The Strategies-for-Achievement Approach (stACH) for Teaching "Study..."
The Effect of Learning and Motivation Strategies Training on College Students’ Achievement

Cognitive and metacognitive strategies, often referred to as “study skills,” are considered essential to being successful in college. Their importance is underscored by the fact that academic tasks at the college level tend to demand far more higher-level thinking and independent learning than those encountered in secondary school (Carson, Chase, Gibson, and Hargove, 1992). Instruction in these strategies is currently the subject of much interest and research in education. An example of a general approach to teaching learning strategies, labeled “learning-to-learn,” has its basis in informational and generative models of learning, and its emphasis on self-regulated and strategic learning (Simpson, Hynd, Nist, and Burrell, 1997).

Building on this foundation, the approach described in this study uses the four specific strategies: (1) take moderate risk, (2) take responsibility for your outcomes, (3) search the environment, and (4) use feedback, each with two substrategies (shown in Figure 1), to cover a variety of learning and motivation tasks, namely: overcoming procrastination, building self-confidence, becoming more responsible, managing your life, learning from lectures and text, preparing for tests, and writing papers. Prior work suggests that the use of strategies such as these increases learners’ motivation and subsequent achievement (Bandura, 1997; McClelland, 1965, 1979).

In support of the proposed strategies and substrategies, Garcia and Pintrich (1994) offer a framework for self-regulation at the college level that includes both a motivational and cognitive component, and two sources of influence: knowledge and beliefs, and strategies. Because it involves all of the strategies, particular emphasis in the training is placed on (a) Bandura’s (1977) concept of reciprocal determinism, the mutually interactive relationship between thoughts, behaviors, and environmental consequences, (b) Graham’s (1997) approach for changing students’ perceptions of the intentionality of others’ actions, (c) Robinson’s (1961) emphasis on the question-asking approach in teaching students to extract meaning from text, and (d) Mayer’s (1989) identification of the value of conceptual models for visualizing ways of solving problems.

The general purpose of this study was to determine the effectiveness of teaching students the use of specific learning and motivation strategies and substrategies to meet the cognitive and motivational demands of college. The research questions were whether students receiving strategy training earned higher GPAs (relative to their prior cumulative GPAs) than a matched group of students who did not receive the training (1) in the term during which the training was received, both (a) including and (b) excluding the grade in the training course, and (2) in the term after the training was received. The outcome measures represented a gradation from the immediate training context to broader ones of other courses taken simultaneously, and subsequently. GPA was used as the criterion measure because improving it was the goal of the training.

What is the likelihood that being taught learning and motivation strategies will enhance school performance? Hattie, Biggs, and Purdie (1996) cite research on approaches of a broad, programmatic nature that indicates the likelihood is high for performance in the immediate or narrow context in which the training took place, but considerably lower in other, broader or future contexts.

Methods

Subjects. The learning and motivation strategies described above were taught to students at a large public, Midwestern university who were enrolled in 18 sections of a 5-credit, elective university course called “Individual Learning and Motivation: Strategies for Success in College” during the Autumn, Winter and Spring Quarters of 2001-02. Off the 397 students who completed the training, 54% were male, 46% were female. Freshmen (excluding new first quarter freshmen because they lacked a prior cumulative GPA) accounted for 39%, while 27% were sophomores, 19% juniors, and 15% seniors. Ethnically, 65% were non-minority and 35% minority. In terms of prior academic performance, the mean grade point average was 2.48 with a standard deviation of 0.58. One-quarter of the students had GPAs of 2.01 or lower. Students generally found out about the training course from their academic advisor.

A comparison group of 397 students was drawn from student records, such that each student in the no-strategy training group matched a student in the strategy-training group on gender, ethnicity, rank (i.e., year in school), number of credit hours completed, and prior cumulative GPA at the time the course-taking student began the course (hence the exclusion of new 1st quarter freshmen).

Independent Variable: The independent variable was condition: strategy training versus no strategy training. Strategy training was provided through the Individual Learning and Motivation course that met four-and-a-half hours a week for 10 weeks (an entire term in the quarter system), and included four modules on motivation: overcoming procrastination, building self-confidence, taking responsibility, and managing your life, and four on learning/thinking: learning from lecture, learning from text, preparing for exams, and writing papers. Students used the textbook Learning & Motivation Strategies: Your Guide to Success (Tuckman, Abry, & Smith, 2002) that provided instruction in each area, and included in-class practice activities, and homework assignments for evaluation. All instructional and evaluative components were based on the set of strategies and substrategies described above and shown in Figure 1.

