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Effects of Enhanced Evaluative Feedback on Student Grades

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Effects of Enhanced Evaluative Feedback On Student Grades

**A Research Project Presented to the Graduate Faculty of the
Department of Occupational and Technical Studies
Old Dominion University**

**In Partial Fulfillment of the Requirements for the
Masters of Science in Occupational and Technical Studies**

By

Roney A. McDaniel

June 2003

SIGNATURE PAGE

Roney Andrew McDaniel prepared this research project under the direction of Dr. John M. Ritz in OTED 636, Problems in Occupational and Technical Studies, at Old Dominion University. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the degree of Master of Science in Occupational and Technical Studies.

Approved by: John M. Ritz

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Roney A. McDaniel

CHAPTER I

INTRODUCTION

The grades earned by students are influenced by different variables. These variables can be classified as either internal or external. Seldom does the instructor have control over external variables such as study environments, living conditions, work requirements and other elements of the student's life outside the classroom. However, the instructor has almost total control over the internal variables; what goes on in the classroom.

The domain of the instructor is the classroom, and it is in this domain that instructor and student exchange is developed and grows into a relationship that promotes learning. This exchange or interaction is based on two key elements of communication.

The first element of the exchange is the information sent to the instructor by the student in the form of class participation, completed assignments, performance tests, conversations, and other forms of interaction. This information is the means by which the students relate their understanding of the content and their satisfaction with the instructor's understanding of their learning styles.

The second element of the exchange is the feedback the student receives from the instructor. This feedback can be verbal, written comments, body language, or other appropriate forms of communication. This exchange can be an important factor in the student's performance and understanding of the information presented. The amount and type of feedback received by the student varies from instructor to instructor and from class to class. How much and what type of feedback can be the key to improving student performance.

The researcher taught two sessions of OTS 110T, Technology in Your World, in the Spring 2003 semester. The experimental group received enhanced evaluative feedback on all activities and the control group received normal instructor feedback. The research goal was to determine if the enhanced evaluative feedback provided to the experimental group made a significant difference in the grades earned by the students.

PROBLEM STATEMENT

The problem of this study was to determine the effects of enhanced evaluative feedback on student grades in OTS 110T, Technology in Your World, at Old Dominion University.

HYPOTHESIS

The following hypothesis was developed to guide this study:

H₁: Students in the OTS 110T, Technology in Your World, class at Old Dominion University that receive enhanced evaluative feedback will earn higher grades than those students receiving normal feedback.

BACKGROUND AND SIGNIFICANCE

The researcher, having recently completed an undergraduate degree as a non-traditional student and working on a graduate program, was exposed to many professors and just as many types of feedback. Having been exposed to the varying degrees of feedback, the researcher chose to determine what effects feedback had on student grades. The researcher, working as a Graduate Teaching Assistant, was assigned as the teacher of

record for OTS 110T, Technology in Your World, at Old Dominion University. Being the teacher of record the previous semester allowed the researcher the opportunity to observe student performance first hand. Additionally, during the previous semester the researcher refined the presentation sequence and evaluation tools, as well as developing evaluation criteria for each segment of the course. As a result of these observations and participation in the course design, coupled with the researcher's current and recent exposure to the university system, a keen interest was developed in the influence instructor feedback had on student grades.

Chappuis and Stiggins (2002) emphasize that the type of feedback provided to the student is extremely important. No longer are the comments of "great work", "good job" or "you need to work harder" sufficient. These types of comments have long been the norm for the type of feedback students received. These non-descriptive comments along with a letter grade or percentage points do little to motivate the student to perform better or increase their desire to learn. Feedback that merely provides a grade and shows what answers the student missed can also be a negative factor in how well students perform in the classroom. Students need to know more than the mere fact that they were wrong. If the instructor expects the student to perform better, then the instructor needs to tell the student what he/she needs to do to be a successful learner.

According to Catalyst, a University of Washington integrated collection of resources for educators (Online, <http://catalyst.washington.edu/method/responsible.html>), "Successful learning requires students to be key players in directing their own education." This statement is echoed throughout the halls of many universities and continually emphasized in graduate programs for education and training. The process of

making students key players in their education can be assisted by professors who provide resources, expectations, open lines of communication, and opportunities for contribution and collaboration accessible evaluative feedback.

As discussed by Olin and Sullivan (2002) there are mixed opinions with reference to the effects of teacher evaluation on student performances. Studies by Cardelle-Elwar and Corono (1985) showed that student attitudes and performance improved with feedback, but Stewart and White (1976) replicated previous studies and concluded that feedback had very little or no effect on student performance. So what is the answer? In this case the researcher decided to investigate this issue further.

LIMITATIONS

The following limitations were observed during this study:

1. This study was limited to students in the OTS 110T, Technology and Your World, class at Old Dominion University.
2. The experimental and control groups were both taught by the researcher.
3. The semester evaluated was not the first time the researcher had taught the course.
4. Students were a mixture of freshmen, sophomores, juniors and seniors.
5. The study population was limited to the spring 2003 semester enrollment.

