

HP Higher Education Teaching Technology Grant Analysis

“Enhancing Analytical Decision Making Skills in MBAs: A Post-Katrina Mobile Approach”

**College of Business and Graduate Studies
The University of Southern Mississippi Gulf Coast
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Control Group - No Individual PC Use in Classroom (n = 20)

Experimental Group - Individual HP Tablet PC
Used in Classroom (n = 12)

Project Results

- 1. Timing: Control Group Data collected in Fall, 2005
Experimental Group Data collected in Fall, 2006**
- 2. Number of comparisons: Three identical assignments were evaluated in each group, using content analysis, for number of:
 - a. software and graphical errors (learning technology)**
 - b. statistical and interpretation errors (mathematical learning)****
- 3. The assignments analyzed in this report included:
 - a. Assignment 1 – use of descriptive and crosstabulation techniques in a market segmentation case.**
 - b. Assignment 2 – use of t test technique to test hypotheses in a salary discrimination case.**
 - c. Assignment 3 – use of one-way and two-way ANOVA techniques to test hypotheses in an employee productivity and wellness case.****
- 4. Six hypotheses are tested in this analysis, at the .05 level.**
- 5. Descriptive statistics are presented for each research question, followed by hypothesis test results.**
- 6. Project limitations and conclusions are discussed.**

Figure 1
Number of Software and Graphic Errors
Assignment 1 - Descriptives and Crosstabs