The course was taught using an instructional model called Active Discovery And Participation thru Technology (ADAPT, Tuckman, 2002) that combined the critical features of traditional classroom instruction (i.e., required attendance, a printed textbook, presence of an instructor) with those of computer-mediated instruction (i.e., class time spent doing computer-mediated activities rather than listening to lectures, over 200 performance activities rather than just two or three exams, self-pacing with milestones rather than a lockstep pattern).

The instructional purposes for the multiple learning performance activities were twofold: (1) to provide the practice necessary for changing behavior, and (2) to provide opportunities for transfer. Practice has been shown to be essential in order to enable students to become accustomed to and adept at performing a behavior (Ericsson, 1996). Transfer is much more likely to occur if training is done in the target context (Hattie, Biggs, and Purdie, 1996). Portfolios and papers presented an opportunity for students to apply the strategies they were learning to other subjects, and to the life of a person outside of themselves.

The second level of the independent variable was no strategy training. Students in this condition, who received the matching variables, were likely to have course schedules similar to those of students who received strategy training, with another elective course in place of the one in which learning and motivation strategies were taught.

Dependent Variables: To determine the effect of being taught learning and motivation strategies, the following comparisons of grade point averages for students in the strategy training and no strategy training conditions were made: (1) for the training term, i.e., the quarter in which the training was received (or not received), a. with the grade for the course included (for those in the group that took it), and b. with the grade for the course excluded, or an equivalent grade excluded for students in the non-course taking group; (2) for the follow-up term, i.e., the quarter following the one in which the training was received (or not received). In all cases grade point averages were adjusted in terms of students’ cumulative grade point averages immediately prior to the term the students experienced (or did not experience) the strategy training. All comparisons were made across all three quarters of the 2000-01 academic year combined. The grading scale (and its numerical equivalents) were as follows: A (4.0), A− (3.7), B+ (3.3), B (3.0), B− (2.7), C+ (2.3), C (2.0), C− (1.7), D+ (1.3), D (1.0), F (0.0).

Data Analysis. One-way analyses of covariance were run for each of the three GPA measures, with condition (strategy training versus no strategy training) as the independent variable, and prior cumulative GPA as the covariate, using pooled data from all three quarters.

Results

Training term/Course Grade Included. A significant main effect for condition was obtained (F=91.75, df=1/791, p<.001). Students in the strategy training condition earned an adjusted mean GPA of 2.96 (sd = .64) in contrast to the adjusted mean of 2.50 (sd = .80) earned by the matched students in the no strategy training condition. This amounts to an Effect Size of 0.64. In terms of gain scores, based on course-quarter GPA relative to prior cumulative GPA, students in the strategy training condition gained an 0.48 GPA points in comparison to 0.02 for no strategy training students. Mean comparisons are shown in Figure 2.

Training Term/Course (or Equivalent)/Grade Excluded. A significant main effect for condition was obtained (F=26.74, df=1/791, p<.001). Students in the strategy training condition earned an adjusted mean GPA of 2.62 (sd = .85) in contrast to the adjusted mean of 2.13 (sd = 1.12) earned by the matched students in the no strategy training condition. This amounts to an Effect Size of 0.50. In terms of gain scores, based on course-quarter GPA relative to prior cumulative GPA, students in the strategy training condition gained 0.14 GPA points in comparison to a Loss of 0.35 for no strategy training students (see Figure 2).

Follow-up term. The N for each condition was smaller than in the previous analysis. Both the strategy training group and the no strategy training group lost 12 students from the previous quarter. Seven of the 12 from the no strategy training group either withdrew from school or were dismissed, while all 12 from the strategy training group were eligible to but chose not to enroll that quarter.

A significant main effect for condition was obtained (F=3.824, df=1/767, p<.04). Students in the strategy training condition earned an adjusted mean GPA of 2.47 (sd = .96) in contrast to the adjusted mean of 2.25 (sd = 1.04) earned by the matched students in the no strategy training condition. This amounts to an Effect Size of 0.20. In terms of gain scores, based on course-quarter GPA relative to prior cumulative GPA, strategy
Students who received the strategy training were found to earn significantly higher (by .48) GPAs for the term in which the training was received, when the GPAs for those receiving strategy training included the grade for the course in which the strategy training was presented. Almost 75% of students receiving strategy training received a grade of A or A-, based on successful performance on 216 learning activities (e.g., assignments, tests, portfolios, papers), each of which had clear evaluation criteria. This result can be regarded as reflecting mastery of the strategies being taught and their successful application, at least within the course itself. Had the majority of the students being trained not received such high grades, the validity of the strategies and the quality of the training would have been suspect, and not likely to lead to their further use.

