Study Skills Course Impact on Academic Self-Efficacy

By Brenna M. Wernersbach, Susan L. Crowley, Scott C. Bates, and Carol Rosenthal

Abstract: ***Although study skills courses improve student retention, the impact of study skills courses on students' academic self-efficacy has not been investigated. The present study examined pre- and posttest levels of academic self-efficacy in college students enrolled in a study skills course (n = 126) compared to students enrolled in a general education course (n = 111). Students enrolled in study skills courses had lower initial levels of academic self-efficacy and demonstrated greater increases than comparison students, reaching equivalent levels or surpassing the comparison students at posttest. Results are considered in light of the broader issue of student retention and in the context of current practice.***

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One of the primary concerns of colleges and universities today is the retention of students. Research suggests that retention, defined as consistent enrollment at one institution across semesters, is impacted by individual factors such as adjustment to college life, financial struggles, stress levels, and lack of study strategies (Lau, 2003). Students who are unable to overcome such obstacles are more likely to drop out. To increase student retention, many colleges and universities employ a variety of programs targeted at helping students persist in the higher education learning setting, such as study strategies and skills courses and workshops. Such interventions are designed to provide students with additional tools and resources to facilitate academic success. Many colleges and universities identify a population of "at-risk" students who are placed on academic probation or "warning status" based on factors such as high school GPA and ACT/SAT scores (Abrams & Jernigan, 1984). These academically underprepared students are referred to courses or workshops based on their predicted need. Such classes and workshops target study skill areas such as managing time, reading textbooks, taking class notes, utilizing available resources, and preparing for and taking exams. The effects of study skill courses or workshops on student academic success and retention have been examined in multiple studies, and their successes have been observed (Abrams & Jernigan, 1984; Braunstein, Lesser & Pescatrice, 2008; Polansky, Horan & Hanish, 1993).

The research literature also suggests that self-efficacy is an important predictor of success (Hsieh, Sullivan, & Guerra, 2007; Klomegah, 2007). Self-efficacy refers to an individual's belief in his or her capability of successfully completing a particular task (Bandura, 1989) and is a useful predictor of achievement, especially in specific rather than global, domains. For example, in a few studies academic self-efficacy has been shown to be a stronger predictor of academic success than general self-efficacy (e.g., Choi, 2005). Despite the evidence demonstrating the effectiveness of study skills courses and workshops as well as the predictive value of academic self-efficacy, the impact of study skills courses and workshops on student academic self-efficacy has not been examined.

The present study was designed to examine pre- and postintervention levels of academic self-efficacy in university students enrolled in a study skills course, as well as the predictive power of academic self-efficacy on academic outcome and retention into the following semester. Differences in levels of academic self-efficacy between the students enrolled in the study skills course and a comparison group of students were also investigated.

Academic Support Services

Many universities currently employ a variety of programs designed to help students adjust to and succeed in higher learning settings. Academic support services offer students help in a number of formats, such as individual counseling, tutoring, study skills courses, and study skills workshops. These programs commonly target time management, reading techniques for textbooks, effective note taking, resource utilizations (such as libraries), and study/exam-taking techniques. Often, incoming students who may be academically underprepared are encouraged or even required to participate in such programs based on factors such as high school GPA or ACT/SAT scores (Abrams & Jernigan, 1984).

A number of researchers have sought to investigate the effectiveness of academic support services. Abrams and Jernigan (1984) investigated the relationship between student use of support services and academic success in high-risk college freshmen. Students were required to participate in study strategies instruction but were provided with the option of attending scheduled workshops or receiving individual help at the support center.

Additionally, free peer tutoring was available to students. They found that the number of hours spent obtaining services in reading and study skills areas and the number of visits to the tutor were the greatest contributors to academic success, with the single best predictor being the number of hours spent in the reading and study skills program.

In another study, Polansky, Horan, and Hanish (1993) investigated the impact of effective study strategies training and career counseling on the retention of at-risk students. Students were classified as at-risk if they met the following criteria: freshmen status, undecided major, and presence of "academic deficiencies" (GPA < 2.0, lack of certain high school courses, SAT < 930 or ACT < 21). Students were considered to have been "retained" if they were enrolled in school for two consecutive semesters after the end of treatment. One hundred percent of the study-skills-alone participants were retained, in comparison to 33% of the control group. Study-skills-alone participants also were considered significantly more successful (GPA > 2.0) than those in the career-counseling-alone and combined treatments. In fact, 89% of study-skills-alone participants had GPAs above 2.0 at follow-up. The authors concluded that study skills training focused on time management, goal setting, learning styles, and relaxation appears to be "an effective way to improve the retention of students at risk for dropping out of school" (p. 492). Interestingly, students in the study-skills-alone treatment group did not self-report improved study habits compared to the other treatment groups, despite their higher GPAs.

