

UNIVERSIDAD SAN FRANCISCO DE QUITO

RELATIONSHIP BETWEEN EFFECTIVE PROFESSORS AND STUDENT
PERFORMANCE: A QUANTITATIVE STUDY AT
THE UNIVERSIDAD SAN FRANCISCO DE QUITO

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ABSTRACT

It is not often that one realizes the opportunity to conduct research in the workplace. However, once this opportunity is recognized it is important to take it and run with it. The author's interest in this topic came as a result of her responsibilities in institutional effectiveness at Universidad San Francisco de Quito (USFQ). This *ex post facto* study's goal was to determine if the effectiveness of the professor had a relationship with the performance of the student. It explored the measure of teaching effectiveness, and it did so in the context of the USFQ math department. It hoped to know whether or not teaching is working, and to what degree it is effective. An extensive literature review was done in the following areas: 1) Influence of Professor Effectiveness; 2) Perception of the Professor by the Students; 3) The Definition of an Effective Professor; and 4) The Relationship between the Professor Rating and the Student Rating. Although the context in which this study was performed and other limitations to the study, the results and findings were in line with the literature. The author concludes with recommendations for further studies.

RESUMEN

No es a menudo que uno se da cuenta de la oportunidad de conducir investigación en el lugar de trabajo. Sin embargo tan pronto se reconoce de la oportunidad es importante tomarla y llevarla adelante. El interés del autor en este tópico surgió como resultado de sus responsabilidades en "institutional effectiveness" en la Universidad San Francisco de Quito (USFQ). La meta de este estudio *ex post facto* era determinar si la eficiencia del profesor tuvo relación con el rendimiento del alumno. Exploró la medida de la eficiencia de la enseñanza y así lo hizo en el contexto del departamento de matemáticas de la USFQ. Se esperó conocer si la enseñanza está funcionando y en que grado es efectiva. Se hizo una extensa revisión de la literatura en las siguientes áreas: 1) Influencia de la Eficiencia del Profesor; 2) Percepción del profesor por parte de los estudiantes; 3) Definición de un Profesor Eficiente; y, 4) La Relación entre la Calificación del Profesor y la Calificación del Estudiante. Aun cuando el contexto en el que este estudio se realizó y otras limitaciones del estudio, los resultados y conclusiones estuvieron de acuerdo con la literatura. El autor concluye con recomendaciones para estudios posteriores.

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I. INTRODUCTION

How can one measure if a university is accomplishing its mission? At The Universidad San Francisco de Quito (USFQ), a liberal arts university in Quito Ecuador, part of the mission is "...to promote the quest for knowledge, individual liberties and the entrepreneurial spirit as a means for the development of Ecuadorian Society through excellence in teaching, supported by qualified and committed faculty, comprehensive and rigorous curricula and adequate resources" (Montúfar, 2002). To effectively measure these diverse elements, the mission itself must be broken into parts - and the part that this study focused on was "excellence in teaching". More specifically, this study explored the measure of teaching effectiveness, and it did so in the context of the USFQ math department. Sensible questions that were asked about the concept of excellence in teaching were: Who is responsible for this effectiveness? Who is the client or beneficiary? Is the teaching working or is it effective? How well is the teaching working or to what degree is this teaching effective? The responsibility for excellence in teaching lies with the faculty. The client or beneficiaries are the students. Knowing whether or not teaching is working, and to what degree it is effective, is what this study hoped to answer.

A. Statement of the Problem

Faculty and student performance are two aspects of university life that are often addressed together but not in a cause and effect relationship. Faculty performance is usually measured by the effectiveness of the professor, through the student to professor evaluations, and student performance is usually measured by the grades received. Professor effectiveness has become a very important part of the USFQ evaluation process, and the results of the student-professor evaluation form are currently the only formal feedback the faculty receives. This study used the results of this form to measure whether or not the professor had achieved his/her goals for the class. According to most regional accrediting agencies such as the Southern or Middle States Associations, student performance is usually used to measure the objectives of a university. The goal of this study was to determine if the effectiveness of the professor had a relationship with the performance of the student.

B. Literature Review

The literature helped determine the purpose, the significance and direction of the study and the hypotheses. In order to strategically discuss the literature, it has

been divided into the following categories: influence of professor effectiveness on student performance, perception of the professor by the students, the definition of the effective professor, and relationship between professor rating and student rating.

1. Influence of Professor Effectiveness

As one might expect, the literature supports the argument that professor effectiveness has an influence on student performance (ie., Marzano, 2003; Bretag, 2003; Bonesronning, 2004). This section looks at four approaches to understanding this influence.

The book that triggered this study was *What Works in Schools: Translating Research into Action* by Robert Marzano (2003). Specifically, the chapter on Professor-Level Factors discusses the independent impact that a teacher can have on student achievement. Marzano identifies three areas that are "primarily a function of decisions made by individual teachers, including instructional strategies, classroom management, and classroom curriculum design" (p.71). This study assumed that at the university level instructional strategies, classroom management and classroom curriculum design are also important factors in decisions made by the professor. Although Marzano is talking about schools and

not universities, one can argue that the same definitions apply because regardless of what level one is teaching, the same factors apply. He cites various studies (ie., Cotton 1995) that show that when the professor is effective, the students show a greater improvement in the performance over time. Marzano also states that the variables that define an effective teacher cannot be isolated or discussed separately with regards to their influence on student achievement. For example, if a professor is good in only one of the areas, this does not mean that they are an effective professor. In other words, a professor has to do well in all of the areas to be considered effective. He also states that "of all the different school level factors (school, professor, and student), the professor-level factor has the greatest impact on student performance" (p.77).

Another practitioner research study by Howard Harris and Tracey Bretag (2003) found that changes in the development of the curriculum and teaching methods at the university undergraduate level, made through the suggestions of students and teaching staff, increased the quality of learning outcomes. These changes resulted in an increased emphasis on collaborative teaching and the introduction of integrated communication skills. The investigators used student evaluations of teaching and grade comparisons to

measure the learning outcomes that resulted from their ability to make suggestions.

Another interesting approach to understanding improved student performance focuses on being able to manage student effort. Hans Bonesronning (2004) argues that successful teachers are characterized by being able to use grades as a tool to influence student effort. This can also be interpreted as the professor being able to motivate the students in different ways using different tools, such as grades. For example, the author concluded that "hard grading leads to improved achievement" (p.245).

Next, Stephen Shmanske's article (1988) argues that while student performance is a product of professor effectiveness, there is only a weak positive relationship between student evaluations of teachers when correlated to student performance. Shmanske used a random sample of students at California State University. He found that professor effectiveness influenced student performance in future classes.

Finally, Paul Wright's article titled *Teacher and Classroom Context Effects on Student Achievement: Implications for Professor Evaluation* (1997), examined the

relative magnitude of professor effectiveness on student achievement while taking into account other influences such as intra-classroom heterogeneity among the students, class size and academic growth, and found that improving the performance of the professor causes more of an improvement in student achievement than any other single factor.

This section covered the influence of professor effectiveness on student performance. The perception of the professor by the students was an equally important factor to this study.