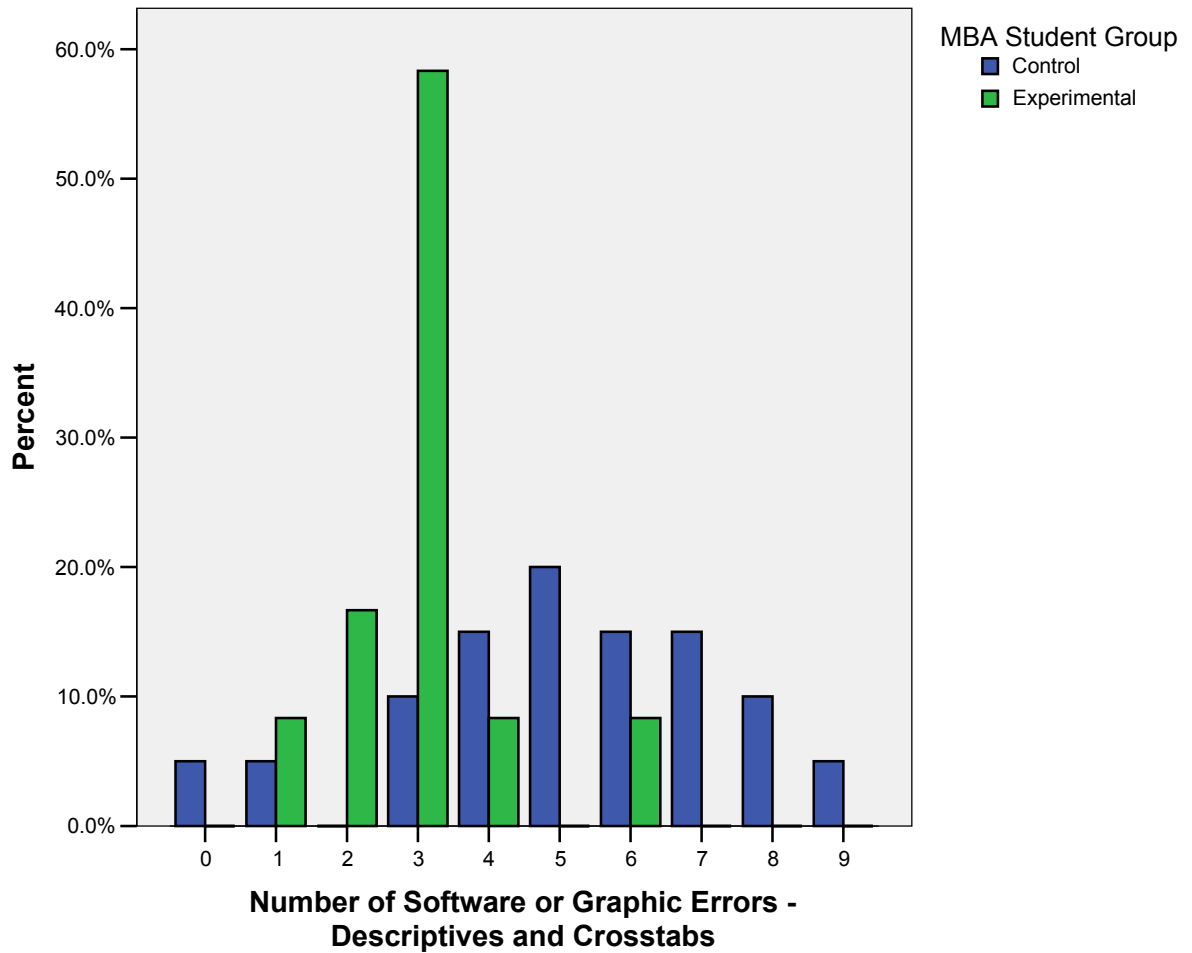


Figure 2
Number of Statistical and Interpretation Errors
Assignment 1 - Descriptives and Crosstabs