More recently, Braunstein, Lesser, and Pescatrice (2008) examined the retention rates of all freshmen at a medium-sized college to those of participants in a program for students at risk of nonpersistence. Students who participated in the program were provided with "personal, academic, and financial aid counseling, help with study skills, tutoring, career planning, peer mentoring, and exposure to cultural enrichment activities" (p. 36). Retention was monitored over a 3-year period. Based on previous research, it was expected that there would be higher levels of retention among all freshmen than within the group of students at risk of nonpersistence, but results indicated equal retention rates in both groups. Additionally, retention within the general student population was impacted to a greater degree by demographic, academic, and financial factors than in the disadvantaged group. The authors concluded that the programs offered to these students "leveled the playing field" (p. 36).

Academic Self-Efficacy

Academic success is determined by multiple factors and self-efficacy is embedded in the social-cultural context. For instance, Lohfink and Paulsen (2005), using the Beginning Postsecondary Students Longitudinal Survey (Wine et al., 2002), reported meaningful differences between first-generation college students and their continuing-generation classmates on a variety of persistence-related characteristics (e.g., ethnicity, income status, sex)—characteristics that are not necessarily a part of the persistence/self-efficacy equation as much as important contextual variables that impact persistency in multiple ways. Bandura (1989) described self-efficacy as a motivational factor that may promote or discourage action based on individuals' judgment of their ability to control events impacting their lives. Individuals who are doubtful about their capabilities are easily discouraged by struggles and failure, whereas individuals with more confidence in their abilities persist despite obstacles until they find success. Indeed, recently Richardson, Abraham, and Bond (2012) reviewed and meta-analyzed the empirical literature on the correlates of one indicator of college student success: grade point average. They reported that the strongest correlate of university GPA was performance self-efficacy. Self-efficacy is domain specific and best assessed at task levels rather than global levels. Various studies have been conducted to examine the impact of academic self-efficacy on college performance.

The strongest correlate of university GPA was performance self-efficacy.

Gore (2006) evaluated the extent to which academic self-efficacy accounted for variance in college outcomes beyond standardized test scores, specifically the ACT. Participants included first-year college students enrolled in a freshmen orientation/transition class. The results of the study indicated that the self-efficacy ratings were weak but significant predictors of college GPA, but that end-of-semester self-efficacy ratings were significantly more predictive of GPA than were beginning-of-semester ratings, suggesting that over the course of a student's first semester in college there was a significant change in self-efficacy beliefs.

The predictive value of academic self-efficacy has been evaluated in nontraditional (largely immigrant and minority) college freshmen with results indicating that academic self-efficacy has a strong positive effect on freshmen grades and credits in these populations (Zajacova, Lynch, & Espenshade, 2005). In the study, academic self-efficacy was the single strongest predictor of GPA, even accounting for high school academic performance and demographic variables. However, self-efficacy did not significantly predict student retention into the following year.

Focus of Inquiry

Academic support services such as study skills courses delivered to students at risk of nonpersistence have demonstrated a positive influence on student academic success. Research has also shown that academic self-efficacy is a meaningful predictor of academic performance. However, the relationship between study skills courses and student levels of academic self-efficacy has not been investigated. The present study used a sample of students from a study skills intervention course as well as a sample of comparison students from a general education course (and not enrolled in study skills course) to examine this relationship. Specifically, we sought to investigate the following research questions:

1. Is there a statistically significant difference in levels of academic self-efficacy between students enrolled in study skills courses and those who are not (a) at the beginning of the semester, and (b) at the end of the semester?
2. Does study skills course participation result in a change in academic self-efficacy as measured at the beginning and the end of the course? Do such academically underprepared students demonstrate greater changes in level of academic self-efficacy in comparison to students not enrolled in the course?
3. Can the variables of academic self-efficacy and semester GPA accurately predict students' retention into the following semester?

Method

Participants

The study examined two samples of students: a sample of students enrolled in a course entitled Strategies for Academic Success (SAS) and a comparison group of students taken from the course General Psychology (GP) during fall semester 2009. Students who enroll in each of these courses typically do so early in their college careers. The SAS course is not a prerequisite for the GP course, and some students in GP may have previously taken the SAS course (these data were not collected). Students enrolled in both courses were retained as SAS participants but removed as GP participants.

Approximately 425 students were presented with the option of participation in the study (175 academically underprepared students, 250 comparison students) and 374 students initially agreed to be contacted for participation (163 academically underprepared students, 211 comparison students). Of these, 300 participants completed the College Self-Efficacy Inventory (CSEI; Solberg, O'Brien, Villarreal, Kennel, &

Davis, 1993) and the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich & DeGroot, 1990) online-preassessments (80.2%), and 285 completed the Learning and Study Strategies Inventory (LASSI; Weinstein & Palmer, 2002) pretest (76.2%). Of those that completed the pretests, 266 completed the CSEI and MSLQ follow-up (88.7%), and 252 completed the LASSI posttest (88.4%; 126 academically underprepared students, 111 comparison students). Participants who did not complete the pre- and posttests for all measures were removed prior to analyses. This resulted in a final sample size of 237 participants: 111 academically underprepared students and a comparison group of 126 students, who had completed all required measures and were retained for the data analyses. Descriptions of the samples are presented in Table 1. Participants were predominantly White (91.6%) and more females were in the sample than males. Participants were at all academic levels, with the majority being Freshman or Sophomores.