2. Perception of the Professor by the Students

Since this study used the student to professor evaluations to measure professor effectiveness, it is essential to know what the literature says about the perception of faculty by students. Phye's article, *Student Performance and the Evaluation of Teaching Effectiveness* (1984) looked at the difference between high and low performing students and their perceptions of effective teaching of college students. Phye's study took into account the students' performance level when using student-professor evaluations to measure professor effectiveness, arguing that the students' academic level plays a role in the way that they evaluate their professors' performance.

Molly Rapert and her team (2004) used a "22 item scale encompassing 7 dimensions for perceptions of quality, and a 7-item scale was used to assess performance" (p.19). They used qualitative and quantitative methods to explore how students select and evaluate a university level graduate program. They found that perceived quality directly affects overall satisfaction, and that students use a variety of issues including ones that are not necessarily in the classroom learning setting, such as integration with community, career preparation services, availability of financial assistance and program clarity to assess program quality. Therefore, students that perceive that the program is high quality are more satisfied with their education.

Greimel-Fuhrmann and Geyer (2003) explored the factors that determine the student evaluation of professors at the college level. They stated that "student biases like their interest in the subject or their liking of the professor may be a result of good teaching behavior and may not be considered a mere bias of student ratings" (p.229). These researchers found that the global rating of professors for the most part depended on their teaching behavior, affected by other factors such as the students' attitudes toward the actual process of evaluating their professors, whether or

not the students liked the professor and the students' interest in the subject.

Finally, Emery, Kramer, and Tian (2003) did an extensive literature review of student evaluations as a measure of teaching effectiveness and found that student evaluation of teaching effectiveness is often the most influential information in promotion and tenure decisions at colleges and universities, but that it fails to capture the professor's ability to promote learning, and that it should not be used as a tool to improve instruction.

The student perception of the professor is a valuable element of the evaluation process, however it cannot stand alone. Since this study attempted to determine if there is a relationship between the effectiveness of the professor and the performance of the student it is essential to define an effective professor.

3. Definition of Effective Professor

There are various definitions of effective teachers that can apply to this study, and several were considered. Stronge (2002) defines it in three key areas: preparation, personality, and practices. Another author prefers to provide a list of words that are used to describe an effective professor, which are: fair, honest, friendly,

knowledgeable, organized, prepared, articulate, creative, well-groomed, intelligent, sympathetic, empathetic, authoritarian, business-like, professional, up-to-date, enthusiastic, interesting, affectionate, and dependable (Ford, 1983). Finally, the definition that this study used is the one from *Effective Schooling Practices: A Research Synthesis* by Kathleen Cotton (1995). This definition was chosen because the researcher found it to be the one that encompassed all aspects of teaching effectiveness in the most direct and comprehensive fashion. This synthesis characterizes effective teaching according to the following six categories (including examples):

1. Planning and Learning Goals: Teacher uses a preplanned curriculum to guide instruction. Teacher provides instruction that integrates traditional school subjects as appropriate.

2. Classroom Management and Organization: Teacher forms instructional groups that fit students' academic and affective needs. Teacher makes efficient use of learning time. Teacher establishes smooth, efficient classroom routines. Teacher sets clear standards for classroom behavior and applies them fairly and consistently.

3. Instruction: Teacher carefully orients students to lessons. Teacher provides clear and focused instruction. Teacher routinely provides students feedback and reinforcement regarding their learning progress. Teacher reviews and re-teaches as necessary to help all students master learning material. Teacher uses validated strategies to help build students' critical and creative thinking skills. Teacher uses effective questioning techniques to build basic and higher-level skills. Teacher integrates workplace readiness skills into content-area instruction.

4. Teacher-Student Interactions: Teacher holds high expectations for student learning. Teacher provides incentives, recognition, and rewards to promote excellence. Teacher interacts with students in positive, caring ways.

5. Equity: Teacher gives high-needs students the extra time and instruction they need to succeed. Teachers support the social and academic resiliency of high-needs students. Teacher promotes respect and empathy among students of different socioeconomic and cultural backgrounds.

6. Assessment: Teacher monitors student progress closely. Teacher makes use of alternative assessment as well as traditional tests. (Cotton, 1995, p.1-6)

This study used the student to professor evaluation form to determine the effectiveness of the professor. The researcher reviewed the form with the definition and found that questions relating to the effectiveness of the professor covered the factors mentioned in Cotton's definition.

The research reviewed in this section addresses the factors that one may use in defining an effective professor. In the next section the researcher will cite other studies that have explored the relationship between the effectiveness of the professor and student performance.

4. Relationship between Professor Rating and Student Rating

There have been many studies done around the world that look at the relationship between the professors' rating and the students' rating. According to Stapelton and Murkison (2001) "student evaluations are widely accepted as a means of evaluating teachers in higher education" (p.269). Even though educators argue that they have resulted in grade inflation and lower academic standards, few in higher education feel that student evaluations shouldn't be used. In general, the studies done between professor ratings and student ratings have found that there is a positive correlation between how much students learn in a course and the rating of the instructor. Generally, there is a weak significant positive correlation between rating of the instructor and grades.

Sheila Tucker and her team (2003) conducted a study at two community colleges and found that there was no significant relationship between learning/teaching style match and student success. However, they did find that a weak significant relationship existed between course grades, final exam scores, instructor evaluations and grade point average.

Robert Williams (2001) reports that the correlation between grades and total course evaluation is statistically significant but low in magnitude. His study was conducted at the undergraduate university level and found that students who obtained higher grades tended to rate the course higher than those who obtained lower grades. However, he also found that this was a weak relationship.

This literature shows that in most cases even though there is a relationship between the professor rating and the student rating, it is a positive but weak significant relationship.

C. Significance of the Study

What is the benefit of determining if the effectiveness of the professor has an impact on student performance? As both Marzano (2003) and Wright (1997) mentioned, the effectiveness of the professor is the most influential factor determining student performance, therefore making it important to study. Also, in recent years, USFQ has begun to place greater attention on the student-professor evaluation results as the university moves towards implementing a quality system. Therefore, it is important for the institution to know if the tool that they are using

is truly measuring whether or not the faculty is achieving its objectives, as measured by the students' performance. In order to prove that the institution provides a quality education requires reliable evidence - especially when the institution is arguing that it is the best in Quito, Ecuador, as USFQ does. For USFQ, this type of information would be important as it tries to quantitatively show that the institution has effective faculty who help their students show measurable improvements. A study such as this has never been done in this context; therefore, it is a significant contribution in this area. Furthermore, this study was used as part of the graduation requirements this researcher needs for the MA in Education program at USFQ.

D. Research Questions and Hypotheses

Based on the literature, this study sets out to determine the relationship between faculty performance and student performance using archival data of the MAT 115 professors and students at USFQ in the spring semester 2004-2005. It hopes to find a relationship between the two variables.

The research questions are:

1. When looking at all of the means of the evaluations of all of the MAT 115 professors, will there be a significant difference between them?
2. When comparing the means of all of the MAT 115 classes' grades by professor, will there be a significant difference between the classes?
3. When comparing the means of all of the MAT 115 classes' departmental exam grades by professor, will there be a significant difference between the classes?
4. Will there be a relationship between the student evaluation of the professor and the student performance by class?
5. When looking at all of the students and professors (totals), will there be a relationship between the performance of the professor and the performance of the students?