ASSUMPTIONS

This study was based upon the following assumptions:

1. The instructional material and training aids were identical for both groups of students.
2. Students enrolled in the class were from various colleges within the university. This course is an elective that fulfills a university requirement in the science and technology perspective.
3. The study population was ethnically diverse.
4. The classroom and laboratory were equipped with appropriate training aids and technological experiments.
5. The effort and abilities of the students varied among the participants.
6. The same assignments and evaluations were used for both groups of students.

PROCEDURES

This study applied different levels of feedback to two groups of students taught by the researcher in the OTS 110T, Technology and Your World, class at Old Dominion University. The experimental group received enhanced evaluative feedback from the instructor and the control group received normal instructor feedback.

Throughout the semester the instructor/researcher evaluated the performance of the students in both groups and provided feedback on each assignment, quiz, laboratory experiment, and classroom participation. Additionally, the instructor held conferences with students not performing well on the course.

At the end of the semester, the researcher collected the data from the final grades earned by the students of the experimental group and compared these with the final

grades earned by the control group to determine if enhanced feedback had a significant impact on the grades earned by the experimental group.

DEFINITION OF TERMS

With regard to this study, the following terms are defined for the purpose of clarification:

Feedback- information provided to the student that represents the student's performance on a particular activity.

Evaluative Feedback- information provided to the student that represents the student's performance on a particular activity and written comments that explain what the student needs to improve.

OTS 110T, Technology in Your World- a freshman level course taught at Old Dominion University that is an overview of the resources and systems of technology. Emphasis is on the impacts that technology has on individuals and society. Discussion and activities explore the evolution of technology, its changes, advances, and effects on individuals and society (Old Dominion University, 2002, p. 315).

Experimental Group- The group of students that received the enhanced evaluative feedback.

Control Group- The group of students that received normal instructor feedback.

OVERVIEW OF CHAPTERS

This study sought to determine if enhanced evaluative feedback, provided to the student by the instructor, made a positive impact on the student's performance. Chapter I

of this study explained the researcher's belief and a brief discussion of the background and significance of the problem. The procedures for conducting the study, as well as the limitations and assumptions that must be acknowledged when analyzing this study are presented. Additionally, a list of terms used throughout the study and their definition are provided for clarity.

The following chapter of this study will include a Review of Literature upon which the researcher based this study. Additionally, the methodology and procedures for collecting the data and the analysis process along with the researcher's findings will be discussed in Chapters III and IV. Finally, in Chapter V, the researcher will provide a summary and provide his conclusions and recommendations for the use of enhanced evaluative feedback.

CHAPTER II

REVIEW OF LITERATURE

The goal of this study was to determine if enhanced evaluative feedback had an effect on the grades achieved by students enrolled in Technology and Your World class during the Spring 2003 semester at Old Dominion University. The researcher collected and analyzed data about student's grades from both a control and an experimental group. Prior to collecting and analyzing the data, a review of feedback and student grades was conducted.

This chapter of the study discusses the role of feedback in the educational process as well as the types of grades that students receive. There are various types of feedback that are provided by educators and trainers, and this feedback can influence not only the student's grade, but also the student's attitude toward learning.

FEEDBACK

Feedback can have a powerful impact on student performance and motivation. The students you see in your classrooms now are not "your father's students." As discussed by Prensky (2001), the students of today learn in a much different manner, and part of learning is the feedback that is provided by the teacher. No longer is providing a numerical or letter grade sufficient. Students in the 21st century require more input from the instructor, which equates to "don't just tell me what I'm doing wrong, but tell me how to improve".

Teacher's evaluations of student's work are the most common form of feedback cited as having positive effects on student performance. In a review of a survey by Olina

and Sullivan (2002), the importance of feedback was evidenced through the study by Cardelle-Elawar and Corno (1985) where they found that elementary school students' performance and attitudes towards mathematics improved when their teachers provided written feedback on their homework. Similarly, Thomas et al. (1993) found that the amount of feedback provided by the teacher had a direct impact on the performance of the students on tests, quizzes, homework, and other assignments.

Not only is the amount of feedback important, but the quality of the feedback is the key to improving student performance. The feedback provided by the teacher is most effective when it is directly related to the task. This feedback should not be vague and it should be in a written format that provides the opportunity for students to correct their performance (Black and William, 1998).

The psychology behind the notion of relating the feedback to the task was shown in a study conducted at Stanford University on eighty students taking a Spanish course by Cardelle-Elawar and Corno (1985). Specific feedback on errors draws attention to material not learned well, thus allowing the student to focus their attention to tasks they did not learn versus tasks they did well. There may be some slight loss of motivation by not recognizing what the student did well, but the time the instructor spends commending the student of what he or she already knows is lost to the time available to correct errors in what the student failed to learn.