Setting

The accessible population consisted of undergraduate students at a large, Carnegie Doctoral Research state University in the West with an enrollment of approximately 28,000 students. Participants were recruited through two classes described following.

SAS course. The SAS course is a 3-credit course taught on an accelerated twice per week schedule. It is described by the university's website as "a dynamic, hands-on course designed to help students develop learning, study, and critical thinking strategies necessary for college success." The SAS course is not mandatory for incoming students (as compared to a freshman experience). However, students who are provisionally admitted are strongly encouraged to take the course by the university advising staff. Students are provisionally admitted if they are admitted with less than the minimum admissions "index," derived by a combination of ACT score and high school GPA. In addition, students who were previously suspended and have returned to the university maybe required to take the course as decided by each student's academic advisor. Students typically become aware of the course through their academic advisor, parent workshops at incoming student orientation, professors, academic resource staff, student services staff, or other advertising. The majority of students enrolled in the course are referred by advisors (e.g., undergraduate, athletic), parents, and student services professionals. Although students who take study skills courses are referred to using a variety of terms (e.g., at-risk), for the purposes of this study, students enrolled in study skills courses will be referred to as academically underprepared.

The aim of the SAS course, as outlined in a typical syllabus, is to educate students about skills and techniques facilitating academic success in higher learning institutions. Courses incorporate lectures, assigned readings, classroom activities, and "hands-on" practice targeting note taking, time management, learning strategies, and test preparation skills. Students are asked to assess their own strengths and weaknesses, develop and implement a plan for improvement, evaluate the effectiveness of different strategies presented, and adapt such strategies accordingly in order to render them most useful to the individual. Students are graded based on attendance, participation, effort, and demonstrated skills proficiency. The class is 7 weeks long with two sessions offered sequentially in each fall and spring semesters and one session offered in the summer. Typically during fall semester, five to six sections are offered during the first session and an additional two to three sections during the second session. In spring, two to three sections are offered during the first session and one to two during the second session. Each section typically consists of 25 students. All sections of the course use a common syllabus and curriculum. Students select the course section based on scheduling and availability. Separate sections are not targeted for individual types of students or academic challenges.

GP course. The general psychology course is a survey course covering a range of topics in psychology. The course was selected because it is a required general education course that nearly every undergraduate student on campus is required to complete. Many students elect to take the course early in their academic career, making a large sample of students available who may be similar in experience to those enrolled in the SAS course. Typically, four sections are offered during fall semester with capacities ranging from 125 to 175, as well as three sections of similar size during spring semester. Invitations for participation were offered in course sections based on instructor responsiveness and scheduling.

Table 1

Demographic Characteristics of the Intervention (SAS) and Comparison (GP) Groups and the Total Sample

	Total Sample		
Characteristic	SAS, *n* = 111	GP, *n* =126	Total, *N* = 237
Mean age yrs. (*SD*)	22.49 (5.92)	20.02 (2.89)	21.18 (4.72)
Gender *n*/ (%)			
Female	55 (49.5)	84 (66.7)	139 (58.6)
Male	56 (50.5)	42 (33.3)	98 (41.4)
Ethnicity *n*/ (%)			
White, Non-Hispanic	104 (93.7)	113 (89.7)	217 (91.6)
Hispanic	1 (0.9)	5 (4.0)	6 (2.5)
Asian/Pacific Islander	1 (0.9)	2 (1.6)	3 (1.3)
Black, Non-Hispanic	1 (0.9)	0 (0.0)	1 (0.4)
Multicultural	0 (0.0)	1 (0.8)	1 (0.4)
Unspecified/Other	4 (3.6)	5 (4.0)	9 (3.8)
Class *n*/ (%)			
Freshman	66 (59.5)	49 (38.9)	115 (48.5)
Sophomore	32 (28.8)	47 (37.3)	79 (33.3)
Junior	9 (8.1)	21 (16.7)	30 (12.7)
Senior	4 (3.6)	9 (7.1)	13 (5.5)

Note. Percentages are out of column totals

CONTINUED ON PAGE 18

CONTINUED FROM PAGE 16

Measures

This project employed the use of two self-report measures designed to target the independent variable of academic self-efficacy, The Motivated Strategies for Learning Questionnaire and the College Self-Efficacy Inventory, and a measure designed to assess student study skills, the Learning and Study Strategies Inventory (LASSI). The Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich & DeGroot, 1990) arose out of the perceived need for a measure that could be used to assess student motivation and learning strategies and thereby help students and faculty facilitate learning (Duncan & McKeachie, 2005). It was developed using a social-cognitive perspective of motivation and learning strategies, and emphasizes the interaction of motivation and cognition.

The MSLQ consists of 81 items scored on a rating scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*). Items correspond with 6 motivation subscales and 9 learning strategies scales that may be used collectively or independently. Items from the Self-Efficacy for Learning and Performance Scale and Control of Learning Beliefs Scale were used for data analyses. The MSLQ has demonstrated factorial, structural, and predictive validity (Davenport, 2003), and the self-efficacy subscale has demonstrated convergent and discriminant validity with other measures of self-efficacy (Bong & Hocevar, 2002).

