

# **The Expanding Role of Developmental Education**

**Jeanne L. Higbee  
Patricia L. Dwinell  
Editors**

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# The Effect Of Study Skills Training On United States Air Force Allied Health Students

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*John C. Griffith*  
United States Air Force

## Abstract

*Study skills intervention was shown to significantly increase end-of-course scores and decrease remedial instruction for 90 randomly selected students attending a three month Air Force allied health technician course. Additionally, students who received the study skills intervention graduated at a higher rate than those who did not. Study skills training in a corporate setting can enhance student learning and significantly reduce training costs.*

**T**he American public education system and national network of colleges and universities are designed to enhance the capabilities of our most valuable national resources, our people. However, many of our educational institutions assume that people know how to learn and know how to study. The teaching of study skills enhances student ability to succeed both academically and in the workforce. An illustration of the value of teaching study skills can be found in the United States military. Recruits are brought on active duty, receive formal training, and then are assigned to a duty position in their career field. Students who fail in technical

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For further information contact: John C. Griffith • 8230 Phoenix Avenue • Universal City, TX 78148 • (210) 536-8037 • fax: (210) 536-2984 • e-mail: jgriff60@aol.com

training are eliminated from active duty before they ever became a “productive member” of the Air Force at a cost of literally millions of dollars per year.

This study examined the effects of a study skills training intervention course on U.S. Air Force aeromedical apprentices with five main purposes. The first was to explore the relationship between study skills training and the number of times students required academic interventions outside of normal class time. The second purpose was to explore the relationship between study skills training and end of course averages. The third was to determine the relationship between study skills training and the amount of additional instruction, measured in time, that students required. The fourth purpose was to explore the relationship between study skills training and graduation rates. The final purpose was to recommend areas for further research.

## **Background**

From 1995 through 1997, Dr. Joy Vroonland conducted classes that were designed to help military technical school students with their study skills. Vroonland and one assistant gave this training to approximately 3,400 students annually. All of these students were assigned to the 882nd Medical Training Group in more than 10 allied health professional courses. She believed that the teaching of her study skills course enhanced student performance, facilitating student success. However, her opinions were not substantiated by any real statistical analysis. She could not show that the effects of study skills instruction made an impact because the course was taught to all students. Put another way, Dr. Vroonland believed that the teaching of her study skills course was making a positive impact on student performance and the mission of the 882nd Medical Training Group. However, no empirical evidence could be shown on the possible positive effects of the study skills training. Moreover, the possible implementation of this study skills course throughout the Air Force depended on the results of an objective and well-designed study.

## **Statement of the Problem**

There was a perceived problem at the School of Aerospace Medicine with regard to student disenrollments, washbacks (i.e., students repeating blocks of training), and failure rates. The school expends a great amount of resources, time, and effort to ensure student success. The average cost to train one student in the three month Aeromedical Apprentice course is \$12,500.00 (Schommer, 1998). Students who fail the course of study and are eliminated from the program and, in most cases, the Air Force, cost thousands of taxpayer dollars without serving as a “productive” part of the Air Force.

## **Purpose of the Study**

The purpose of this study was to determine the difference in academic interventions, grades attained, time spent in one-on-one instruction, and graduation rates, between students who

received study skills training prior to the start and during technical training and students who did not receive study skills training prior to the start and during technical training.

## Hypotheses

Study skills course intervention was hypothesized to reduce the number of academic interventions beyond normal classroom instruction, improve higher end-of-course test scores, reduce the time required for one-on-one instruction for student tutoring beyond normal classroom instruction, and reduce the attrition rate.

### Limitations

The study did not consider racial or ethnic differences among students as a separate variable because the Air Force does not consider race or ethnicity as a factor when recruiting or delivering instruction to Air Force members. The Air Force only considers race to ensure discrimination does not exist.

The sample of students was limited to Department of Defense students attending the School of Aerospace Medicine, Aeromedical Apprentice Course, Brooks Air Force Base Texas, from December 1997 to May 1998. One foreign student was excluded from this study due to differences in culture and educational experience as compared to American students.

## Literature Review

An extensive review of the literature was conducted, including civilian and military sources, to fully investigate research on study skills intervention. Particularly noteworthy was McMurry's work How to Study and Teaching How To Study, a 1909 effort that formed the foundation of many later works in the field. Walter and Siebert (1993) and Ellis and Lankowitz (1997) provided explanations of effective study skills methods. These works formed the foundation of the study skills model used in this experiment. Prather (1983) and Sterling (1996) conducted previous research in military training environments that proved very helpful to the development and execution of this project.