Remember that the literature shows that in most cases even though there is a relationship between the professor rating and the student rating, it is a positive but weak significant relationship. This study is not attempting to find causality rather a correlation. When attempting to answer the research questions the following null hypotheses were tested to determine the relationship between the variables:

1. When looking at all of the means of the evaluations of all of the MAT 115 professors, there will not be a significant difference between them.
2. When comparing the means of all of the MAT 115 classes' grades by professor, there will not be a significant difference between the classes.
3. When comparing the means of all of the MAT 115 classes departmental exam grades by professor, there will not be a significant difference between the classes.
4. There will not be a relationship between the student evaluation of the professor and the student performance.
5. When looking at all of the students and professors (totals), there will be no relationship between the performance of the professor and the performance of the students.

In the following section the researcher describes how these hypotheses were tested.

II. METHODOLOGY

This section describes the design, the hypotheses, the participants, the instruments, and the procedure of this study.

A. Design

This study is a quantitative correlational study of the MAT 115 classes at Universidad San Francisco de Quito, using archival data from the spring 2004-2005 semester. The

mathematics department at USFQ was chosen by the researcher for a few reasons. First the math department administers a departmental final to measure the performance of the students, placing them on an even playing field. Another reason was that the math department had the necessary archival data to conduct the study. The third reason was that the department chair was willing to allow access to the data. All of these reasons made the sample used to conduct this study a convenient purposeful study.

This study was *ex post facto* using data that was collected but never used or analyzed. The evaluation process is conducted at the end of every semester. Usually the data from the evaluations are anonymous, meaning that there is no way to find out who each of the forms belongs to. However, in order to be able to conduct this study it was necessary to know how each student evaluated their teacher so that the evaluations could be matched to the grades. The data that was used in this study is collected every semester by the university and the math department. However, there has never been an analysis of this data. Consent was granted by the department of mathematics and by the president of the university, authorizing the use of the data and the use of the name of the university for the purposes of this study (See Appendix A).

B. Sample-Participants

In the spring 2004-2005 semester there were five MAT 115 classes taught by four different professors. For the purposes of this study, the professor that repeats is counted as a separate professor. In other words, the results are being looked at separately, by class. However, an additional test will be run to see if this particular professor performed differently in these classes. The null hypothesis is that there will be no significant difference in performance of this professor in the 2 sections taught.

The population was made up of a total of 100 students in all of the MAT 115 classes and the breakdown was as follows: 20 students in professor #1's class, 25 students in professor #2's class, 12 students in professor #3's class, 25 students in professor #4's class, and 18 students in professor #5's class. Unfortunately, not all of the students of all of the classes participated in the professor evaluation and results are only available for 77 of the total population of 100. The sample breakdown was as follows: 14 students in professor #1's class, 20 students in professor #2's class, 10 students in professor #3's class, 19 students in professor #4's class, and 14 students in professor #5's class. Since the researcher was able to obtain a signed consent form (See Appendix B) from all of

the participating professors and students, the following demographic data was obtained:

1. Of the four professors two were female and two were male. The age of the faculty participants was not obtained.

2. Of the 77 participants 43 (55%) were female and 34 (44%) were male. The ages of the participants were between 16 and 33. This information was only provided by 72 of the 77 participants. (See Figure 2)

C. Instruments

The instruments used to collect the data on the performance were as follows: For the professor performance, the student to professor evaluation form was used (See Appendix C), and for the student performance the departmental final exam (See Appendix D) and class grades (in percentages) were obtained (See Appendix E).

1. Professor Evaluation

The student to professor evaluation form is made up of 47 questions divided into four sections: 1. Evaluation of the professor; 2. Evaluation of the course; 3. Self Evaluation; 4. Overall Evaluation of professor and course.

Since the study is attempting to correlate the performance of the student to the performance of the professor the only questions that were used for this study are the 26 that relate directly to the performance of the professor. This section includes 25 items that ask specific questions with relation to the performance of the professor and the question in the last section that gives an overall evaluation of the professor. The answers to the questions are based on a five-point Likert scale from never to always. The evaluations were done promising the student anonymity. However, for the purposes of this study and in order to be able to do a correlational study it was necessary to know how each student was evaluating their teacher. The researcher was granted special permission from the evaluation team at USFQ to participate in the distribution of the evaluations to the MAT 115 classes in order to explain the study and ask for consent from all the students and faculty to use their evaluations ONLY for the purposes of this study. Once the data was collected, the evaluations were returned without the respective consent forms to be processed with the same anonymity that the evaluation process at USFQ guarantees the students.

The factor analysis test of the professor evaluation found that there was only one significant factor. Since the

researcher only used the questions that measured the professors' performance, this was expected. All the variables (questions) hung together. As described in the literature by Marzano (2003) individual variables that define an effective professor cannot be isolated or discussed separately with regards to their influence on student achievement. The result of this test are in line with the literature, as all of the questions chosen as part of this study fit together to define the effectiveness of the professor.

The reliability analysis was done with the student to teacher evaluation questions to ensure that the scale used for the responses to the questions was reliable. The Cronbach's alpha was .7379 indicating strong reliability.

2. Student Grades and Departmental Exam

The departmental exam is an exam that was created by the chair of the math department in consultation with the faculty. It is made up of 15 questions and no partial grades are given. The math department grades the exams, and the scores can be between 0 and 15. A score of 10 or greater is considered a passing grade. The student grade

sheet was obtained for each of the faculty to also be used as an additional tool in measuring student performance.

D. Procedure

The researcher distributed the student to professor evaluation forms on the day determined by the Evaluation Team and explained in detail and in writing to each of the potential participants the purpose of the study. Each participant (professor and student) read and signed the consent form and filled out the evaluation form. The researcher gathered all of the forms and stapled the consent form to each of the evaluations in order to be able to match the evaluations to the student outcome scores (departmental exam score and class grade). Copies were made of all of the evaluation forms, and the originals (without the consent forms that identify the students) were returned to the Evaluation Processing Office to be processed as all other university evaluations are processed. The researcher obtained the results of the departmental exams and the professor grade sheet from the department chair of mathematics.

All of the data was manually inputted into SPSS and tests were run to work with the data and test the null

hypotheses. The following section details the results of this analysis.

III. RESULTS AND FINDINGS

Overall, most of the null hypotheses were rejected and the alternate hypotheses accepted. Now it is important to understand what this all means.

Once all of the data was inputted into SPSS, tests were run to determine the validity of the instruments. The instrument used to measure the effectiveness of the professor was the student to professor evaluation. Within this form the only questions used were the ones related to the actual performance of the professor. A factor analysis was done to determine if the 27 questions really did hang together. The extraction method was the principal component analysis, the rotation method was the varimax with Kaiser Normalization, and Eigen-values were set to over 1. A scree plot was also done to graph the results. A reliability analysis was run to ensure that the scale used, for the questions on the student to professor evaluation, was reliable.

Null Hypothesis #1:

When looking at all of the means of the evaluations of all of the MAT 115 professors, there will not be a significant difference between them.

The test run was the One-way ANOVA Total evaluation score by Professor.