The Self-Efficacy for Learning and Performance scale consists of eight items designed to assess student expectancy for task specific success as well as evaluations of personal ability and skill in performing said task (Duncan & McKeachie, 2005). This subscale has previously demonstrated high internal consistency reliability ($\alpha = .93$; Duncan & McKeachie, 2005), as was true for the present sample (pretest $\alpha = .94$, posttest $\alpha = .95$). The Control of Learning Beliefs Scale consists of four items designed to assess student beliefs that outcomes are contingent on personal effort, rather than teacher variables or "luck." This subscale has demonstrated moderate internal consistency reliability ($\alpha = .68$: Duncan & McKeachie, 2005), although this was higher in the present sample (pretest $\alpha = .72$, posttest $\alpha = .82$).

The College Self-Efficacy Inventory (CSEI; Solberg, O'Brien, Villarreal, Kennel, & Davis, 1993) is used to assess the role of self-efficacy beliefs in student academic performance and retention (Gore, Leuwerke, & Turley, 2005). In total, 20 items – scored on a Likert scale from 1 (*not at all confident*) to 10 (*extremely confident*)–and three subscales– Academic Self-Efficacy, Social Self-Efficacy, and Roommate Self-Efficacy—are included. Although this study was primarily concerned with items included in the Academic Self-Efficacy scale (e.g., "Write a course paper," "Do well on your exams"), many items on the Social Self-Efficacy scale were relevant to the research questions (e.g., "Ask a question in class," Talk to your professors"); therefore these two subscales were included in the present study. The Roommate Self-Efficacy scale items ($n = 4$) were omitted from data collection.

The CESI has demonstrated convergent validity through positive correlation with measures of parental and peer support and academic integration, as well as discriminant validity as evidenced by negative correlation with measures of academic and psychological stress. Previously reported internal consistency reliability estimates range from .62 to .89 for scale scores (Gore, Leuwerke, & Turley, 2005). The data from the present project demonstrated high internal reliability on the Academic Self-Efficacy Scale (pre- and posttest $\alpha = .89$), as well as the Social Self-Efficacy Scale (pretest $\alpha = .88$, posttest $\alpha = .90$).

The Learning and Study Strategies Inventory (LASSI) is an assessment measure of learning and study strategies developed for use with high school and college students. It is aimed at addressing student awareness about and use of skill, will, and self-regulation components of learning. The LASSI may be used as "a pre-post achievement measure for students participating in programs or courses focused on learning strategies and study skills" (Weinstein & Palmer, 2002, p. 4), as an evaluation of the degree of success of such courses and programs, and as a tool for academic advisors/counselors.

Students...were eligible to earn a lab credit for completion of the study.

The LASSI is a self-report measure that may be completed via paper-and-pencil and self-scored or completed online and scored by computer. It is composed of 80 items divided across 10 scales. The scales are designed to correspond with one of three strategic learning components: skill, will, and self-regulation. Skill component scales include Information Processing, Selecting Main Ideas, and Test Strategies. Will component scales include Anxiety, Attitude, and Motivation. Finally, Self-Regulation scales include Concentration, Self-Testing, Study Aids, and Time Management. Internal consistency data for individual scales range from .73 to .89 (Weinstein & Palmer, 2002). The convergent validity of LASSI scores has been supported through positive correlations with other measures of self-regulated learning, such as the Meta-cognitive Awareness Inventory (MAI) and MSLQ (Muis, Winne, & Jamieson-Noel, 2007). LASSI scores have also been able to differentiate students with and without learning disabilities (Abreu-Ellis, Ellis, Hayes, 2009).

Procedure

Students were recruited for participation at two points during the semester in line with the start date of each 7-week session of the study skills course. At the time of first recruitment seven sections of the course (four instructors) were invited to participate in the study as well as two sections of the general psychology course (two instructors). Instructors of the all study skills courses agreed prior to the semester to include participation in the study as a course assignment, allowing students to request an alternate assignment if they preferred not to participate. Instructors presented the study to their classes and distributed and collected the informed consent forms (allowing researchers to contact them for participation). Students enrolled in the introductory courses were eligible to earn a lab credit for completion of the study (other lab credit opportunities were available to students as well). Announcements regarding participation were made to all students at the end of class periods, during which time informed consent documents were distributed, signed, and collected. This process was repeated at the beginning of the second 7-week session of the study skills courses (two sections and two instructors) and one section of the general psychology course.

Students submitted a preferred email address for contact as part of the informed consent. This information was used to email a link to the online pretest survey. All measures were completed by students individually and at their convenience online via Survey Monkey and the LASSI web administration site. Upon arrival at the survey website, participants were asked to confirm that they had received a copy of the informed consent document and were then routed to the measures. At the end of the 7-week period, students were recontacted with a link to the posttest survey. Measures were presented in a standardized order beginning with the demographic questions, followed by the MSLQ, CSEI, and the LASSI at each testing.