The findings of Cardelle-Elwar's and Corno's study concluded that teacher's feedback on student assignments can make a difference when they provide constructive comments to students. "This contact provides the teacher with information about how a

student perceives instruction, thinks, learns and solves problems and so guides adaptive teaching” (Cardelle-Elawar and Corno, 1985).

Feedback is not only important in improving student performance, but it plays a key role in keeping the student interested in learning. Feedback can be viewed as a vital element in the formula required to keep a student motivated, and without this element of motivation the student loses interest and takes a vacation from learning (Netherton, 2003). The student’s world is full of many distractions and it is sometimes difficult for the teacher to keep the students on track and involved in their learning.

The teacher’s ability to keep students’ minds in the classroom can be greatly enhanced with feedback. Feedback is not merely the notes and grades you put on an assignment or test paper, but the total communication medium that develops between the teacher and the students. The ability to decode students’ nonverbal behavior, especially the behavior that communicates a loss of concentration, or lack of comprehension, is an extremely important skill for teachers to develop and employ (Webb, Diana, Luft, Brooks, and Brennan, 1997).

The unspoken language that develops between students and the teacher is an integral part of the feedback that takes place in the classroom. Students are continually sending signals to the teacher, and the teacher is responding with feedback to those signals. A teacher may have to go back and reinforce certain material if the students’ concentration is not present in the verbal and nonverbal feedback they are sending. Likewise, students routinely receive nonverbal feedback from the teacher.

The message sent by the teacher may also be encoded. It could be a look, a smile, a frown, or a hand gesture. No matter what the medium, both teachers and

students use these and other methods of feedback everyday. The teachers and the students show approval, disapproval, satisfaction, dissatisfaction, and comprehension through feedback. These are the actions that feedback should illicit.

Modeling is another example of a desirable action the teacher would want to achieve with her/his students. When the student submits a good assignment there is a stronger likelihood of the student repeating the required efforts on the next assignment when praise and encouragement (feedback) is applied (Borich, 1996). This feedback should be specific and directed at the problem. Additionally, the teacher should provide the student directions and not just corrections.

Not all researchers agree that feedback has a positive effect on student performance. The foundation for the notion that feedback has a positive effect on student performance is derived from a study conducted by Page (1958). Although somewhat dated, this study of seventy-four classrooms and 2,139 secondary students concluded that when the average secondary teacher takes the time and trouble to write encouraging comments on student papers, these comments have “a measurable and potent effect” on the students performance and attitude.

The other camp, lead by Stewart and White (1976), have failed to replicate or find consistent replication of Page’s findings. Stewart and White, although paying high praise to Page for the contributions he made to research literature in the form of replication studies, reviewed Page’s research and analysis of thirteen replication studies and failed to support the notion of comment (feedback) effectiveness.

It is noteworthy to mention that the most consistent evidence for comment effectiveness was found among college students. Here the feedback was more personal

and motivating, rather than simple normal statements. The results at the secondary education level were much less consistent.

Even though there is evidence for and against the effectiveness of feedback on student grades, the researcher's goal was to determine the effectiveness of enhanced evaluative feedback on grades. To further understand this effect, the researcher reviewed literature on student grades.

STUDENT GRADES

The founding of the first university in 1636 marked the beginning of higher education in the Western World. The university accepted its first students in 1638 in Newtowne, MA, and in 1639 what is now known as Harvard University became the birthplace of student evaluation and grading. In early universities the fields of study were limited. The choice was either (1) the advancement of knowledge in arts, sciences and literature; (2) the education of individuals in the fields of philosophy, language, arts, and sciences; (3) education for the service of the state; and (4) the propagation of religious faith (Smallwood, 1935). The very first American college examinations were concerned with the evaluation of factual performance and ability of a student about to graduate. Students were required to prove their ability by reading and conversing in Latin. These types of examinations were the most important and inclusive and were widely used until the idea of more frequent tests of student progress was developed.

The first record of a real marking system was at Yale, where the initial marking mechanism was descriptive adjectives. One example of the use of descriptive adjectives reported that fifty-eight students had been present for examination and there were twenty

Optimi, sixteen second *Optimi*, twelve *Inferiores*, and ten *Preiores* (Smallwood, 1935). The use of such descriptive adjectives was very subjective, leaving room for wide variations within each descriptor. Later, in 1813, Yale developed the first known scale ever used to report achievement. The scale utilized a four point range with 1 being the worst grade and 4 being the best grade. The utilization of this scale was intended to lessen the individual bias that had been apparent in prior years of evaluation using descriptive adjectives.