The means of the evaluations were between 77.70 and 119.79 (See Table 1). The alpha level was set at 0.05. There was a statistically significant difference between the five professors ($F=17.67$, $p \leq 0.05$) (See Table 2). The investigator ran Bonferroni contrasts to determine where these differences exist. Namely there was a significant difference between Professor #1 ($x=95.86$) and Professor #2 ($x=77.70$); Professor #1 ($x=95.86$) and Professor #5 ($x=119.79$); Professor #2 ($x=77.70$) and Professor #3 ($x=112.30$); Professor #2 ($x=77.70$) and Professor #4 ($x=106.42$); and Professor #2 ($x=77.70$) and Professor #5 ($x=119.79$). Professor 2 was evaluated significantly lower than the rest of the professors (See Table 3).

Null Hypothesis #2:

When comparing the means of all of the MAT 115 classes' grades by professor, there will not be a significant difference between the classes.

The test run was the One-way ANOVA Grades by Professor.

The means of the grades by professor were between 67.07 and 86.42 (See Table 4). The alpha level was set at 0.05. There was a statistically significant difference between the means of the grades in the different classes ($F=3.312$, $p \leq 0.05$) (See Table 5). Between Professor #1 ($x=67.07$) and Professor #4 ($x=86.42$) was the statistically significant difference. The students in Professor #1's students got lower grades than those in the other classes, but there was only a significant difference between Professor #1 and Professor #4 (See Table 6).

Null Hypothesis #3:

When comparing the means of all of the MAT 115 classes departmental exam grades by professor, there will not be a significant difference between the classes.

The test run was the One-way ANOVA Exam by professor.

The means of the departmental exam by professor were between 9.5 and 12.8(See Table 7). The alpha level was set at 0.05. There was a statistically significant difference between the means of the departmental exam in the different classes ($F=4.70$, $p\leq 0.05$) (See Table 8). There is a significant difference between the performance of Professor #2's students ($x=10.37$) and Professor #4's students ($x=12.84$); and Professor #3's students ($x=9.5$) and Professor #4's students ($x=12.84$). Professor #3's students did worse on the departmental exam than the other classes (See Table 9).

Null Hypothesis #4:

There will not be a relationship between the student evaluation of the professor and the student performance.

The tests run were the Bivariate Correlation for each class' professor evaluation and grade (doing filters by professor); and, the Bivariate Correlation for each class' professor evaluation and departmental exam (doing filters by professor).

There was not a statistically significant relationship between these grades and professor evaluation for Professor #1 ($r=0.028$, $p>0.05$) (See Table 10). The null hypothesis was accepted for this professor. The same test was run

between exam and Professor #1's evaluation. Likewise there was no significant relationship between exam grade and professor evaluation, therefore the research supports the null hypothesis ($r=0.77$, $p>0.05$) (See Table 11).

For professor #2, there was no significant relationship between professor evaluation and grade ($r=.177$, $p>0.05$). The null hypothesis was accepted for this professor (See Table 12). Likewise there was no significant relationship found between professor evaluation and exam ($r=.126$, $p>0.05$); again, the researcher accepted the null hypothesis (See Table 13).

There was not a statistically significant relationship between professor evaluation and grade for Professor #3 ($r=.227$ $p>0.05$). The null hypothesis was accepted (See Table 14). Likewise there was no significant relationship between professor evaluation and exam for Professor #3 ($r=.372$, $p>0.05$), also accepting the null hypothesis (See Table 15).

Again, no statistically significant relationship between grades and professor evaluation were found for professor #4, and the null hypothesis was accepted ($r=.331$ $p>0.05$) (See Table 16). Likewise, the null hypothesis was

accepted for Professor #4 regarding professor evaluation and exam($r=.206$, $p>0.05$) (See Table 17).

The only statistically significant relationship between grades and professor evaluation was found with professor #5, ($r=.534$, $p\leq 0.05$) (See Table 18). The null hypothesis was rejected, and the alternative hypothesis was accepted. However, when the same test was run between departmental exam and professor evaluation there was no statistically significant relationship ($r=.299$, $p>0.05$) (See Table 19).

Null Hypothesis #5:

When looking at all of the students and professors (totals), there will be no positive relationship between the performance of the professor and the performance of the students.

The tests run were the Bivariate Correlation for professor evaluation and grade; and, the Bivariate Correlation for professor evaluation and departmental exam. Some of the results and findings were expected and others surprising.

The investigator found a statistically significant positive relationship between professor evaluations and grades ($r=.260$, $p\leq 0.05$) (See Table 20).

The investigator found a statistically significant positive relationship between professor evaluations and departmental exams ($r=.265$, $p\leq 0.05$) (See Table 21).

IV. DISCUSSION

Did this study determine if the effectiveness of the professor has a relationship with the performance of the student? By and large, the findings and results were as expected and in line with the literature.

In the means of the evaluations there was a significant difference between professors indicating that the students' perceptions of the various faculty were different. Professor #2 performed considerably lower than the rest of the MAT 115 faculty. This may have had to do with the make up of the class. A One way ANOVA was done for student age by professor and there was no significant difference overall between the classes; however a means plot shows that the mean age in Professor #2's class is older than the rest of the classes and that may have influenced these results (See Appendix R).

As Phye (1984) suggested it is important to take into account the students' academic level when looking at the

perception of the professor by the students as he argues it plays a role in the way that they evaluate their professors. This would mean that in order for Phye's argument to hold true Professor #2's students should have performed at a lower academic level than the rest. However, in this study Professor #2's students did not perform significantly lower than the others.

When comparing the means of all the MAT115 classes by professor there was a significant difference between grades by professor and departmental exam by professor. It seems that Professor #1's students obtained lower grades than the others, with a mean of 67.07; in the USFQ system this is equivalent to a D which is barely passing. What brought down the mean grade for this class was the fact that this professor gives the grade of 0 for those students who failed to take the departmental exam. With regards to the means of departmental exam by professor, there was also a significant difference found between the classes, namely between Professor #2 and Professor #4, and Professor #3 and Professor #4. Again, the demographics of Professor #2's class may have influenced these findings. In the case of Professor #3's class, it is important to note that the departmental exam is given in Spanish and Professor #3 was the only professor who taught the class in English. This

could have affected the performance of the students if they had learned all the material in English and then taken the exam in Spanish.

Research question # 4 was asking if there would be a relationship between the student evaluation of the professor and the student performance by class. It is important to recall that Tucker (2003) had found a weak significant relationship between course grades, final exam scores and instructor evaluations. Williams (2001) reported that the correlation between grades and total course evaluation is statistically significant but low in magnitude. This study found that for all of the classes except for one, there was a no significant relationship between professor evaluations and student performance as measured by grades and departmental exams. This could have been a result of the size of the sample. The class sizes were between 10 and 19, and often with a small sample size it is difficult to find a significant relationship. Despite the small sample size, there was a statistically significant relationship between the student evaluation of the professor and the student grades. (Actually, the relationship is moderate, not weak).

Finally, when running the correlation to look at all of the data for professor evaluation and all of the grades and departmental exams as a group, there was a significant

positive relationship. The larger sample size may have made it easier to detect significant relationships between these variables. Like Tucker (2003), Williams (2001), and Stapelton and Murkison (2001) this study also found a positive weak relationship between the performance of the professor and the performance of the students.