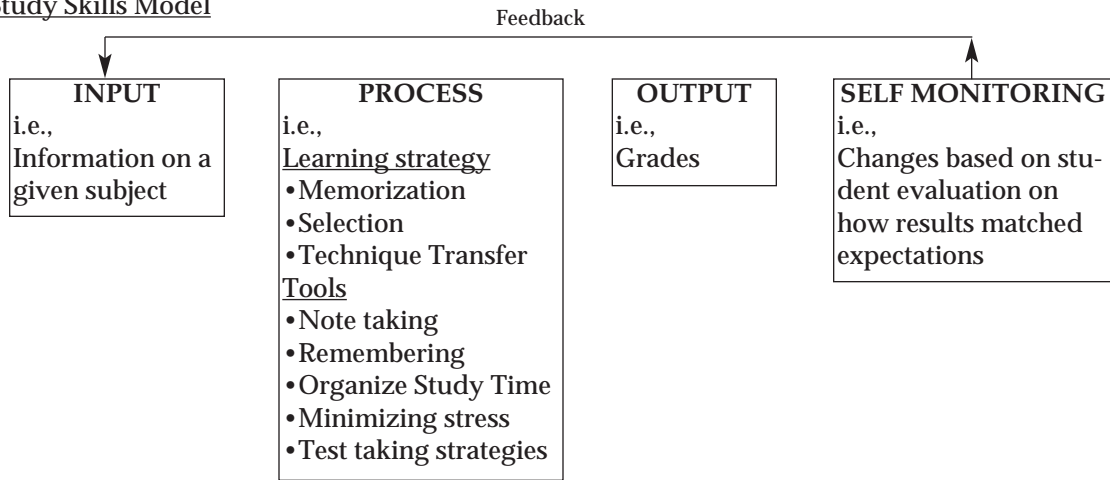
Many students complete high school without disciplined and systematic study habits. This idea was highlighted in a 1984 study by Christian and Murphy demonstrating the idea that study skills are not taught in high school. Their survey included 479 students from three widely different high schools. In the survey 74% indicated a desire to attend college, however 70% had not been trained in time management techniques. Additionally, 52% of the students indicated that they did not typically listen before they began to take notes, and 52% also indicated that they had no system for note taking during class. A surprising 44% indicated that they received no training on how to read a text book and 82% of the students reported that they studied less than three times per week. Christian and Murphy concluded that the majority of the students in this survey were not adequately trained in study skills. None of the three schools had an organized curriculum concerning the teaching of study skills even though students seemed to want training

in how to study. It cannot be assumed that students entering our university or military service medical technical schools have the appropriate level of study skills needed to succeed.

The issue of students “not knowing how to study” is not new. McMurry (1909) made a passionate argument in his book How to Study and Teaching How to Study that most people do not know how to study, causing many to fail. The focus of this research was based on the premise that students who are very much alike can have differences in performance that are directly related to their command of study skills. The grade a student gets at the end of a module or a term is not only based on intelligence but also on the ability to use a given set of study skills for differing subjects or courses (Marshak, 1984; McMurry, 1909). Study skills can be better understood by viewing a “Study Skills Model” shown in Figure 1.

Figure 1

Study Skills Model



The model was designed during the course of this study and shows four basic steps with a feedback loop. “Self monitoring” (step four of the model) assists in answering the question, “did the results match expectations?” The student then makes any necessary changes based on the results (grade) for future study.

Differences from Previous Studies

This study on the effects of study skills training intervention on United States Air Force aeromedical apprentices represents a departure from previous studies involving the teaching of study skills to students because it involved military students in a military technical school setting. Previous studies by Smith and Dowdy (1989), Zimmerman and Pons (1986), Christen and Murphy (1984), and Valeri-Gold, Callahan, Deming, Mangram, and Errico (1997) have focused on high school or college student settings. Prather (1983) conducted a study at the U.S. Air Force Academy involving 24 students with low grade averages. These studies all assert, in one form or another, that study skills need to be taught to students to enhance their probability of success.

Sterling (1996) focused on test anxiety, asserting that test anxiety was a factor that could be modified to enhance military student success. Sterling's study was conducted in a military technical school. The major differences between this study and previous studies are that it involved a military technical school setting, focused specifically on the effects of teaching study skills using random sampling (not targeted groups), and followed student progress for at least three months.

## Method

The course in this experiment was originally developed by a board certified psychologist at Sheppard Air Force Base. The researcher modified the course based on the review of literature for this study, four years of experience as an instructor and two years experience as a course supervisor. The study skills course was based on the study skills model discussed earlier and emphasized five major areas: (a) note taking; (b) remembering; (c) organizing study time; (d) minimizing stress; and (e) test taking strategies.