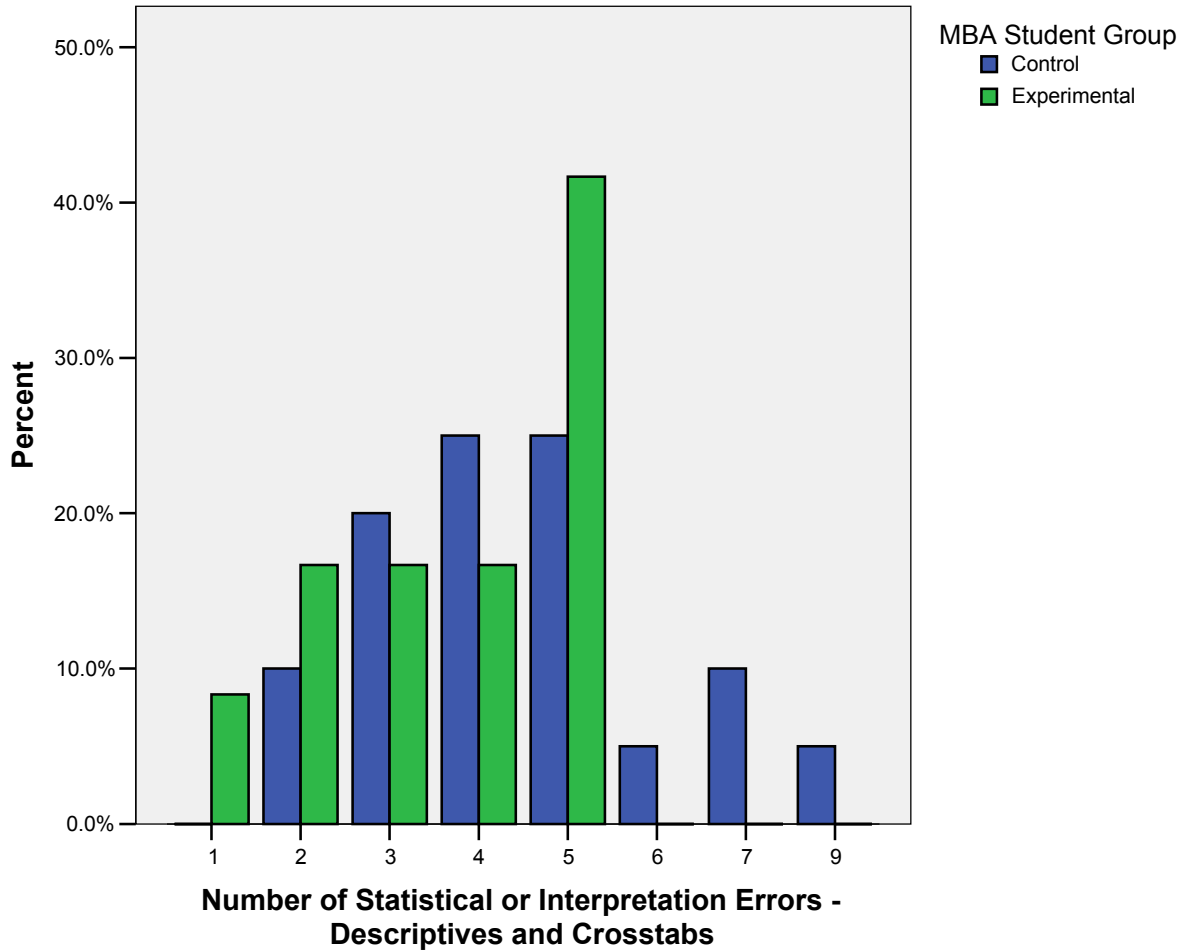


Figure 3
Number of Software and Graphical Errors
Assignment 2 - T Tests

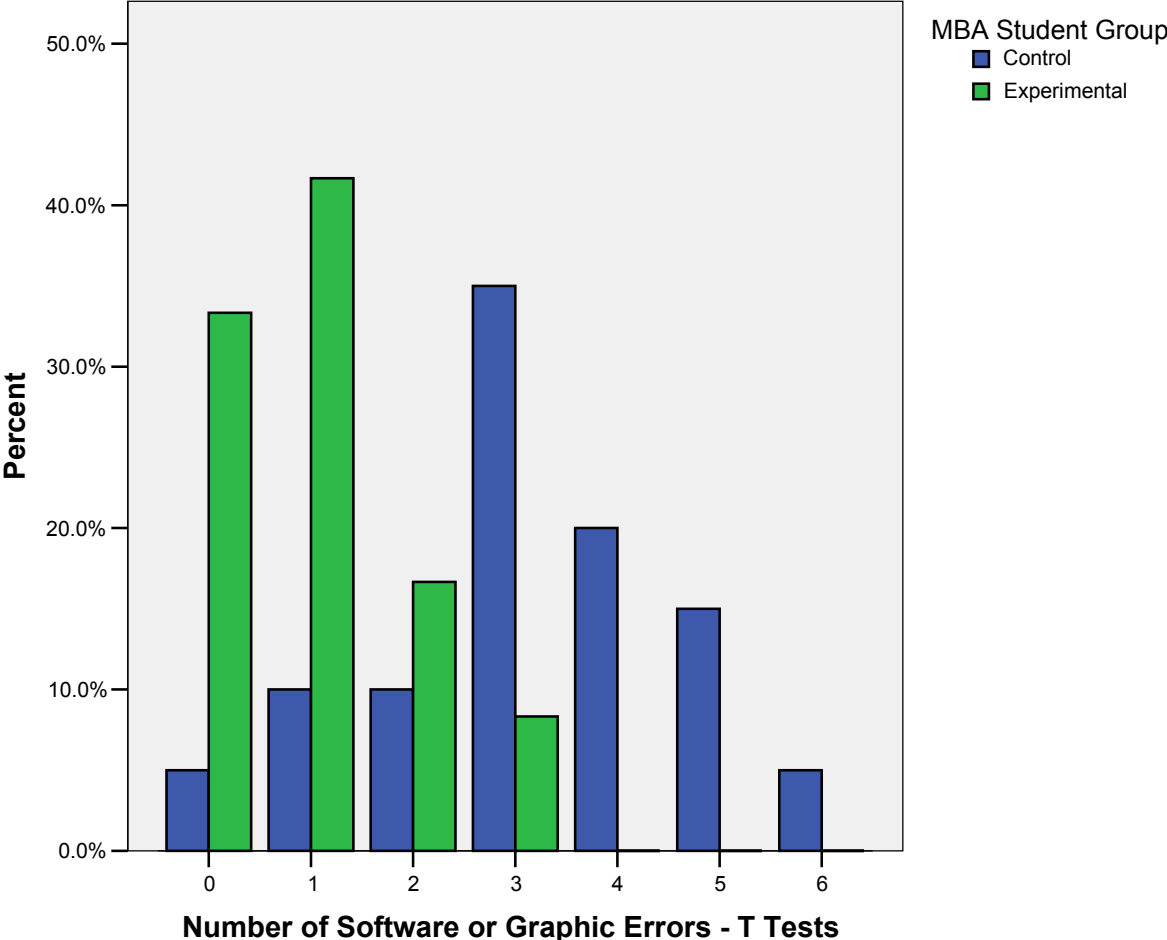


Figure 4