Following the completion of the semester, any participants who had not completed both portions of the study were eliminated from the data set. Academic information for the remaining participants was released by the Registrar's Office as outlined in the informed consent. Information released included demographic data such as gender, ethnicity, and year of birth as well as academic information including number of completed credits, course grade, term GPA, overall GPA, class level, and academic standing. Once all Survey Monkey, LASSI, and registrar data had been collected, participants were assigned unique identification numbers, which replaced all previous identifying information.

Results

A series of independent sample *t* tests was conducted to evaluate the differences between the academically underprepared and comparison group students. Results from these analyses indicated that there was a significant difference between groups with regard to age ($t = 3.99$, $p < .01$), ACT composite score ($t = -4.135$, $p < .01$), and high school grade point average ($t = -5.97$, $p < .01$). Academically underprepared students tended to be older than comparison group students, which is not surprising since many students referred to the study skills course have not entered college directly after high school. Likewise, academically underprepared students had lower ACT composite scores and high school GPAs, additional factors that frequently lead to referral into the course examined. No significant differences were found between groups on SAT scores; however, very few participants in the sample had taken the SAT.

To assess categorical differences between groups, Chi-Square tests were conducted. Gender distribution between the two groups was significantly different (X^2 [1, $n = 237$] = 7.31, $p = .008$, Cramer's $v = .173$), with a greater proportion of females participating in the comparison group. Class distribution was also unequal between groups (X^2 [3, $n = 237$] = 11.18, $p = .011$, Cramer's $v = 2.17$), with more upperclassmen participating in the comparison group. No significant differences were found between groups on ethnicity and both samples were primarily White (see Table 1, p. 16)).

Descriptive statistics for the dependent measures are presented in Table 2 (p. 20). An independent sample *t*-test and an effect size estimate (Cohen's *d*) compared academically underprepared and comparison students' levels of academic self-efficacy at each time point (pre and post). Levene's tests for homogeneity of variance were nonsignificant for all scales, with the exception of the CSEI Academic Self-Efficacy Scale at pretest. An adjusted *t* was used to account for the heterogeneity of variance on this scale. Results are presented in Table 3 (p. 21).

On the CSEI there was a statistically significant difference between groups on the Academic Self-Efficacy scale at pretest with academically underprepared students scoring lower than comparison students, suggesting that genuine differences existed between the two groups. There were no statistically significant differences on the Academic Self-Efficacy scale at posttest, nor were there any significant differences on the Social Self-Efficacy scale at either time period. Thus, academically underprepared students increased their academic self-efficacy over the duration of the course, moving to a level similar to the comparison students.

On the MSLQ there was a statistically significant difference between the two groups on the Self-Efficacy for Learning and Performance scale at posttest with academically underprepared students scoring higher than comparison students. Thus, participation in the study skills course significantly impacted students' self-efficacy as measured by the MSLQ, and this improvement is more than would be expected for students not receiving the study skills intervention. There were no statistically significant differences on the scale at pretest nor were there any statistically significant differences between groups on the Control of Learning Beliefs scale at either time period.

Although not directly addressing academic self-efficacy, comparisons were also made on the LASSI scales to better understand how academically underprepared students compared to general students on study skills. On the LASSI pretest, comparison students scored higher than academically underprepared students on the Anxiety, Motivation, and Test Strategies scales. Skill levels of students enrolled in the study skills courses were meaningfully lower than students not enrolled in the course in these areas. There were no statistically significant differences between groups on the other scales. At posttest, academically underprepared students scored

significantly higher than comparison students on the Concentration, Information Processing, Self-Testing, Study Aids, and Time Management scales. The effect sizes suggest that meaningful improvements occurred in each of these domains, particularly in students' abilities to test their own knowledge of material to be learned. There were no statistically significant differences between groups on the other scales. Overall, academically underprepared student scores increased, reflecting that their anxiety, motivation, and testing strategy skills were at a level similar to comparison students. These students also surpassed the comparison students in several domains.

The second research question addressed changes in academic self-efficacy. To assess change in each group, a series of paired sample *t*-tests for dependent samples were conducted. Results for the CSEI and MSLQ are presented in Table 4 (p. 22). On the CSEI, a comparison of pre- to postscores on the Academic Self-Efficacy scale revealed a significant improvement over time in academically underprepared students, but no statistically significant change in comparison students. Both groups increased on the Social Self-Efficacy scale, with the effect size for academically underprepared students being moderate whereas the effect size for comparison students was small, supporting the claim that the study skills course had a greater impact than time alone.

On the MSLQ, academically underprepared students significantly improved on both the Self-Efficacy for Learning and Performance and the Control of Learning Beliefs scales. Comparison students did not demonstrate statistically significant change on either subscale. Again, these findings support the hypothesis that the study skills course has a meaningful impact on academic self-efficacy. Scores from the LASSI provided further support with academically underprepared students demonstrated significant improvements from pretest to posttest on all 10 subscales, and comparison students improved significantly on 7 of the 10 subscales.