What is the benefit of knowing this? First of all, it is valuable that the different cultural context that this study was conducted in, it found similar results as the literature mentioned above. Second of all, the results suggest that the value placed on the evaluation of the professor is important since this evaluation does relate to student performance.

However, there is no such thing as the perfect study. Especially, when conducting an *ex post facto* study where the instruments were not designed with this particular study in mind, it is difficult to expect everything to fit perfectly.

A. Limitations

There were several limitations to this study. As previously mentioned, the researcher didn't have control over the instruments used in this study. The student to

professor evaluation was a new form created by the Evaluation team at USFQ, and it was the first time it was being implemented. Therefore validity and reliability have not been established. The evaluation was long and time consuming to fill out and that may have influenced the results. It took the students on average 20 to 30 minutes to fill out. The sample was a convenience sample, due to the fact that the math department is one of the few areas of the university that conducts a departmental exam. There wasn't very much demographic data available on the participants therefore it is not clear how age, gender and race may have influenced the professors' evaluation. If there had been a pre- test, the researcher could have measured student improvement which is a better indicator of the effectiveness of the professor. There was no qualitative data available on the participants who would have provided personalized information on the effectiveness of the professor and his or her influence on student performance.

Despite its limitations, this study opens up possibilities for future studies taking into account the limitations of the current study when conducting similar studies.

B. Recommendations

For future studies it would be important to use instruments designed specifically for the purposes of the study at hand. When doing the literature review, there was a substantial amount of previous research done on the relationship between students expected grades and professor evaluations. This data would have been valuable to a study such as this and was a missing element. Future studies should incorporate such findings. There are plenty of opportunities for studies such as this at USFQ as it is an environment that is implementing change and that is concerned for the betterment of the education that it provides. This institution is preoccupied about the performance of both its faculty and its students.

This study shows that there is a relationship between effective professors and student performance, and other studies like it can help USFQ demonstrate, as it is applying for US accreditation, that they are accomplishing their mission, "...promote the quest for knowledge, individual liberties and the entrepreneurial spirit as a means for the development of Ecuadorian Society through excellence in teaching, supported by qualified and committed faculty, comprehensive and rigorous curricula and adequate resources" (Montúfar, 2002).

REFERENCES

- Bonesronning, H. (2004). Can effective teacher behavior be identified? *Economics of Education Review*, 23(3), p.237-248.
- Cotton, K. (1995). *Effective schooling practices: A research synthesis 1995 update*. Retrieved March 3, 2004, from <http://www.nwrel.org/scpd/esp/esp95.html#1.1>
- Emery, C., Kramer, T., & Tian, R. (2003). Return to academic standards: A critique of student evaluations of teaching effectiveness. *Quality Assurance in Education: An International Perspective*, 11(1), p.37-47.
- Gay, L. R., & Airasian, P. W. (2000). *Educational research : competencies for analysis and application* (6th ed.). Upper Saddle River, N.J.: Merrill.
- Greimel-Fuhrmann, B., & Geyer, A. (2003). Students' evaluation of teachers and instructional quality- analysis of relevant factors based on empirical evaluation research. *Assessment & Evaluation in Higher Education*, 28(3), p. 229-239.
- Harris, H., & Bretag, T. (2003). Reflective and collaborative teaching practice: Working towards quality student learning outcomes. *Quality in Higher Education*, 9(2), p.179-185.
- Marzano, R. (2003). *What works in schools: Translating research into action*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Montúfar, C. (2002) *University mission*, Universidad San Francisco de Quito Retrieved March 20, 2006, from <http://www.sacsie.usfq.edu.ec>
- Phye, G. (1984). Student performance and the evaluation of teaching effectiveness. *Teaching of Psychology*, 11(2), p.92-95.
- Rapert, M., Smith, S., Welliquette, A., & Garretson, J. (2004). The meaning of quality: Expectations of students in pursuit of an MBA. *Journal of Education for Business*, 80(1), p.17-24.

- Shmanske, S. (1988). On the measurement of teacher effectiveness. *Journal of Economic Education*, 19(4), p.307-314.
- Stapelton R., Murkison G., (2001). Optimizing the fairness of student evaluations: A study of correlations between instructor excellence, study production, learning production and expected grades. *Journal of Management Education*, 25(3), p.269-291.
- Stronge, J. (2002). *Qualities of effective teachers*. Alexandria, VA: Association of Supervision and Curriculum Development.
- Tucker, S., Stewart, D., Schmidt, J., (2003). Teaching and learning styles of community college business instructors and their students: Relationship to student performance and instructor evaluations. *New Horizons in Adult Education*, 17(2), p.11-20.
- Williams, R., (2001) Course evaluation: A strategy for improving instruction. (HE 033 764) *Educational Resources Information Center ERIC*, p.1-17.
- Wright, P., Horn, S., & Sanders, W. (1997). Teacher and classroom context effects on student achievement: Implications for teacher evaluation. *Journal of Personnel Evaluation in Education*, 11, p.57-67.

Appendix A

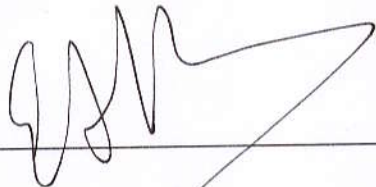
APPENDIX A

LETTER OF PERMISSION TO CONDUCT THE STUDY AT UNIVERSIDAD SAN FRANCISCO DE QUITO (USFQ) TO BE SIGNED BY THE DEPARTMENT CHAIR OF THE MATH DEPARTMENT AND THE PRESIDENT OF THE UNIVERSITY FOR THE USE OF THE STUDENT DATA, FACULTY DATA AND THE NAME OF THE UNIVERSITY.

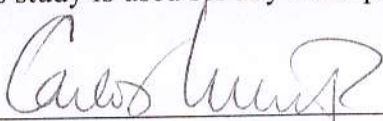
To Whom It May Concern:

This letter grants permission to Mona Haghjoo Khozein to conduct the study of the relationship between effective professors and student performance: a quantitative study at Universidad San Francisco de Quito, for the purposes of her Masters degree in Education from USFQ.

On behalf of the Math Department: I, Eduardo Alba, agree to provide Mona Haghjoo Khozein, with all of the data necessary from the Spring 2005 semester for her to conduct the study, as long as, all of the data is kept confidential and no ones privacy is compromised.

Signature:  _____ Date: May 6, 2005

On behalf of Universidad San Francisco de Quito: I, Carlos Montúfar, allow Mona Haghjoo Khozein, to use the name Universidad San Francisco de Quito for the study. It is understood that the purposes of this study is for educational purposes ONLY and in the event that this study is used for any other purposes permission will have to be granted.

Signature:  _____ Date: May 9, 2005

Appendix B

Estimado estudiante de Matemáticas 115/115E:

Presentación: Como parte de mi trabajo de maestría en el Departamento de Educación en la Universidad San Francisco de Quito (USFQ), estoy conduciendo un estudio de investigación para establecer la relación entre la efectividad del profesor y el desempeño de los estudiantes.