The class was taught in a 90-minute session prior to the start of the Aeromedical Apprentice course. Additionally, a one-hour follow-up session was given to students one month after they began technical training in the Aeromedical Apprentice course. The course and follow-up session were intended to put the students in the correct frame of mind to approach their studies in an effective fashion. The class was interactive; the students were encouraged to participate and express their feelings.

### Research Design

This experiment used the posttest only control group design (Campbell & Stanley, 1963; Yount, 1990). This design used a treatment group and a control group. The treatment group received study skills training and was measured on four dependent variables. The control group was measured on the same four dependent variables, but received no study skills training.

The experimental control used in this study was random assignment and the use of the disguised experiment technique (Kirk, 1995). Subjects were randomly assigned to two groups, the treatment and control group. Randomization is one of the chief tenets of inferential statistics and is a critical way of neutralizing the possible effects of nuisance variables, greatly increasing the probability that the sample will be representative of the population as a whole and minimizing bias (Hinkle, Wiersma, & Jurs, 1994; Kirk, 1995). Kerlinger (1986) indicated that randomization is the only method that controls for all possible extraneous variables, allowing the researcher to consider the treatment and control group statistically equal.

The statistical analysis used in this experiment was regression analysis. The aptitude of all students in this experiment had already been measured by the Armed Services Vocational Aptitude Battery, (ASVAB) Test General Score, which was used as a covariate in the experiment. Use of the covariate reduced the amount of unknown error, making this design even more powerful (Yount, 1990). The directional hypotheses were tested using regression analysis at the

$p \leq .05$  level.

### **Ethical Standards**

Informed consent was obtained from the University of North Texas human subjects review board. Written approval was obtained from the Commander, School of Aerospace Medicine, Brooks Air Force Base, Texas, where the study was conducted. This report was made available to the School of Aerospace Medicine and the United States Air Force to further knowledge regarding the effects of study skills training. The study was designed to be as unobtrusive as possible with its only possible impact being improvement of student performance and improved methods for student retention.

### **Independent Variables**

The main independent variable was a study skills intervention consisting of a 90-minute study skills course and a one hour follow-up session four weeks after the start of technical training. The second independent variable used in this study was student ASVAB General Test scores. These scores were designed to show student aptitude. The main purpose for using ASVAB General Test scores in this study was to show that the treatment and control groups were similar and to reduce the amount of unknown error making the design even more powerful (Yount, 1990).

### **Dependent Variables**

Maring, Shea and Warner (1987) recommended that evaluating a study skills program on the basis of a single variable such as grade point average is inappropriate. Therefore, four dependent variables were chosen for this experiment. These variables were: number of academic interventions for individualized instruction, end-of-course test scores, time spent in one-on-one instruction for student individual assistance, and graduation rates. The dependent variables involving extra time devoted to students who needed help beyond normal course time, (i.e., number of academic interventions for individualized instruction and time spent in one-on-one instruction for student individual assistance) were reported through the instructors to the researcher via weekly updates during the experiment. End-of-course scores and graduation rates were reported upon course completion.

### **Sample**

This study examined a random sample of 90 U.S. Air Force Aeromedical Apprentice students, representing a population of approximately 250 students. The students in the sample included seven of the nine enlisted ranks from Airman Basic to Master Sergeant. The sample included Air Force and Air Reserve Component students who were new to the Air Force as well as senior non-commissioned officers with over 15 years of prior military experience. Participants were randomly assigned into the control and treatment groups of 45 students each and observed for a three-month period.



A detailed analysis using independent sample t-tests was conducted to ensure the control and treatment groups were not different in any statistically significant way at the  $p \leq 0.05$  level. Additionally, the fact that the groups were randomly selected suggests that the control and treatment groups were similar at the beginning of the experiment.

## Results

The study skills course was given to the treatment group on the first day of training, (90 minute orientation) followed by a 60 minute session one month later. Neither the study skills course nor the follow-up session were given to the control group. The study skills course was hypothesized to: (a) decrease the amount of times additional instruction was required; (b) increase end-of-course average; (c) decrease the amount of additional time required for one-on-one instruction for student tutoring beyond normal class room instruction; and (d) increase the graduation rate.

These four hypotheses were tested in the null form to determine the effectiveness of the study skills course. Each hypothesis was tested by comparing full versus restricted regression models. The differences between the  $r^2$  values of the full and restricted models were then computed to determine statistical significance at the  $p \leq .05$  level. These results are shown in Table 1.