The roots of the current grading system used by most universities, colleges, and high schools can be traced to Mount Holyoke in 1897. Mount Holyoke combined the three types of grading systems, descriptive adjectives, percentages and group letters, which had been used separately at several universities, and developed a grading system using a distribution of numbers and letters. It is important to note that they completely dropped the descriptive adjectives. This grading system, with some changes in the numbers, looks much like what is seen today in American schools: A= 95-100, B= 90-94, C= 86-89, D= 80-84, E= 75-79, and F= failed (Smallwood, 1935).

Grading systems served various purposes in the early days of education such as determining class standing, honors, commencement participation, special awards and class divisions, aggregates, and weighting marks. Today they serve much the same purpose, but their uses are more defined, such as credit, feedback to students, feedback to parents, feedback to administrators and teachers, placement, admissions, awards and honors, selection, academic and career counseling, motivation, employment, and employment criterion (Haladyna, 1999). As competition increases for the best jobs and

positions, these grades become more and more important. Additionally, government funding for many institutions is based on grades earned on standardized tests.

The researcher's primary concern during this study dealt with three of the uses of grades: feedback to students, motivation, and feedback to administrators and teachers. The first use addressed was feedback to students. The grade earned by the student provides feedback about his/her relative level of achievement, or how the student understood the content. The student can then take this information and determine how much effort is needed for the next grading period or the next level of achievement. The grade, when used as a form of feedback, provides the student with means of measuring his/her success of learning. Thus, grades are an integral part of the learning process, and answer the question: How am I doing? The grade answers the question for the student (Anderson and Speck, 1998).

The second use for grades was motivation. If hard work, determination, and motivation result in good grades, students will likely continue to work hard and pursue further success in their studies. On the other hand, low grades can be an indication of a lack of effort or understanding, and can become a negative motivator. Once a student is in this state of helplessness with thoughts like "no matter how hard I work I still get low grades", it can be a real challenge for the teacher to get the student focused and back on track. In this case the teacher must use the low grades as a warning sign for the student to make a change in his/her studies, and for the teacher to show the student how to succeed.

In a perfect world educators would like to think that students would be learning for the sheer pleasure of gaining new knowledge, and any motivation required would be intrinsic. However, educators do not live in the perfect world and most students require

extrinsic motivation to achieve learning goals. Grades are a part of this extrinsic motivation (Haladyna, 1999).

Finally, the third use for grades is feedback to administrators and teachers. In addition to providing the department, college, and the university information about student's achievement, grades can provide a measure of success for the instructional program as well as providing the teacher with a measure of his/her effectiveness. Assuming the students actually earned the grades versus the students being given the grades, these grades reflect a measure of success that was achieved with the students.

Grades are the means by which the teacher, the school, the district, and the state are held accountable, therefore responsible for one's work and responsive to its effects. Teachers are responsible for their impact or lack thereof, not merely the good faith effort they expended. Feedback and self adjustment by the teacher plays a crucial role in the performance of the student (Wiggins, 1998). When you combine the two facts that most teachers try very hard to insure that students learn, and students try very hard to appear knowledgeable, it is no wonder that teachers may fail to recognize their need for change or improvement. Therefore, grades are a means to hold teachers, administrators, and schools accountable for the education of the nation's children and young adults.

SUMMARY

This review of literature focused on two major areas, feedback and student grades. From this review, it is apparent that feedback and student's grades are closely tied. This is more evident in institutions where students are not intrinsically motivated and environments where the successes of educational programs are measured with grades. In

Chapter III, the researcher will explain the methods and procedures used to determine if the amount and type of feedback made a significant difference in the grades earned by the students taking the Technology in Your World class at Old Dominion University during the Spring 2003 semester.

CHAPTER III

METHOD AND PROCEDURES

Chapter III, Methods and Procedures, of this experimental study sought to determine if enhanced evaluative feedback applied to students taking the Technology In Your World course, at Old Dominion University, achieved higher final grades than students taking the same course that received normal classroom feedback. This chapter will describe the research methods and statistical procedures used to collect and analyze the data. Included in Chapter III are the population that was studied, the research variables, the instrument design, the classroom procedures, the methods of data collection, the statistical analysis, and a summary.

POPULATION

The population for this study was derived from students enrolled in OTS 110T, Technology and Your World, at Old Dominion University during the Spring 2003 semester. Registration for this course was controlled by the university's advisors. Technology and Your World fulfills the science and technology requirement for many of the colleges, therefore the course is filled by students from various fields of study.

The students, both male and female, were all undergraduate students seeking degrees from various colleges within the university. The classes consisted of students in their freshman, sophomore, junior and senior years.

There were a total of two segments consisting of 48 students initially registered for this course with each class consisting of 24 students. The researcher taught both segments of this class for a total of 48 students.

RESEARCH VARIABLES

The research variables for this study were derived from the hypothesis:

H₁: Students in the OTS 110T, Technology in Your World, class at Old Dominion University that receive enhanced evaluative feedback will earn higher grades than those students receiving normal feedback.

There were two research variables identified for this study. The independent variable was the enhanced evaluative feedback and the dependent variable was the student's grade.

