant differences between the two groups. The comparison group significantly increased their use of flashcards and group studying, while decreasing textbook reading and note-taking. In contrast, the treatment group significantly increased their use of most strategies listed, including note-taking, flashcards, creating charts/diagrams/concept maps, group studying, completing practice problems, and self-quizzing. Tables 3 and 4 provide details about these strategy changes.

Table 3

Results of McNemar's Tests on the Treatment Group's (n=255) Use of Study Strategies over Time

| Strategies Used | Pre-Strategy Project | | Post-Strategy Project | |
|--|----------------------|------------|-----------------------|------------|
| | n | % of group | n | % of group |
| Read textbook | 121 | 47% | 131 | 51% |
| Took notes on textbook | 91 | 36% | 86 | 34% |
| Took notes in class** | 220 | 86% | 241 | 95% |
| Read over class notes | 180 | 71% | 189 | 74% |
| Made flashcards*** | 79 | 31% | 160 | 63% |
| Created chart, diagram or concept map*** | 9 | 4% | 35 | 14% |
| Group study*** | 60 | 24% | 121 | 47% |
| Completed practice problems*** | 114 | 45% | 154 | 60% |
| Engaged in self-quizzing*** | 106 | 42% | 166 | 65% |

** pre- to post-project change is significant at $p < .01$

*** pre- to post-project changes is significant at $p < .001$

Note: Students in the treatment group significantly increased their use of class notes, flashcards, charts/diagrams/concept maps, group study, practice problems, and self-quizzing. There were no significant decreases in strategy use.

Table 4

Results of McNemar's Tests on the Comparison Group's (n=253) Use of Study Strategies over Time

| Strategies Used | Pre-Strategy Project | | Post-Strategy Project | |
|---------------------------------------|----------------------|------------|-----------------------|------------|
| | n | % of group | n | % of group |
| Read textbook* | 159 | 63% | 136 | 53% |
| Took notes on textbook | 101 | 40% | 95 | 38% |
| Took notes in class* | 230 | 91% | 213 | 84% |
| Read over class notes | 197 | 78% | 185 | 73% |
| Made flashcards* | 39 | 15% | 56 | 22% |
| Created chart, diagram or concept map | 19 | 8% | 30 | 12% |
| Group study** | 49 | 19% | 71 | 28% |
| Completed practice problems | 136 | 54% | 117 | 46% |
| Engaged in self-quizzing | 98 | 39% | 106 | 42% |

*pre- to post-project change is significant at $p < .05$

**pre- to post-project change is significant at $p < .01$

Note: Students in the comparison group significantly increased their use of flashcards and group study. They significantly decreased their use of the textbook and class notes.

Discussion

Both studies discussed in this paper were guided by the question: Does the Strategy Project impact first-year students' self-regulation and metacognition strategies as measured by the MSLQ and self-reported strategy use when brought to scale for a large first-year seminar program?

Findings from the pilot study and current study indicate that the Strategy Project does positively affect students' metacognition and self-regulation, but the effect as measured by the MSLQ varies. In the current study, students who experienced the Strategy Project assignment had a statistically significant increase in their scores on four subscales, all of which reflect various aspects of metacognition and self-regulation, when compared with their peers: Task Value, which reflects "beliefs about the importance, utility, and relevance of the task" (Pintrich, 2004, p. 365); Metacognitive and Self-Regulated Learning; Management of Time and Study Environment; and Peer Learning. These subscales were closely aligned with our goals for the project. Of particular interest was the "Management of Time and Study Environment" subscale, which "is a measure of how well you manage your time and schedule, and your use of a place to study" (Pintrich et al., 1991), and reflects a major challenge for first-year students (Tuckman, 2003). Notably, median scores on this subscale actually decreased for the comparison group during the semester but increased significantly for students using the Strategy Project. The change in Peer Learning subscale scores was also significantly different between groups. This subscale measures the degree to which students report collaborating with peers to increase learning. Instructors using the Strategy Project encouraged this

collaboration by making explicit the advantages of group studying, and by including group study as a choice in the metacognitive strategies portion of the assignment.

More impressive, perhaps, is that students in the treatment group significantly increased their use of metacognitive strategies like creating concept maps, completing practice problems, and self-quizzing, while the comparison group did not. Recent research indicates that self-quizzing, in particular, is a highly effective metacognitive strategy (Dunlosky et al., 2013; Rodriguez et al., 2018). One explanation for this success lies in the fact that the Strategy Project explicitly requires students to practice, then observe the effect of, metacognitive and self-regulation strategies. What is notable is that the post-test measure was taken during Week 14 (out of 16) of the semester, several weeks after the Strategy Project itself had taken place, suggesting that students continued to use metacognitive strategies in the course chosen for the Strategy Project when they were no longer formally required and encouraged by their instructors. This finding confirmed the researchers' intent to empower individual students to become strategic and self-directing in their use of specific "learning skills." In other words, it is likely that students began to themselves disaggregate the utility of various strategies depending on the task at hand.