Propósito: El propósito de este estudio es entender la relación entre la efectividad del profesor y el grado de desempeño del estudiante

Confidencialidad de la identidad: Su identidad y sus respuestas como parte de este estudio serán confidenciales durante todo el proceso. Únicamente tendrán acceso a estos expedientes el investigador, el y el Comité de Tesis. Todas las respuestas serán guardadas bajo llave y todos los archivos de las computadoras serán protegidos con claves. El nombre de los participantes no aparecerá en ningún documento del estudio con la excepción de este formulario, y todos los nombres serán cambiados para mantener la confidencialidad. Una vez que toda la información sea procesada, los formularios de consentimiento serán archivados y las evaluaciones anónimas serán entregadas a su instructor.

Participación voluntaria: Su participación en este estudio es completamente voluntaria. Usted puede rehusarse a contestar cualquiera de las preguntas sin temor a ser penalizado o a tener que dar explicaciones. Sin embargo, debe tener en cuenta que agradezco encarecidamente su participación ya que sus respuestas son de gran valor para mi estudio.

Su participación implicará el uso de sus evaluaciones al profesor durante el segundo semestre del año 2005, así como el resultado en los exámenes de destrezas del segundo semestre 2004-2005, los cuales serán suministrados por el Jefe de Departamento de Matemáticas de la USFQ.

Contacto: Si usted tiene alguna pregunta o comentario respecto a este estudio por favor contactarme en mi oficina 289-4794 ext. 623. Las preguntas o comentarios también pueden ser enviadas al Director del programa Dr Cornell Menking 289-5723 x291, oficina de la Maestría en Educación.

Gracias por su asistencia.

Sinceramente,

Mona Menking

Nombre: _____

Firma del participante: _____

Numero de Estudiante: _____

Firma del investigador: *Mona Menking*

Fecha: 5/5/05

En caso de que desee recibir los resultados de este estudio, incluya su dirección de correo electrónico: _____

Appendix C



EVALUACIÓN DE PROFESOR Y CURSO 2º SEMESTRE 2005

Por favor llene completamente los espacios. NO haga marcas como: o UTILICE LAPIZ.

Escriba en el casillero:
P: Colegio C. Policiales
T: Colegio de Tecnologías
Nada en cualquier otro caso

Código Único

Este código no es su número de estudiante ni el número de profesor, este código está escrito en el sobre que contiene las evaluaciones.

Dentro de los recuadros, escriba el código único en forma numérica.

Rellene por completo los círculos correspondientes a cada número en la matriz

Código Único



Los estudiantes son una importante fuente de retroalimentación.

Por favor, responda honestamente a las siguientes preguntas. Los resultados de estas evaluaciones serán entregados al instructor y serán totalmente confidenciales.

1. Demostró interés en que los estudiantes aprendan.
2. Demostró tener el conocimiento adecuado y actualizado del contenido del curso.
3. Supo contestar claramente las preguntas o inquietudes que le plantearon los estudiantes.
4. Organizó el trabajo de tal manera que estimuló a los estudiantes a mantenerse al día.
5. Uso y cumplió con un syllabus.
6. Cumplió el horario de clases puntualmente.
7. Demostró la importancia y relevancia del curso.
8. Explicó claramente los procedimientos de evaluación y las tareas.
9. Explicó los conceptos con claridad.
10. Usó varios métodos de enseñanza además de las charlas.
11. Involucró a los estudiantes en proyectos prácticos (investigación, casos de estudio, etc.).
12. Formó "equipos" o "grupos de discusión" para facilitar el aprendizaje.
13. Estimuló a los estudiantes a compartir y a considerar puntos de vista diversos.
14. Pidió a los estudiantes que se ayudaran los unos a los otros.
15. Estimuló la participación de los estudiantes en clase.
16. Asignó proyectos, pruebas y tareas que requieran de creatividad y de pensamiento crítico.
17. Estuvo disponible fuera de las clases (por medio de email, oficina, teléfono, etc.).
18. Utilizó varios métodos - no sólo exámenes escritos - para evaluar a los estudiantes.
19. Estimuló un esfuerzo intelectual superior al logrado por otros profesores.
20. Inspiró a los estudiantes a plantearse y lograr metas reales.
21. Me ayudó a responder mis propias interrogantes.
22. Hizo que el curso fuera interesante.
23. Dio retroalimentación oportuna y útil sobre pruebas, informes, proyectos, etc.
24. Mantuvo un ambiente de respeto en la clase.
25. Usó casos, ejemplos o situaciones aplicables al contexto ecuatoriano.
26. ¿Recomendaría este PROFESOR a otros estudiantes?

ESCRIBE TUS COMENTARIOS SOBRE EL PROFESOR (AL REVERSO, POR FAVOR).

B. A continuación se enumeran diez OBJETIVOS DE APRENDIZAJE. Evalúa tu progreso comparado con lo aprendido en otros cursos que has tomado en esta universidad. (Una calificación baja puede significar que el objetivo de aprendizaje simplemente no era parte de la clase.)
En este curso el progreso alcanzado en este aspecto fue: 1. = Bajo; 2. = Promedio; 3. = Alto

- En este curso yo ...
27. He aprendido nuevos términos, métodos, y/o tendencias en éste campo de estudio/actividad
 28. He aprendido principios fundamentales, generalizaciones o teorías.
 29. He desarrollado destrezas que se aplican en éste campo de estudio/actividad.
 30. He adquirido habilidades necesarias para el trabajo en equipo.
 31. He desarrollado capacidades creativas (escritura, diseño, desempeño artístico, etc.).
 32. He desarrollado habilidades de expresión oral o escrita.
 33. He aprendido a encontrar y usar recursos externos para solucionar problemas.
 34. He desarrollado comprensión y compromiso hacia los valores personales (ética).
 35. He aprendido a analizar y evaluar críticamente ideas, decisiones y puntos de vista.
 36. He adquirido interés por aprender más sobre ésta materia/actividad.

ESCRIBE TUS COMENTARIOS SOBRE LO QUE RECIBO DEL CURSO (AL REVERSO, POR FAVOR)

C. Describe SUS ACTITUDES Y COMPORTAMIENTOS en este curso, usando la siguiente escala:

Falso 1 2 3 4 5 Verdadero

- Yo creo que...
37. Realmente quería tomar este curso sin importar quien lo enseña.
 38. Mi previa formación académica me preparó adecuadamente para este curso.
 39. Realmente quería tomar un curso con este profesor.
 40. Trabajé más duro en este curso, que en muchos otros que he tomado.
 41. Como resultado de este curso puedo apreciar mejor este campo de estudio.
 42. Leí más en este curso que en otros.
 43. Las lecturas y los libros usados fueron excelentes.
 44. Encontré difícil el contenido de este curso.
 45. ¿Recomendaría el contenido de este curso a otros estudiantes?

ESCRIBE TUS COMENTARIOS SOBRE SUS ACTITUDES Y COMPORTAMIENTO (AL REVERSO, POR FAVOR)

D. Describe SUS ACTITUDES Y COMPORTAMIENTOS en este curso, usando la siguiente escala:

Totalmente en desacuerdo 1 2 3 4 5 Totalmente de Acuerdo

- Yo creo que...
46. En general evalué este profesor como excelente.
 47. En general evalué este curso como excelente.