INSTRUMENT DESIGN

At the beginning of the semester the students were asked write their name, their e-mail address, telephone number, expected grade for the course, and why they were taking the course on 3 X 5 index card. These cards were collected and kept by the researcher.

CLASSROOM AND LAB PROCEDURES

On the first day of class, the researcher requested that the students participate in this research study. The researcher explained the study to the students and the students had the choice to participate or not to participate, and any student would be allowed to drop out of the study at anytime for any reason during the semester without any negative consequences. The students participating in the study completed a consent form.

Prior to the semester beginning and the class roster being provided, the researcher randomly selected the 0930 class to be the control group by the flip of a coin. The 1100 class then became the experimental group.

Both classes were provided with the course syllabus, a class schedule, and an assignments explanation page. These documents were the same for both groups of students. Additionally, the students were provided with the same web address for downloading note taking guides.

The course consisted of normal lectures, small working group discussions, film viewing and discussion and class brain-storming sessions controlled by the instructor. Student's understanding of the content was tested at various intervals during the semester using quizzes and written assignments. The total point value for the course was 400 points. Attendance and classroom participation was measured by answering questions in class and completing three written journal during the semester. Each journal was worth 20 points. There were three quizzes during the semester and each was worth 30 points. The three quizzes that were administered asked the same questions, and consisted of true-false, fill in the blank, multiple choice and short essay questions.

There were three other written assignments consisting of an energy time-line (25 points), a futures wheel (25 points), and the projection of technology in the future (50 points). The final exam was worth 50 points.

Additionally, during a three week period in the middle of the semester, students in each class were systematically paired by the instructor and participated in five laboratory activities that were worth 20 points each. The students received 10 points for successful completion of the laboratory experiment and 10 points for completing the research for

each laboratory activity completed. The students were required to submit a laboratory completion form containing their research information.

Each class participated in the same activities and the instructor used the same notes for each class. The only difference was the discussion that each class created with the questions raised by the students.

When the students completed an assignment the instructor graded the assignments using the same criteria for grading. This grading criterion was shared with the students at the time the assignments were explained and discussed. Assignments were expected to be turned in on time, grammatically correct, and with sufficient content and subject coverage.

The guidelines for feedback for the control group are shown below:

0930 Session (Control Group)

- Standard lecture, labs, and group work utilized to provide classroom content.
- Standard grading of assignments per established criteria.
- Standard instructor comments/notes on paper assignments, i.e., good job, excellent work, etc.
- Encourage meeting with instructor to discuss problems.
- Provide information for the student to compute his/her grade to date.

The guidelines for feedback for the experimental group are shown below:

1100 Session (Experimental Group)

- Standard lecture, labs, and group work utilized to provide classroom content.
- Standard grading of assignments per established criteria as listed above with the non-test group.

- Additional feedback on each assignment (Experimental group only).
 - a. Provide current percentage of obtainable points.
 - b. Current grade to date.
 - c. Provide numerical class standing.
 - d. Provide written and verbal recommendations for improvement.
 - e. Provide corrective and problem specific comments on each assignment.
 - f. Strongly encourage meetings with instructor to discuss any problem areas.

All assignments were graded and returned to the students during the next scheduled class period with the points earned and the appropriate feedback marked on each assignment. The student's grades were recorded in the grade book by the researcher and not compared after the first assignment.

METHODS OF DATA COLLECTION

At the end of the semester the researcher compiled all the test scores, laboratory scores, and assignment scores for both the experimental and the control group. Since the researcher was the instructor for both classes, immediate and total access to all grades earned by the students was available. The final grade for the course was determined by dividing the total number of points earned by the student by the total number of points available to be earned. The numerical scale for the final grades is shown below.

360 – 400 points = A 320 – 359 points = B 280 – 319 points = C
240 – 279 points = D 239 and below points = F

STATISTICAL ANALYSIS

The final grades of the students enrolled in both the experimental group and the control group were compared by the researcher to determine if there was a significant difference between the group that received enhanced evaluative feedback and the group that received normal feedback. A one-tailed t-Test was used to analyze the data. The final grade earned by each student was the only data that were analyzed.

SUMMARY

Chapter III, Methods and Procedures, of this study described the population that was studied as well as identifying the variables that affected the population. This chapter also described the procedures that the researcher followed in the classroom and laboratory activities. Additionally, the data collection methods and the instrument used to perform the statistical analysis were discussed. The results of this study will determine whether or not the group of students that received the enhanced evaluative feedback earned better grades than those who received normal instructor feedback. The finding of this statistical analysis will be discussed in Chapter IV.

CHAPTER IV

FINDINGS

This study examined the final grades of students enrolled in the OTS 110T, Technology in Your World, class at Old Dominion University during the Spring 2003 semester to determine if the experimental group, which received enhanced evaluative feedback, earned higher grades than the control group, which received normal instructor feedback. This chapter presents all the relevant data that were collected and provides a statistical comparison using the sample mean from each group of students to test the predictive hypothesis.