A two-way repeated measures ANOVA with one repeated factor (time) and one between subjects factor (class) was conducted to examine the interaction between course enrollment and time (pretest to posttest change). As shown in Table 5 (p. 22), on the CSEI Academic Self-Efficacy scale a significant interaction was found indicating that individuals enrolled in the study skills course changed significantly more over time than comparison students not enrolled in the course. Although the main effect for time was significant, indicating that both groups changed over time, the main effect for course was not significant. On the Social Self-Efficacy scale the course by time interaction was also significant with academically underprepared students making greater gains over time than the comparison students. The main effect for time was statistically significant while the main effect for course was not. Despite statistically significant change on these scales, however, effect sizes were small.

On the MSLQ Self-Efficacy for Learning and Performance scale a significant time by course interaction was found, with academically underprepared students making greater gains than comparison students. The main effect for time was significant as was the main effect for course. A significant time by course interaction was also found on the Control of Learning Beliefs scale with academically underprepared students making greater gain than comparison students, but neither main effect was statistically significant and effect sizes were small.

All of the LASSI subscales had significant interactions with small effect sizes (results are available from the authors by request). As with the other measures, academically underprepared students tended to improve at a greater rate over time than comparison group students on all LASSI subscales, catching up or surpassing the comparison students on all scales.

Logistic regression was used to assess the extent to which student retention could be predicted based on academic self-efficacy and semester GPA. Eighty-eight percent of the total sample was retained into the following semester (n = 209) and only twelve percent of the original 237 participants did not register for classes for the upcoming term (n = 28). The proportion of nonretained students was similar for both academically underprepared (96 retained, 15 not retained, 15.6%) and comparison group students (113 retained, 13 not retained, 11.5%). Because of the high correlation between the CSEI subscales only the Academic Self-Efficacy scale was selected for use in the regression. For the MSLQ, the total score was used as a predictor. The two measures of academic self-efficacy and semester GPA were entered into a logistic regression. None of the variables significantly increased prediction of retention. This finding is not surprising due to the high rate of retention in the sample.

Table 2

Means and Standard Deviations at Pretest and Posttest by Group

	Academically Underprepared				Comparison Students			
	Pretest		Posttest		Pretest		Posttest	
Scale	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
CSEI								
Academic Self-Efficacy	6.56	1.52	7.21	1.18	6.93	1.08	7.02	1.14
Social Self-Efficacy	6.43	1.66	7.02	1.61	6.66	1.55	6.92	1.57
MSLQ								
Self-Efficacy for Learning and Performance	5.92	0.92	6.29	0.81	5.75	0.82	5.79	0.96
Control of Learning Beliefs	6.02	0.82	6.25	0.84	6.18	0.75	6.10	0.89
LASSI								
Anxiety	23.14	7.71	26.32	7.23	25.89	7.10	27.35	4.08
Attitude	31.70	4.28	33.02	4.88	32.13	3.74	32.58	4.08
Concentration	26.25	5.57	28.70	5.75	26.64	5.36	27.27	5.36
Information Processing	26.16	4.99	30.14	4.93	26.25	5.17	28.41	5.62
Motivation	30.23	5.39	32.71	4.95	31.56	4.97	32.67	4.78
Self-Testing	20.95	5.84	25.98	6.11	22.27	5.64	22.23	5.94
Selecting Main Ideas	26.30	6.12	29.82	5.40	27.49	5.73	29.25	5.30
Study Aids	22.48	5.55	26.08	5.41	23.09	4.69	24.24	5.00
Time Management	23.93	6.03	27.43	6.44	23.79	6.69	24.75	6.40
Test Strategies	27.36	4.90	30.51	4.57	28.75	5.06	29.90	4.71

Discussion

The purpose of the present study was to examine the impact of study skills courses on academic self-efficacy in college students. Colleges and universities are increasingly offering courses aimed at improving study skills (e.g., effective note taking, time management, preparing for and taking exams, etc.) in students considered to be at elevated risk of nonpersistence. Previous studies have showed that such courses and workshops significantly increase student academic success and retention (Abrams & Jernigan, 1984; Polansky, Horan, & Hanish, 1993; Braunstein, Lesser, & Pescatrice, 2008). Although academic indicators such as ACT/SAT scores and GPA have traditionally been used to predict academic success in college students, an additional factor to consider is self-efficacy. Previous research suggests that self-efficacy may be a significant predictor of success (Hsieh, Sullivan, & Guerra, 2007; Klomegah, 2007). Although study skills programs have demonstrated success in improving student study skills, grades, and retention, their relationship to student academic self-efficacy has not been previously examined.