Limitations

Like most studies involving the scholarship of teaching and learning, this study was quasi-experimental due to the impossibility of randomly placing students into the various sections of first-year seminar. As in most universities, students self-selected their own course section. However, prior to registration, most sections were not yet staffed with instructors, and students were not aware which instructors were participating in the study, nor were they aware to which group participating instructors belonged. In order to reduce instructor differences as a confounding variable, the research team was very intentional about matching instructors for comparison. However, it is possible that the instructors in the two groups differed in some way that acted as a confounding variable.

It is also possible that the two groups of students differed at the outset of the study. To investigate this possibility, demographic data for the treatment and comparison group were compared. A t-test revealed no significant difference in age, and chi-square analyses revealed no significant difference in gender or ethnicity between the two groups. Additional comparisons between the comparison and treatment groups were made on the pre-MSLQ subscale scores and self-reported strategies to establish that the two groups were equivalent at the beginning of the study in their approach to metacognition and self-regulated learning. A series of t-tests did reveal significant differences on some of the pre-test subscales, including task value, metacognition and self-regulated learning, and management of time and study environment. A series of chi-square analyses revealed significant differences on the use of textbook reading, flashcards, and practice problems. In all of these cases except for the use of flashcards, the comparison group scored higher than the treatment group on their pre-tests, which meant that the treatment group often had more room for improvement. The research team could find no plausible

explanation for this initial difference between the groups. Pre-test group differences such as these are not uncommon in educational research (McGrath, 2016), but it is a potential moderator for how the key findings of the study are interpreted.

Conclusions and Future Directions

Essential skills like metacognition, time management, and self-regulation are critical for first-year student success and are often within the purview of a first-year seminar (Young & Hopp, 2014). First-year students, in particular, need appropriate guidance from faculty about the component parts that constitute complex concepts like motivation and “academic skills” so as not to reinforce faulty prior knowledge about how such academic skills are developed. In a large first-year seminar program, it can be a struggle to maintain consistency and quality of instruction, especially for programs that rely on instructors with varying disciplinary backgrounds and few years of teaching experience. Therefore, there is a need for high quality, evidence-based practices that can be brought to scale by providing appropriate faculty development and support.

Based on the evidence described in this paper, the Strategy Project assignment may be a viable option for first-year programs seeking to scale up students’ use of time management, learning strategies, “study skills,” or “academic skills” in the authentic environment of another course in which they are enrolled. Future studies should establish the replicability of the Strategy Project assignment in other contexts; one such study is currently being conducted at another institution (Steiner, Sturges, & Langdon, 2018). In addition, longitudinal studies of students’ strategy use would reveal whether the changes brought about by the Strategy Project have lasting impact beyond the first semester.

Dunlosky and colleagues (2013) have suggested that students continue to use ineffective study techniques because they don’t know—and haven’t been taught—which techniques are most effective, perhaps in part because instructors themselves don’t know. The project discussed in this paper could serve as a springboard for both students’ and instructors’ learning about learning. In a post-project feedback survey, instructors in the treatment group touted the benefits of the project, indicating that the project made “more of a difference to my students than any other assignment I’ve ever taught.” Another appreciated that it was a “great tool for teaching these necessary study habits and strategies, all rolled into one project.” This anonymous instructor also said that it sparked his/her own interest in metacognition and self-regulation: “Study strategies are not my strong suit so I didn’t feel highly equipped, but did the best I could and learned a lot. [I] may want to become an expert in the future!” When complex assignments like the Strategy Project are paired with faculty development, both students and faculty may benefit. The studies described in this paper suggest that these important benefits can be brought to scale for even the largest first-year seminar programs in order to maximize student success.

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Appendix

Strategy Project

This assignment will help you see the connections between what you are learning in your first-year seminar and your other courses. In this project, you will apply the strategies and hints that we have learned in seminar to preparing for a test in another class. The test you select should be between Sept. 30 and Oct. 30, and should be a test that requires you to study. To complete the strategy project, you will complete and submit a variety of test preparation strategies along with written reflections about your experience. You will submit these materials as noted below. All papers should be double-spaced, with 12-point font.

Strategy Project Timeline and Activities:

Contract (5 points). List the details of your chosen test, choose the strategies you plan to use, and mark the necessary due dates. We will meet briefly in class to ensure your chosen test and strategies are appropriate. Please bring the printed and signed contract to class on **[date]**. **If you need to make changes to your contract after this meeting, please notify me. No changes may be made after Week 5 of the semester.**

Pre-Project Survey (5 points). This portion of the project will require you to take the MSLQ survey (found at [this link](#)) or complete an alternative assignment in accordance with IRB policy (see your instructor for details). If you are younger than 18, please ask your instructor for the alternative assignment. Your instructor will only grade the survey for completion, not for how you answered the questions.

Pre-Project Reflection (25 points). Please reflect on your current habits in a 2-3 page essay. When writing your essay, please consider the following questions:

- What do you feel are your strengths when it comes to college success?
- What do you feel are your weaknesses when it comes to college success?
- What are you most worried about when it comes to college studying and learning?
- What are your favorite study strategies, and why? Where did you learn these strategies?
- Is there anything you would like to improve this semester that could lead you to be a successful college student?