The issue of the contribution of the grade to that quarter’s GPA was dealt with by removing it from the GPA of students receiving the strategy training, while simultaneously removing an equivalent grade from the GPAs of students not receiving the training. The resultant comparison, still significantly favoring the students trained to use the strategies, reflected transfer of strategy training to other courses taken at the same time as the training. The analysis of GPA for the follow-up quarter, again significantly favoring students receiving the training in comparison to those not, clearly reflected even greater transfer of the strategies, particularly over time, rather than a direct effect or possible bias of the training course grade. Given the great variation in programs of study from student to student, the existence of a reliable difference lends support to the conclusion that the training results in substantial transfer of effective strategies to other courses and other academic terms.

The use of students’ grade point averages as a yardstick for evaluating learning skills intervention programs is both uncommon and demanding, given the many variables, both dispositional and environmental, that may affect students’ performance. Nevertheless, GPA is the basis by which many important decisions influencing a student’s future are made, and thus would seem to be a highly valid, if challenging, criterion for evaluating such programs. Causing changes in students’ GPAs would suggest that an intervention program was sufficiently influential to outweigh or overcome uncontrollable variables.

The question of the validity of the design used in studies such as the one reported here invariably is raised. Internal validity is susceptible to bias introduced by uncontrolled variables. In situations such as this one where random assignment of students to conditions is impossible without seriously compromising external validity, it is necessary to compare intact groups, if indeed a comparison is to be made at all. In the study of outcomes that reflect motivation, internal and external validity must be pitted against one another. Studying real student behavior with real consequences reveals true motivation well beyond that which can be uncovered through simulation. It also requires that students be given the choice to participate, that choice potentially reflecting prior motivational differences. Controlling potentially relevant demographic variables and pretest scores, as was done in this study, represents the most feasible approach to finding out what will “work” in the real world.

Implications and Applications

The finding that training in learning and motivation strategy use contributed to GPA improvement suggests that the research-based principles and theories of educational psychology regarding self-regulation and cognitive information processing bear a relationship to actual performance in educational settings. Along with efforts such as those by Pressley, Woloshyn et al. (1995) and Zimmerman, Bonner, and Kovach (1996), the approach evaluated here reflects a growing trend toward applying educational psychology research to the improvement of students’ academic performance by improving their learning and motivation.

The findings of this study have some major implications for academic advisors and others who work with at-risk students. Training for these professionals typically involves a different set of theories and foundations than those on which the learning and motivation strategies used in this study are based. To increase the likelihood that advisors will have an impact on students’ academic performance, it would seem appropriate to provide them with workshops that cover both the theoretical basis for the school success strategies described in this study and their application in various situations. The training should involve scenarios of actual experiences with students and ways the strategies could be effectively applied. This would not only help academic advisors learn about the strategies and their use, but enable them to use the materials with students they advise or are called upon to help. (Indeed, we have conducted such workshops here for this audience, and they have been well-received.)

In one-to-one or small group interactions, advisors can use concepts from the course as a basis for posing questions, asking questions and conducting discussions that will lead students to the very strategies taught in the course.

Some examples of specific applications may be helpful. At-risk students may have the tendency to select majors with entrance requirements that are beyond their demonstrated capabilities, and persist in these choices in the face of continual failure. The “take moderate risk strategy” with its “go for goal” substrategy could be used for helping these students see that their choices may be inappropriate at that particular time, or require some intermediate goals that would help them reach their long-range objective. For students who divert their energies into blaming others for their academic difficulties, the “take responsibility for your outcomes” strategy would be very applicable, and could help them focus on effort and strategy, causes that are much more amenable to personal control than what others around them do.

For the student who relies on friends and roommates for important information about courses and requirements, the “search the environment” strategy and “just ask” substrategy could be suggested as a way to find and use more reliable and well-informed information sources such as advisors themselves or other academic staff. Finally, for those students whose academic problems stem from inability to manage their own time or life, the “use feedback” strategy and “tell yourself” substrategy could be recommended to help them take a more constructive approach to their difficulties. “Taking responsibility” and “planning” would apply as well, and the “To-Do Checklist” could be recommended as a tool.

Future research should focus on the features of the training likely to have been responsible for the observed improvement in academic performance. This would include (1) the broad strategies and substrategies applied to the various topics covered, (2) the use of performance activities to provide practice, feedback assessment, and transfer and (3) specific techniques taught, such as the To-Do Checklist for overcoming procrastination, and the Question and Answer Outline for text processing. The strategies and substrategies, by virtue of their small number and repeated application, may help to narrow the focus of students to the most critical elements, thereby facilitating learning. The frequent performances serve as a way of causing students to be actively involved in the learning process throughout the entire training period. The use of activities explicitly designed to help students contextualize what they are learning by applying it to other courses and other situations, may be the cause of the broader transfer required to increase grades, especially subsequent to the training period.

References


STRATEGIES FOR ACHIEVEMENT

Text Box: Action Phase
Search the Environment
Just Ask
Visualize It