DATA

Appendix A illustrates the grading scale that was utilized for both the control group and the experimental group. Appendix B provides a listing of the total points earned, the percentile score, and the letter grade for each student in the control group, and Appendix C provides a listing of the total points earned, the percentile score, and the letter grade for each student in the experimental group. The table of critical values for *t* is presented in Appendix D.

RESULTS

The mean final score for the control group was based on the twenty-four (24) students enrolled in the 9:30 class, and the mean final score for the experimental group was based on the twenty-two (22) students enrolled in the 11:00 class. The experimental group only had twenty-two students due to experimental mortality. Table 1 depicts the

population and the final mean score for both the control group and the experimental group.

Table 1: Mean Final Scores

Test Groups	Population	Mean Final Score
Control Group	24	88.43
Experimental Group	22	90.13

The mean final scores for the control group and the experimental group were collected and the single-tailed t-Test was used to determine statistical significance of the results. The mean final grade for the control group (M_1) was 88.43, while the mean final grade for the experimental group (M_2) was 90.13. Using a degree of freedom of forty-four (44) at the .05 level of significance the critical t-value was determined to be 1.68. The t-value was - .62 with a population size of 46. The results are indicated in Table 2.

Table 2: Comparison of Populations at the .05 Level of Significance

	Population	Mean	Critical t-value	Study t-value
Control Group (M_1)	24	88.43	1.68	-.62
Experimental Group (M_2)	22	90.14		

SUMMARY

This chapter presented the data collected during the study and the method of statistical analysis that was utilized to determine whether or not there was a significant difference in the final scores earned by students who received enhanced evaluative feedback versus those students who received normal feedback while taking OTS 110T, Technology in Your World, at Old Dominion University during the Spring 2003 semester. The mean final scores for both groups was compared and subjected to a single tailed t-Test to determine statistical significance. In Chapter V, a summary of the method of data analysis and the final conclusions will be provided based on statistical analysis of the findings. Additionally, recommendations for future studies will be presented.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this experimental study was to determine if there was a significant difference in the final grades earned by students that received enhanced evaluative feedback versus the final grades earned by students receiving normal feedback while taking OTS 110T, Technology in Your World, at Old Dominion University during the Spring 2003 semester. This chapter summarizes the study, draws the conclusions based on the findings, and offers recommendations for further studies.

SUMMARY

The goal of this study was to determine if students who received enhanced evaluative feedback earned higher grades than students that received normal instructor feedback. The hypothesis that established the framework and guided the research for this study was:

H₁: Students in the OTS 110T, Technology in Your World, class at Old Dominion University that receive enhanced evaluative feedback will earn higher grades than those students receiving normal feedback.

Feedback for learners is fundamental to the learning process. Without feedback the learner may be unsure of how well he/she may have retained the material presented. This feedback is provided by the teacher or trainer to the student in hopes that the student will be motivated to continue at the same pace, or it may tell the student that improvement is required. At the same time the teacher is providing feedback to the students, the students are also providing feedback to the teacher. This student-to-teacher

feedback allow for self evaluation by the teacher, as well as the opportunity to make changes that will insure learning takes place. The questions are how much feedback, and what types are most effective? Students today require more than the normal “good job or excellent work” that most teachers provide on assignments. Most students today want to know what they did wrong, and how to not make the same mistake again. Students can be divided into two broad categories; those who are motivated to do well, and those who are not. Motivated students will take this enhanced feedback and continue to excel, where the non-motivated student may be encouraged to try harder. In so doing, you would anticipate that the class receiving enhanced feedback would earn an overall improved grade. Therefore, this study attempted to determine if the enhanced feedback applied by the researcher made a significant difference in the grades earned.

This study was limited to the students in the OTS 110T, Technology in Your World, class taught during the Spring 2003 semester at Old Dominion University. The researcher was a graduate teaching assistant teaching this course for the second consecutive semester, and the classes were taught back to back. Additionally, the same instructional material and methods were used for both groups.

The students in both the control group and the experimental group were a random mix of male and female students, as well as random ethnic backgrounds. The students were enrolled in various degree programs within the university system, and both groups were populated with a mix of freshman, sophomore, junior, and senior class standings.

The students in the control group and the experimental group were provided with different levels of feedback on every assignment during the semester. The researcher kept a record of all grades earned and communications between the student and the

researcher. These data were recorded on grade sheets and memorandums stored in electronic and hard copy format.

Upon completion of the semester, the researcher compiled the data from the control group and the experimental group. The score earned by each student was calculated and the mean for each class was determined. The research utilized a one-tailed t-Test to determine if there was a significant difference between the grades earned by the control group and the experimental group. The conclusion on the resultant data follows.