Table 3

Independent t-Test for Differences Between Academically Underprepared and Comparison Students at Pretest and Posttest for All Measured Variables

Scale	*t*	*p*	Cohen's *d*
CSEI			
Academic SE – pre	–2.167	.03	.29*
Academic SE – post	1.232	.22	.16
Social SE – pre	–1.103	.27	.14
Social SE – post	0.951	.34	.12
MSLQ			
Learning & Performance – pre	1.496	.10	.20
Learning & Performance – post	4.322	<.001	.57*
Control Learning Beliefs – pre	–1.636	.10	.21*
Control Learning Beliefs – post	1.373	.17	.18
LASSI			
Test Anxiety – pre	–2.854	.005	.37*
Test Anxiety – post	–1.083	.28	.14
Test Attitude – pre	–0.814	.42	.11
Test Attitude – post	0.753	.45	.10
Concentration – pre	–0.55	.58	.07
Concentration – post	1.984	.05	.26*
Info Process – pre	–0.127	.90	.02
Info Process – post	2.491	.01	.33*
Motivation – pre	–1.990	.05	.26*
Motivation – post	0.059	.95	.01
Self-Testing – pre	–1.182	.07	.24*
Self-Testing – post	4.785	<.001	.63*
Main Ideas – pre	–1.551	.12	.20
Main Ideas – post	0.813	.42	.11
Study Aids – pre	–0.917	.36	.12
Study Aids – post	2.727	.007	.36*
Time Management – pre	0.162	.87	.02
Time Management – post	3.206	.002	.42*
Test Strategies – pre	–2.148	.03	.28*
Test Strategies – post	1.007	.32	.13

Note. Degrees of freedom equal 235 in all tests except in Pre-Academic SE where degrees of freedom equal 195.7; *indicates medium effect size (Cohen's d = 0.2-0.8).

The present study found significant differences between academically underprepared students and comparison students at the beginning and end of the study. Academically underprepared students initially had lower levels of both study skills ability and academic self-efficacy on a variety of scales. This suggests that students enrolled in the study skills course were correctly identified as academically underprepared in comparison to students not enrolled in the course; however, alternative explanations should be considered in understanding these results. First, it may be that students referred to the study skills course are more aware of their academic weaknesses, either through interpersonal feedback directing them to the course or the material presented early in the course itself, whereas comparison students "don't know what they don't know" in terms of academic preparedness. If this is the case, comparison students may overestimate their skill level and those identified as academically underprepared underestimate (or perhaps accurately assess). Additionally, being identified as "academically underprepared" may influence an individual's social identity; students who struggle in comparison to their peers or are identified as needing "extra help" may internalize messages from their environment that asking for help is a sign of weakness or inferiority. This may further lower the individual's self-beliefs, including self-efficacy, explaining additional variance between those enrolled in the course and those who are not.

The inventories used for the study query students about their behaviors to measure levels of self-efficacy; that is, rather than asking students to respond to questions regarding their knowledge about appropriate approaches to academic study and learning, responses are gathered about current behaviors. Although the surveys are self-report, students shared changes in their actions, not simply their understanding of concepts. Therefore, there is an increased likelihood that the changes in academically underprepared students pre- and posttest scores on scales and items related to self-efficacy reflect changes that have been internalized.

In summary, the findings indicate that over the duration of the 7-week study skills course academically underprepared students increased their self-reported skill ability and their feelings of confidence in using those skills appropriately;

that is, their academic self-efficacy. Furthermore, their improvements were significantly greater than improvements in these areas made by comparison group students.

Limitations

A number of limitations must be considered in interpreting the results from the current study. The use of a comparison group is a strength of the study, but having a matched sample of comparison students would better "rule out" other factors which may have influenced control group scores. The addition of direct observation of student behaviors would further strengthen the study design. Finally, a longer follow-up period would address the important long-term effects of study skills courses and if the gains seen at posttest are maintained across students' academic career, and particularly students' retention in college. Despite these limitations, however, academic self-efficacy shows promise as an addition to the literature on student retention.

Implications for Practice and Future Research

This particular study-skills course appears to have done more than improve study skills, it also appears to have changed academic self-efficacy. Students at the end of the academic skills course were measurably more self-efficacious than students in the other course. What does this mean to the retention specialist r the academic advisor? Every practitioner has the experience of working to convince a capable student that they are, indeed, capable. Our results provide another tool in the practitioners tool-kit. An academic skill course can provide an experience-based argument that a student can be successful. Perhaps the best way for students to believe that they can be successful is to demonstrate that success to themselves. Our data shows that these academic skills courses can do that and thus provide another positive support for retention and completion.

It may also be useful to incorporate supports for academic self-efficacy into courses and other programming related to student retention. For example, curriculum designed to augment self-efficacy can be woven into study skills courses as well as other academic venues. Freshman seminar and tutoring programs could incorporate self-efficacy building activities and exercises for a greater number of students.

If the connection between these courses and retention is observed (see Braunstein, Lesser & Pescatrice, 2008) and if these courses are able to shift academic self-efficacy (which our data would support is the case), then it is not only study skills—like note-taking, the use of a textbook, and access to advising—that are important. It is also important to measure and address psychological factors like academic self-efficacy to support students in their efforts to complete their college degree. In addition, incorporating a broader array of assessments that can be used early in a student's experience and

Table 4

Paired Samples t-Tests Assessing Change Over Time for CSEI and MSLQ Scores

Scale	*t*	*p*	Cohen's *d*
CSEI			
Academic Self-Efficacy			
Academically Underprepared	6.282	<.001	.60*
Comparison Students	1.314	.19	.12
Social Self-Efficacy			
Academically Underprepared	4.872	<.001	.46*
Comparison Students	2.042	.04	.18
MSLQ			
Self-Efficacy for Learning & Performance			
Academically Underprepared	5.316	<.001	.50*
Comparison Students	0.493	.62	.04
Control of Learning Beliefs			
Academically Underprepared	3.364	.001	.32*
Comparison Students	–1.177	.24	.10

Note. Degrees of freedom for the Academically Underprepared group equal 110, and 125 for the Comparison Student group in all cases; *indicates medium effect size (Cohen's d = 0.2-0.8).