Submit the essay via the Assignments Tool on D2L. The survey and reflection must be completed by **[date]**.

Professor Interaction (15 points). Attend office hours or a drop-in session with the instructor of the course you have chosen for the project and write a one- or two-paragraph description of the questions you asked, what you learned, and why attending office hours might be helpful. A list of suggested questions is below, but please feel free to add your own:

- What is the format of the upcoming test? What do you think are the best ways to study for this test?
- What do you think differentiates the most successful students in your class from the least successful students?
- What do you like most about being a college instructor?

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- Do you conduct research? If so, what is it about?

Submit this via the D2L Assignments Tool by **the due date indicated on your contract**.

Plan of Study (15 points). Using the suggestions from your professor interaction as well as what you've learned in KSU 1101, please outline your plan for studying for this test. You should create a detailed study schedule that describes what you will do and when you will do it, demonstrating your plan to spread out your studying over at least two weeks, using a variety of active learning strategies. This outline should be created and submitted via the D2L Assignments Tool **by the due date indicated on your contract**.

Metacognitive Study Strategies (60 points). These study strategies should be submitted **in one folder or binder in class on the date indicated on your contract**. Please make sure everything is clearly labeled, and that your signed contract is in the front of the folder. You must choose at least four of these strategies, one of which must be active notetaking or active reading. Please choose your strategies carefully, taking into consideration the course, the professor, and the type of test.

Choose at least one:

- **Active Notetaking.** Use the Cornell or a modified Cornell method to take notes in your chosen class for at least two weeks during the period leading up to your test, making sure to set aside space for self-quizzing and daily summaries. Submit these notes (or a copy of these notes) in your folder.
- **Active Reading.** Preview and annotate all textbook chapters associated with this test, paying special attention to the visual aids, vocabulary, and concepts. Summarize these annotations by distilling all important information into a one-page study sheet. Copy a 4-page sample of your annotations and include it and your one-page study sheet in your folder.

Choose three (or two, if you chose both strategies above):

- **Complete Practice Problems** from an outside source. This is a good strategy for math, physics, chemistry, and computer science courses.
 - **Quiz Yourself** by creating your own test.
 - **Create Flashcards.** This flashcards must include explanations of the topic in your own words as well as examples. You must create at least fifteen flashcards.
 - **Create a Concept Map.**
 - **Meet with a study group** and describe your experience in 1-2 paragraphs.
 - **Attend a tutoring session** and describe your experience in 1-2 paragraphs.
 - **Other strategies?** Propose a strategy that is appropriate to your course in consultation with your instructor.
-

Post-Project Survey (5 points). Complete the MSLQ survey (found at [this link](#)) or complete an alternative assignment in accordance with IRB policy (see your instructor for details). Again, your instructor will only grade the survey for completion, not for how you answered the questions.

Post-Project Reflection (20 points). After you take your test but before you receive it back, please estimate the grade you think you received. Once you receive your feedback, please write a reflection paper 2-3 pages in length about your experiences with the strategy project. In particular, please reflect on which elements of the project you think helped and which did not. Please also reflect on the grade you received, whether it was an improvement over your last grade (list both grades), and whether it matched what you thought you'd receive. Also address whether or not your study strategies have changed since you've been in college. Submit your reflection paper via the D2L Assignments Tool.

The survey and reflection must be completed by the **date indicated on your contract**.

Strategy Project Presentation--IF REQUIRED BY YOUR INSTRUCTOR (15 points). Please plan to share your Strategy Project with fellow students in an informal presentation of about 10 minutes in length on **[date]**. You may use the doc cam to show elements of your project. This is a great chance for other students to learn strategies that may be useful to them in the future. In particular, your fellow students would like to know: What is your course like? Was the professor receptive to your questions? What elements of the Strategy Project worked in your course?

Strategy Project Contract

Name _____

Course you will use for this project _____ Date of Test (between 9/30 and 10/30):

I would like to choose the following study strategies for my project. Please choose at least four.

- Active Notetaking** AND/OR **Active Reading**
- Complete Practice Problems**
- Quiz Yourself**
- Create Flashcards**
- Create a Concept Map**
- Meet with a study group**
- Attend a tutoring session**
- Other (Please Describe):**

I understand that my due dates for this project are the following:

- _____ Contract
- _____ Pre-Reflection Paper and Survey
- _____ Professor Interaction (three weeks prior to test)
- _____ Plan of Study (two weeks prior to test)
- _____ Active Notetaking (next KSU 1101 class meeting after your test day)
- _____ Active Reading (next KSU 1101 class meeting after your test day)
- _____ Additional Test Preparation Strategies (next KSU 1101 class meeting after your test day)
- _____ Post-Reflection Paper and Survey (two weeks after your test day)
- _____ Presentation (if required by instructor)

_____ Student Signature

_____ Instructor Signature