CONCLUSIONS

The goal of this study was based upon the following hypothesis:

H₁: Students in the OTS 110T, Technology in Your World, class at Old Dominion University that receive enhanced evaluative feedback will earn higher grades than those students receiving normal feedback.

The statistical analysis of the data collected for this study resulted in a t-value of -.62. This value did not exceed the value of 1.68 obtained from the table of critical values at the .05 level of significance. Therefore, the hypothesis was rejected.

Even though the experimental group earned a higher mean score, the analysis of the data determined that no significant difference resulted from the amount of evaluative feedback that was provided. However, it is noteworthy to point out that the experimental group's mean was in the "A" grade range and the control group's mean was in the "B" range. So, therefore even though there was no significant difference in the statistical analysis of the data, the experimental group did earn a higher academic grade than the control group. The statistical indicators prove that there was no significant difference,

but because of such a small sample the data may be insignificant. Based on these results the following recommendations are provided.

RECOMMENDATIONS

Even though this study reported that the feedback provided by the researcher made no significant difference, we must realize that feedback is paramount to learning, not only for the student, but also for the teacher. Just as the review of literature pointed out, there are mixed opinions and varying research results on evaluative feedback, which just proves that more studies should be performed in this area of education.

As mentioned in the limitations, the students were from different grade levels within the university system. This difference may have skewed the results since students in different grade levels are motivated by different factors. This motivation definitely affects the learning process. In future studies limiting the test groups to the same grade level might provide better data.

Forty-six students is a small population. In future studies it is recommended that more students be included in the study groups. This will provide for more accurate data.

A third recommendation would be that the study be conducted on classes that are taught at the same time period. During this study the control group was an early morning class and the experimental group's session ran into the normal lunch period for most students. These time frames for learning might have affected the final results. Some students are just not morning people, and the late class was always ready to go to lunch.

Finally and most importantly, the researcher recommends that future studies be conducted by other researchers. This researcher, and teaching assistant, firmly believes

that feedback is vital to the educational process, and it is important that we determine what level and what type of feedback provides the best results.

REFERENCES

- Anderson, R. S., & Speck, B. W. (1998). Classroom assessment and the new learning paradigm. *Changing the Way we Grade Student Performance*. San Francisco: Jossey-Bass Publishers.
- Black, P., & William, D. (1998). Assessment and classroom learning. An assessment in education: *Principles, Policy & Practice*, 5 (1), 7-75.
- Borich, G. D. (1996). *Effective teaching methods*. (3rd ed.). New Jersey: Prentice-Hall, Inc.
- Cardelle-Elawar, M., & Corno L. (1985). A factorial experiment in teacher's written feedback on student homework: Changing teacher behavior a little rather than a lot. *Journal of Educational Psychology*, 77, 162-173.
- Catalyst, *encourage responsibility for learning*, Retrieved February 10, 2003, from University of Washington Center for Learning, Teaching and Technology Web site: <http://catalyst.washington.edu/method/responsible.html>.
- Chappuis, S., & Stiggins, R. (2002). Classroom Assessment for Learning. *Educational Leadership*, 60 no1, 40-3 S.
- Ahaldyna, T. M. (1999). *A Complete Guide to Student Grading*. Needham Heights: Allyn & Bacon.
- Olina, Z., & Sullivan, H. (2002). Effects of Classroom Evaluation Strategies on Student Achievement and Attitudes. 50 no 3, 61-75.
- Page, E. B. (1958). Teacher comments and student performance: a seventy-four-classroom experiment in school motivation. *Journal of Educational Psychology*, 49, 173-181.
- Presnky, M. (2001). The games generation: How learners have changed. *Digital Game Based Learning*, 35-39. New York: McGraw-Hill.
- Simon, P. (1998). Simon Touts Education As Key to Future Employment. *Institute for Policy Research News*, Summer 1998, Vol 19, Number 1.
- Smallwood, M. L. (1935). A critical study of the original records of Harvard, William and Mary, Yale, Mount Hokyoke, and Michigan from their founding to 1900. *A Historical Study of Examinations and Grading Systems in Early American Universities*. Cambridge: Harvard University Press.

Stewart, L.G., & White, M.A. (1976). Teacher comments, letter grades, and student performance: What do we really know? *Journal of Educational Psychology*, 68, 488-500.

Thomas, J.W., Bol, L., Warkentin, R.W., Wilson, M., Strage, A., & Rohwer, W.D., Jr. (1993). Interrelationships among students' study activities, self-concept of academic ability, and achievement as a function of characteristics of high-school biology courses. *Applied Cognitive Psychology*, 7, 499-532.

Webb, J. M., Diana, E.M., Luft, P., Brooks, E.W., Brennan, E. L. (1997). Influence of pedagogical expertise and feedback on assessing student comprehension from nonverbal behavior. *The Journal of Educational Research*, 91, no 2, 89-07.

Wiggins, G. (1998). Designing assessments to inform and improve student performance. *Educative Assessment*. San Francisco: Jossey-Bass Inc.