Adaptado de: IDEA Center, (1998). Student Reactions to Instruction and Courses. Manhattan, Kansas: HCS Press

Appendix D

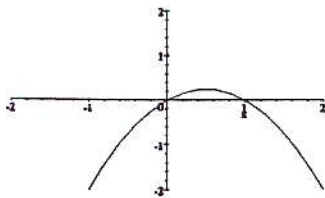
Universidad San Francisco de Quito

Examen de destrezas mínimas Matemáticas Aplicadas Semestre I 2002-2003

Instrucciones: Escriba su nombre en el espacio proporcionado. Llene el círculo a la izquierda de la respuesta que seleccione. No puede usar calculadora o formularios. Tiempo 1 hora.

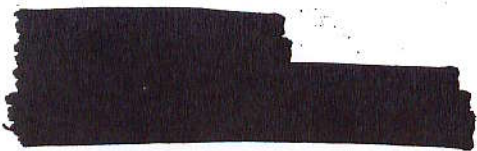
Nombre:

- Si $a = 7$ y $b = 10$ entonces $\ln(ab)$ es igual a
 $\ln 7 - \ln 10$ $\ln 7 + \ln 10$ $\frac{\ln 7}{\ln 10}$ $\ln(7 \ln 10)$ Ninguna de las anteriores.
- La recta que pasa por $(1, 8)$ y tiene pendiente 3 tiene la siguiente ecuación
 $y = 3x + 1$ $y = 3x + 5$ $y = \frac{3}{2}x + \frac{3}{2}$ $y = 3x + 8$ Ninguna de las anteriores.
- Sea $f(x) = 8 + 3x^2$ entonces $f(-2)$ es
 3.0 20 35.0 11.0 Ninguna de las anteriores.
- La parábola $y = 9x^2 + 9x + 7$ corta al eje x en
 $(0, 0)$ $(\frac{81}{2}, \frac{63}{2})$ $(-\frac{1}{2} + \frac{1}{6}i\sqrt{19}, -\frac{1}{2} - \frac{1}{6}i\sqrt{19})$ $(0, 9)$ Ninguna de las anteriores.
- Si $f(x) = 5x^2 + 4x$, $g(x) = -5\sqrt{x}$ entonces $f \circ g(2)$ es
 $\sqrt{x^2 - 5x}$ $10 + 4\sqrt{2}$ $250 - 20\sqrt{2}$ $2 - 5\sqrt{2}$ Ninguna de las anteriores.
- Las rectas $y = 5x - 6$ y $y = 8x + 3$ se cortan en
 $(-3, -21)$ $(-3, 0)$ $(0, 0)$ $(-3, -1)$ Ninguna de las anteriores.
- La ecuación de la gráfica es



- $x^2 - x - 1$ $x^2 + x$ e^x $-x^2 + x$ Ninguna de las anteriores.
- Calculate $\begin{pmatrix} 2 & 2 \\ 2 & 4 \end{pmatrix} \begin{pmatrix} 5 & 5 \\ 4 & 2 \end{pmatrix}$.
 $\begin{pmatrix} 20 & 30 \\ 12 & 16 \end{pmatrix}$ $\begin{pmatrix} 18 & 14 \\ 26 & 18 \end{pmatrix}$ $\begin{pmatrix} 20 & 30 \\ 12 & 16 \end{pmatrix}$ $\begin{pmatrix} 15 & 14 \\ 26 & 15 \end{pmatrix}$
 $\begin{pmatrix} 17 & 14 \\ 26 & 17 \end{pmatrix}$
 - El valor presente de 11 332 dólares a 1.0 año(s) plazo con una tasa de interés 7% compuesto trimestralmente es
 $11332(1 + \frac{7}{100})^{-3}$ $11332(1 + \frac{7}{100})^{-4}$ $11332(1 + \frac{7}{100})^{12}$
 $11332(1 + 3 * 1 * 7)$ Ninguna de las anteriores.

Appendix E



MATEMATICAS APLICADAS
PARALELO 4
MAÑANA

PON CAL

		PON	CAL
1	[REDACTED]	65	D
2	[REDACTED]	[REDACTED]	F
3	[REDACTED]	[REDACTED]	
4	[REDACTED]	84	B
5	[REDACTED]	80	B
6	[REDACTED]	[REDACTED]	F
7	[REDACTED]	80	B
8	[REDACTED]	100	A
9	[REDACTED]	[REDACTED]	F
10	[REDACTED]	70	C
11	[REDACTED]	63	D
12	[REDACTED]	71	C
13	[REDACTED]	73	C
14	[REDACTED]	75	C
15	[REDACTED]	[REDACTED]	F
16	[REDACTED]	71	C
17	[REDACTED]	72	C
18	[REDACTED]	84	B
19	[REDACTED]	82	B
20	[REDACTED]	94	A

Table 1

	N	Mean	Std. Deviation	Std. Error
Professor 1 J	14	95.8571	15.55564	4.15742
Professor 2 R	20	77.7000	16.55008	3.70071
Professor 3 S	10	112.3000	11.24525	3.55606
Professor 4 E1	19	106.4211	15.09347	3.46268
Professor 5 E2	14	119.7857	19.01893	5.08302
Total	77	100.2338	21.83966	2.48886

Table 2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	17958.789	4	4489.697	17.673	.000
Within Groups	18291.003	72	254.042		
Total	36249.792	76			

Table 3

Dependent Variable: TOTAL
Bonferroni

(I) PROFESOR	(J) PROFESOR	Mean Difference (I-J)	Std. Error	Sig.
Professor 1 J	Professor 2 R	18.1571*	5.55409	.017
	Professor 3 S	-16.4429	6.59924	.150
	Professor 4 E1	-10.5639	5.61395	.639
	Professor 5 E2	-23.9286*	6.02426	.002
Professor 2 R	Professor 1 J	-18.1571*	5.55409	.017
	Professor 3 S	-34.6000*	6.17303	.000
	Professor 4 E1	-28.7211*	5.10614	.000
	Professor 5 E2	-42.0857*	5.55409	.000
Professor 3 S	Professor 1 J	16.4429	6.59924	.150
	Professor 2 R	34.6000*	6.17303	.000
	Professor 4 E1	5.8789	6.22694	1.000
	Professor 5 E2	-7.4857	6.59924	1.000
Professor 4 E1	Professor 1 J	10.5639	5.61395	.639
	Professor 2 R	28.7211*	5.10614	.000
	Professor 3 S	-5.8789	6.22694	1.000
	Professor 5 E2	-13.3647	5.61395	.199
Professor 5 E2	Professor 1 J	23.9286*	6.02426	.002
	Professor 2 R	42.0857*	5.55409	.000
	Professor 3 S	7.4857	6.59924	1.000
	Professor 4 E1	13.3647	5.61395	.199

*. The mean difference is significant at the .05 level.