Hypotheses 1, 2 and 3 were rejected, signifying a statistically significant correlation at the  $p \leq .05$  level between study skills training and the dependent variables of amount of times

Table 1  
Statistical Results of Full vs. Restricted Models, Critical Values and Significance Levels

	F Value (Full vs. Restricted Models)	Critical Value	$p^*$
Ho <sub>1</sub>	5.18	3.951	.025*
Ho <sub>2</sub>	5.454	3.951	.022*
Ho <sub>3</sub>	5.048	3.951	.027*
Ho <sub>4</sub>	1.367	3.951	.246

\* All hypotheses were tested at the  $p < .05$  level of significance.

additional instruction was required, (negative correlation), end-of-course grade average, (positive correlation), and additional time required for one-on-one instruction for student tutoring beyond normal class room instruction, (negative correlation). Hypothesis 4 was retained at the  $p \leq .05$  level.

Based on the findings of the study, the following conclusions were reached:

1. A statistically significant negative correlation existed between the independent variable of study skills training and the dependent variable of the number of times students required additional assistance outside of normal classroom instruction. Students who were trained in study skills required additional assistance on fewer occasions than students who were not trained in study skills.

2. A statistically significant positive correlation existed between the independent variable of study skills training and the dependent variable of end-of-course grade average. Students who were trained in study skills had higher end-of-course grade averages than students who were not trained in study skills.

3. A statistically significant negative correlation existed between the independent variable of study skills training and the dependent variable of the amount of time spent in one-on-one instruction for student individual assistance outside of normal class time. Students who were trained in study skills required less time spent in one-on-one instruction for student individual assistance outside of normal class time than students who were not trained in study skills.

4. Although the student attrition rate was 50% lower for the treatment group than for the control group, the difference was not statistically significant at the  $p \leq .05$  level. Though a statistically significant difference did not exist between the independent variable of study skills training and the dependent variable of graduation rates in this particular study, students who were trained in study skills were more likely to graduate than students who were not trained in study skills.

5. The ASVAB General Test score was a statistically significant predictor of all of the dependent variables used in this study.

## Discussion

The Study Skills Model presented earlier is an effective tool to use when developing and delivering a study skills course. Findings of this study were consistent with earlier works of Zimmerman and Ponds, (1986), Kirschembaum and Perri (1982), Entwisle (1960), and Prather (1983). These works indicated that study skills training can yield statistically significant positive results. This is especially true with study skills interventions that include multi-component instruction, which involves such components as note taking, reading, test taking strategies, organization of study time, and if the study skills instruction is reinforced over time.

The implementation of the study skills course used in this experiment appears to be a very effective use of time and resources. The amount of time and resources expended in providing additional instruction to poor performing students or the cost incurred when a student fails a course dictates the use of preventative methods such as the study skills course used in this experiment. Air Force health care technical schools should encourage the teaching and use of effective study skills techniques to their students to reduce remedial instruction and increase end-of-course scores and graduation rates. Continued efforts in the area of study skills training will lead to a reduction in costs for the Air Force and savings for U.S. taxpayers.

## Recommendations For Further Study

1. The results of this study suggest a possible relationship between study skills training and graduation rates. In this study that relationship was not found to be statistically significant; however, a relationship may be possible in other academic settings that do not place such a large emphasis on graduation rates.

2. The results of this study suggest applicability of study skills intervention to other fields of technical training. The study skills intervention course in this experiment could provide a basis for further studies implementing study skills interventions in military and civilian medical and non-medical training settings.

3. Further studies regarding age and education level should be conducted prior to implementing a study skills intervention course in adult nontechnical training environments.

4. Further research should be conducted in primary and secondary school settings to determine the feasibility of providing sustained cost effective study skills training to students early in their academic careers to enhance their learning capabilities.

5. Further studies should be conducted to identify the minimum number of study skills training sessions required for effective adaptation of study skills as evidenced by little or no remedial training and high graduation rates.

6. Further research should be conducted to determine the projected cost savings of implementing a study skills intervention course throughout U.S. Air Force medical and non-medical technical training schools. This analysis could then be applied to the other three branches of the military if cost savings prove significant.

### Final Note

The U. S. Air Force School of Aerospace Medicine has incorporated the study skills course described in this article into all five enlisted courses taught at the school as of September, 1998.

Additionally, the author has put forth an official Air Force suggestion regarding the implementation of the study skills course for all Air Force initial technical training courses in an effort to offer this training to over 25,000 students per year.

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