APPENDIX A—OTS 110T Grading Scale

Raw Score	Percentile Range	Letter Grade
360-400	90-100	A
320-359	80-89	B
280-319	70-79	C
240-279	60-69	D
<239	<59	F

APPENDIX B—Control Group Final Grades

Student Number	Raw Score	Percentile	Letter Grade
1	350	87.50	B
2	238	59.50	F
3	384	96.00	A
4	395	98.75	A
5	385	96.25	A
6	335	83.75	B
7	360	90.00	A
8	354	88.50	B
9	370	92.50	A
10	383	95.75	A
11	383	95.75	A
12	357	89.25	B
13	269	67.25	F
14	359	89.75	A
15	367	91.75	A
16	362	90.50	A
17	367	91.75	A
18	369	92.25	A
19	366	91.50	A
20	354	88.50	B
21	369	92.25	A
22	301	75.25	C
23	344	86.00	B
24	368	92.00	A

APPENDIX C—Experimental Group Final Grades

Student Number	Raw Score	Percentile	Letter Grade
1	48	12.00	W
2	379	94.75	A
3	378	94.50	A
4	389	97.25	A
5	331	82.75	B
6	396	99.00	A
7	374	93.50	A
8	371	92.75	A
9	329	82.25	B
10	375	93.75	A
11	374	93.50	A
12	220	55.00	F
13	0	0	W
14	347	86.75	B
15	389	97.25	A
16	377	94.25	A
17	372	93.00	A
18	381	95.25	A
19	368	92.00	A
20	366	91.50	A
21	337	84.25	B
22	353	88.25	B
23	326	81.50	B
24	400	100	A

APPENDIX D—Table of Critical Values for t

One-tailed Significance

Degrees of Freedom	.25	.10	.05	.025	.01	.005
1	1.0000	3.0777	6.3138	12.7062	31.8207	63.6574
2	0.8165	1.8856	2.9200	4.3027	6.9646	9.9248
3	0.7649	1.6377	2.3534	3.1824	4.5407	5.8409
4	0.7407	1.5332	2.1318	2.7764	3.7469	4.6041
5	0.7267	1.4759	2.0150	2.5706	3.3649	4.0322
6	0.7176	1.4398	1.9432	2.4469	3.1427	3.7074
7	0.7111	1.4149	1.8946	2.3646	2.9980	3.4995
8	0.7064	1.3968	1.8595	2.3060	2.8965	3.3554
9	0.7027	1.3830	1.8331	2.2622	2.8214	3.2498
10	0.6998	1.3722	1.8125	2.2281	2.7638	3.1693
11	0.6974	1.3634	1.7959	2.2010	2.7181	3.1058
12	0.6955	1.3562	1.7823	2.1788	2.6810	3.0545
13	0.6938	1.3502	1.7709	2.1604	2.6503	3.0123
14	0.6924	1.3450	1.7613	2.1448	2.6245	2.9768
16	0.6901	1.3368	1.7459	2.1199	2.5835	2.9208
17	0.6892	1.3334	1.7396	2.1098	2.5669	2.8982
18	0.6884	1.3304	1.7341	2.1009	2.5524	2.8784
19	0.6876	1.3277	1.7291	2.0930	2.5395	2.8609
21	0.6864	1.3232	1.7207	2.0796	2.5177	2.8314
22	0.6858	1.3212	1.7171	2.0739	2.5083	2.8188
23	0.6853	1.3195	1.7139	2.0687	2.4999	2.8073
26	0.6840	1.3150	1.7056	2.0555	2.4786	2.7787
27	0.6837	1.3137	1.7033	2.0518	2.4727	2.7707
28	0.6834	1.3125	1.7011	2.0484	2.4671	2.7633
29	0.6830	1.3114	1.6991	2.0452	2.4620	2.7564
30	0.6828	1.3104	1.6973	2.0423	2.4573	2.7500
34	0.6818	1.3070	1.6909	2.0322	2.4411	2.7284
35	0.6816	1.3062	1.6896	2.0301	2.4377	2.7238
36	0.6814	1.3055	1.6883	2.0281	2.4345	2.7195
37	0.6812	1.3049	1.6871	2.0262	2.4314	2.7154
38	0.6810	1.3042	1.6860	2.0244	2.4286	2.7116
39	0.6808	1.3036	1.6849	2.0227	2.4258	2.7079
40	0.6807	1.3031	1.6839	2.0211	2.4233	2.7045
41	0.6805	1.3025	1.6829	2.0195	2.4208	2.7012
42	0.6804	1.3020	1.6820	2.0181	2.4185	2.6981
43	0.6802	1.3016	1.6811	2.0167	2.4163	2.6951
44	0.6801	1.3011	1.6802	2.0154	2.4141	2.6923
45	0.6800	1.3006	1.6794	2.0141	2.4121	2.6896