Table 5

Repeated Measures ANOVA Examining the Interaction Between Group and Time for All Measures

Scale	*F*	*p*	η^2
CSEI			
Academic Self-Efficacy			
Time	36.44	<.01	.13*
Course	0.41	.52	<.01
Time / Course	20.43	<.01	.08*
Social Self-Efficacy			
Time	27.89	<.01	.11*
Course	0.01	.93	<.01
Time / Course	8.65	<.01	.04
MSLQ			
Self-Efficacy for Learning & Performance			
Time	15.25	<.01	.06*
Course	10.82	<.01	.04
Time / Course	10.14	<.01	.04
Control of Learning Beliefs			
Time	2.21	.14	.01
Course	0.01	.95	<.01
Time / Course	10.03	<.01	.04

Note. Degrees of freedom equal 1,235 in all cases; *indicates moderate effect size (>.06).

providing results of such assessments to student advisors could enhance student success and retention. This would allow advisors to recommend courses and experiences to strengthen students' capacity to engage fully in their educational experience. Thus, mindfully and programmatically incorporating supports for self-efficacy may provide an additional potency for these courses. The down-stream outcomes, like retention and completion, may be positively impacted.

The average age of academically underprepared students was significantly higher than the age of comparison students. There are likely other differences between the groups that were not assessed and could play a role in better understanding student retention as well as the impact of an SAS course including employment, family constellation, and financial constraints. Students' engagement with higher education is impacted by the context from which they come and in which they live. As we seek to better understand the factors impacting student retention in higher education, assessing beyond the academic context may be a fruitful avenue. A greater understanding of unique factors impacting students will allow study skills classes, and the higher education environment overall, to better meet the needs of students.

Conclusion

Positioning students for success in their educational context is key goal for all educators. For students with less preparation who seek higher education, additional support services are needed. Academic self-efficacy is one important aspect to consider in helping students be successful and persevere in the face of challenges in the academic context. Study skills courses have demonstrated effectiveness in providing academic support for underprepared students. Additionally, the educational context of these courses also impacts students' academic self-efficacy. The combination of improved skills and greater confidence is a combination that may launch academically underprepared students toward greater success. Actively addressing academic self-efficacy in support services provided by universities may further enhance the effectiveness of the services and overall retention in the academic context.

The best way for students to believe that they can be successful is to demonstrate that success to themselves.

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CONTINUED ON PAGE 33

Annual Index

Volume 37, 2013–2014

Author Index

Title Index

a partner or in groups to create their maps and to discuss how the concepts work together. They can also use the information contained in the concept map as a metacognitive check of their understanding.

Scientific Modeling

Many college students do not understand the importance of modeling in science, which differs from the instructional modeling described previously. Scientific modeling involves building representations that assist in defining, visualizing, exploring patterns, and understanding the natural world (Clement, 2000). Models can be simple (planets in the solar system) or complex (interaction between enzymes and DNA) as well as large scale (galaxy formation) or small scale (diffusion across a cell membrane). Scientists communicate extensive information using models, use the models for reliable and accurate prediction, and expect their students to be able to work with models. In order to gain these disciplinary literacy skills before they enter science classes, students need to practice working with different models to learn how scientists use modeling as part of their scientific thinking. For example, a student in an introductory chemistry class might be expected to work with a model of an atom. In order to fully understand the concept, a student must be able to fluidly move from a diagram of the model, to a mathematical representation of the model, to a written description of the model using scientific discourse. Mobile apps might be an ideal way to infuse this type of learning into a DE classroom. For example, apps such as *Nova Elements* (WGBH Educational Foundation, 2013; iOS) show multiple representations of an atom and allow students to build atoms by combining protons, neurons, and electrons. In order to support disciplinary literacy, students can use the app to understand how the same information can be displayed in a multiple diagram forms as well as in narrative. Using this app, students can manipulate data, test theory, and explain concepts. Providing students with strategies to work with and interpret science models will help them as they progress through science courses at the college level.

Conclusion

Incorporating both disciplinary literacy strategies and mobile apps into DE courses has the potential to become a powerful approach for integrated reading and writing. Using this approach, students would be able to learn reading and writing strategies within disciplines using authentic texts and tasks. In this way professionals can exemplify NADE's motto of "helping underprepared students prepare, prepared students advance, and advanced students excel" (NADE, 2014), by preparing students for the literacy tasks they will experience once they leave DE courses.

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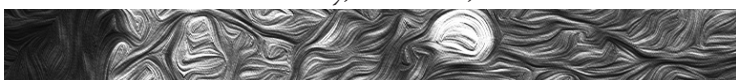

CONTINUED FROM PAGE 23

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