Table 4

GRADE

	N	Mean	Std. Deviation	Std. Error
Professor 1 J	14	67.0714	30.13933	8.05507
Professor 2 R	19	75.9474	13.19711	3.02762
Professor 3 S	10	77.3000	13.96066	4.41475
Professor 4 E1	19	86.4168	8.97636	2.05932
Professor 5 E2	14	84.2957	9.93885	2.65627
Total	76	78.6455	17.53425	2.01132

Table 5

GRADE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3626.280	4	906.570	3.312	.015
Within Groups	19432.476	71	273.697		
Total	23058.756	75			

Table 6

Dependent Variable: GRADE
Bonferroni

(I) PROFESOR	(J) PROFESOR	Mean Difference (I-J)	Std. Error	Sig.
Professor 1 J	Professor 2 R	-8.8759	5.82708	1.000
	Professor 3 S	-10.2286	6.84978	1.000
	Professor 4 E1	-19.3454*	5.82708	.014
	Professor 5 E2	-17.2243	6.25296	.075
Professor 2 R	Professor 1 J	8.8759	5.82708	1.000
	Professor 3 S	-1.3526	6.46334	1.000
	Professor 4 E1	-10.4695	5.36751	.551
	Professor 5 E2	-8.3483	5.82708	1.000
Professor 3 S	Professor 1 J	10.2286	6.84978	1.000
	Professor 2 R	1.3526	6.46334	1.000
	Professor 4 E1	-9.1168	6.46334	1.000
	Professor 5 E2	-6.9957	6.84978	1.000
Professor 4 E1	Professor 1 J	19.3454*	5.82708	.014
	Professor 2 R	10.4695	5.36751	.551
	Professor 3 S	9.1168	6.46334	1.000
	Professor 5 E2	2.1211	5.82708	1.000
Professor 5 E2	Professor 1 J	17.2243	6.25296	.075
	Professor 2 R	8.3483	5.82708	1.000
	Professor 3 S	6.9957	6.84978	1.000
	Professor 4 E1	-2.1211	5.82708	1.000

*. The mean difference is significant at the .05 level.

Table 7

EXAM

	N	Mean	Std. Deviation	Std. Error
Professor 1 J	14	10.8571	2.53763	.67821
Professor 2 R	19	10.3684	2.77310	.63619
Professor 3 S	10	9.5000	3.30824	1.04616
Professor 4 E1	19	12.8421	1.77210	.40655
Professor 5 E2	14	12.2143	1.57766	.42165
Total	76	11.3026	2.62815	.30147

Table 8

EXAM

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	108.521	4	27.130	4.704	.002
Within Groups	409.519	71	5.768		
Total	518.039	75			

Table 9

Dependent Variable: EXAM
Bonferroni

(I) PROFESOR	(J) PROFESOR	Mean Difference (I-J)	Std. Error	Sig.
Professor 1 J	Professor 2 R	.4887	.84591	1.000
	Professor 3 S	1.3571	.99437	1.000
	Professor 4 E1	-1.9850	.84591	.217
	Professor 5 E2	-1.3571	.90773	1.000
Professor 2 R	Professor 1 J	-.4887	.84591	1.000
	Professor 3 S	.8684	.93827	1.000
	Professor 4 E1	-2.4737*	.77919	.022
	Professor 5 E2	-1.8459	.84591	.324
Professor 3 S	Professor 1 J	-1.3571	.99437	1.000
	Professor 2 R	-.8684	.93827	1.000
	Professor 4 E1	-3.3421*	.93827	.007
	Professor 5 E2	-2.7143	.99437	.080
Professor 4 E1	Professor 1 J	1.9850	.84591	.217
	Professor 2 R	2.4737*	.77919	.022
	Professor 3 S	3.3421*	.93827	.007
	Professor 5 E2	.6278	.84591	1.000
Professor 5 E2	Professor 1 J	1.3571	.90773	1.000
	Professor 2 R	1.8459	.84591	.324
	Professor 3 S	2.7143	.99437	.080
	Professor 4 E1	-.6278	.84591	1.000

*. The mean difference is significant at the .05 level.

Table 10

		GRADE	TOTAL
GRADE	Pearson Correlation	1	.028
	Sig. (2-tailed)	.	.924
	N	14	14
TOTAL	Pearson Correlation	.028	1
	Sig. (2-tailed)	.924	.
	N	14	14

Table 11

		TOTAL	EXAM
TOTAL	Pearson Correlation	1	.077
	Sig. (2-tailed)	.	.793
	N	14	14
EXAM	Pearson Correlation	.077	1
	Sig. (2-tailed)	.793	.
	N	14	14

Table 12

		TOTAL	GRADE
TOTAL	Pearson Correlation	1	.177
	Sig. (2-tailed)	.	.468
	N	20	19
GRADE	Pearson Correlation	.177	1
	Sig. (2-tailed)	.468	.
	N	19	19

Table 13

		TOTAL	EXAM
TOTAL	Pearson Correlation	1	.126
	Sig. (2-tailed)	.	.607
	N	20	19
EXAM	Pearson Correlation	.126	1
	Sig. (2-tailed)	.607	.
	N	19	19

Table 14

		TOTAL	GRADE
TOTAL	Pearson Correlation	1	.227
	Sig. (2-tailed)	.	.528
	N	10	10
GRADE	Pearson Correlation	.227	1
	Sig. (2-tailed)	.528	.
	N	10	10

Table 15

		TOTAL	EXAM
TOTAL	Pearson Correlation	1	.372
	Sig. (2-tailed)	.	.290
	N	10	10
EXAM	Pearson Correlation	.372	1
	Sig. (2-tailed)	.290	.
	N	10	10

Table 16

		TOTAL	GRADE
TOTAL	Pearson Correlation	1	.331
	Sig. (2-tailed)	.	.167
	N	19	19
GRADE	Pearson Correlation	.331	1
	Sig. (2-tailed)	.167	.
	N	19	19

Table 17

		TOTAL	EXAM
TOTAL	Pearson Correlation	1	.206
	Sig. (2-tailed)	.	.397
	N	19	19
EXAM	Pearson Correlation	.206	1
	Sig. (2-tailed)	.397	.
	N	19	19

Table 18

		TOTAL	GRADE
TOTAL	Pearson Correlation	1	.534*
	Sig. (2-tailed)	.	.049
	N	14	14
GRADE	Pearson Correlation	.534*	1
	Sig. (2-tailed)	.049	.
	N	14	14

*. Correlation is significant at the 0.05 level (2-tailed).

Table 19

		TOTAL	EXAM
TOTAL	Pearson Correlation	1	.299
	Sig. (2-tailed)	.	.299
	N	14	14
EXAM	Pearson Correlation	.299	1
	Sig. (2-tailed)	.299	.
	N	14	14

Table 20

		GRADE	TOTAL
GRADE	Pearson Correlation	1	.260*
	Sig. (2-tailed)	.	.023
	N	76	76
TOTAL	Pearson Correlation	.260*	1
	Sig. (2-tailed)	.023	.
	N	76	77

*. Correlation is significant at the 0.05 level (2-tailed).

Table 21

		EXAM	TOTAL
EXAM	Pearson Correlation	1	.265*
	Sig. (2-tailed)	.	.021
	N	76	76
TOTAL	Pearson Correlation	.265*	1
	Sig. (2-tailed)	.021	.
	N	76	77

*. Correlation is significant at the 0.05 level (2-tailed).