Number of Statistical and Interpretation Errors
Assignment 2 - T Tests

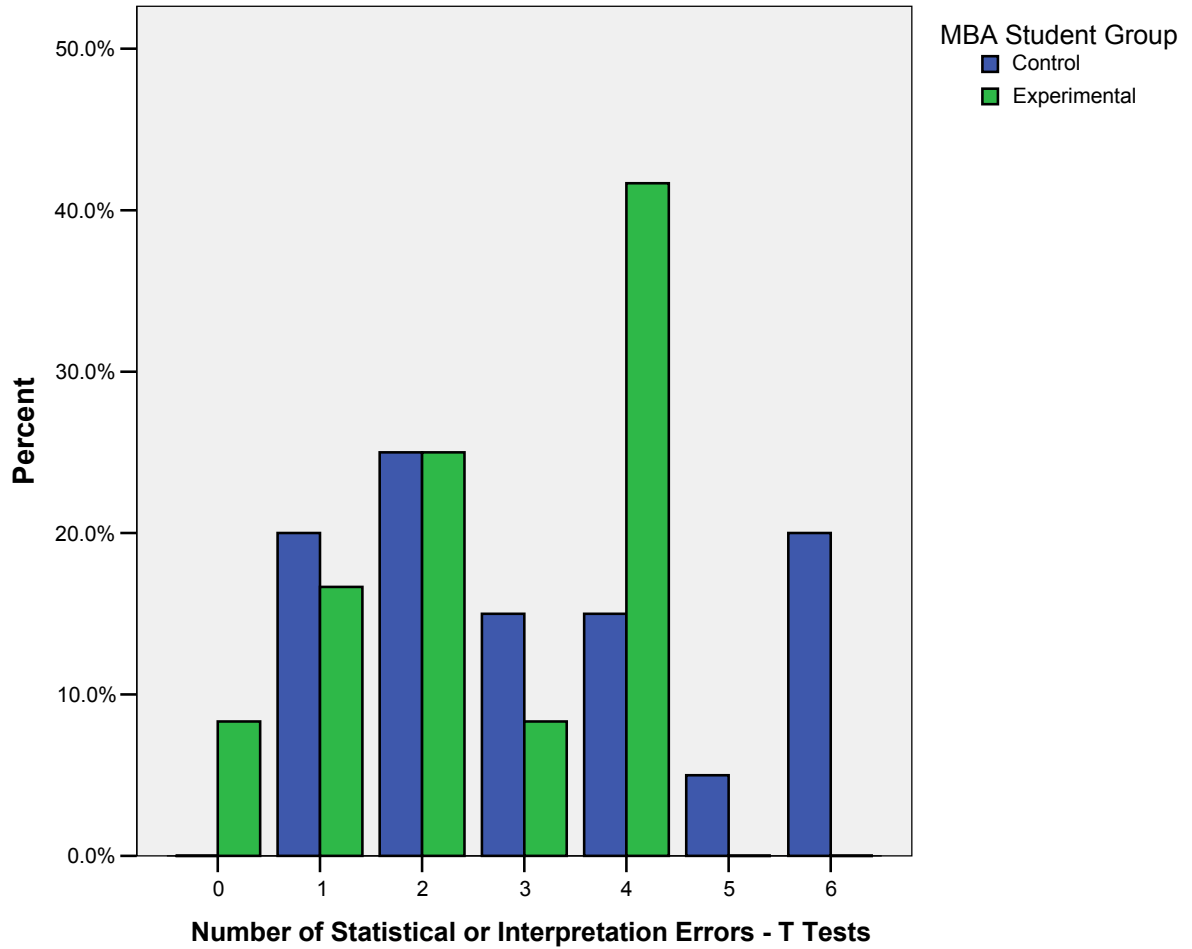


Figure 5
Number of Software and Graphical Errors
Assignment 3 - ANOVA

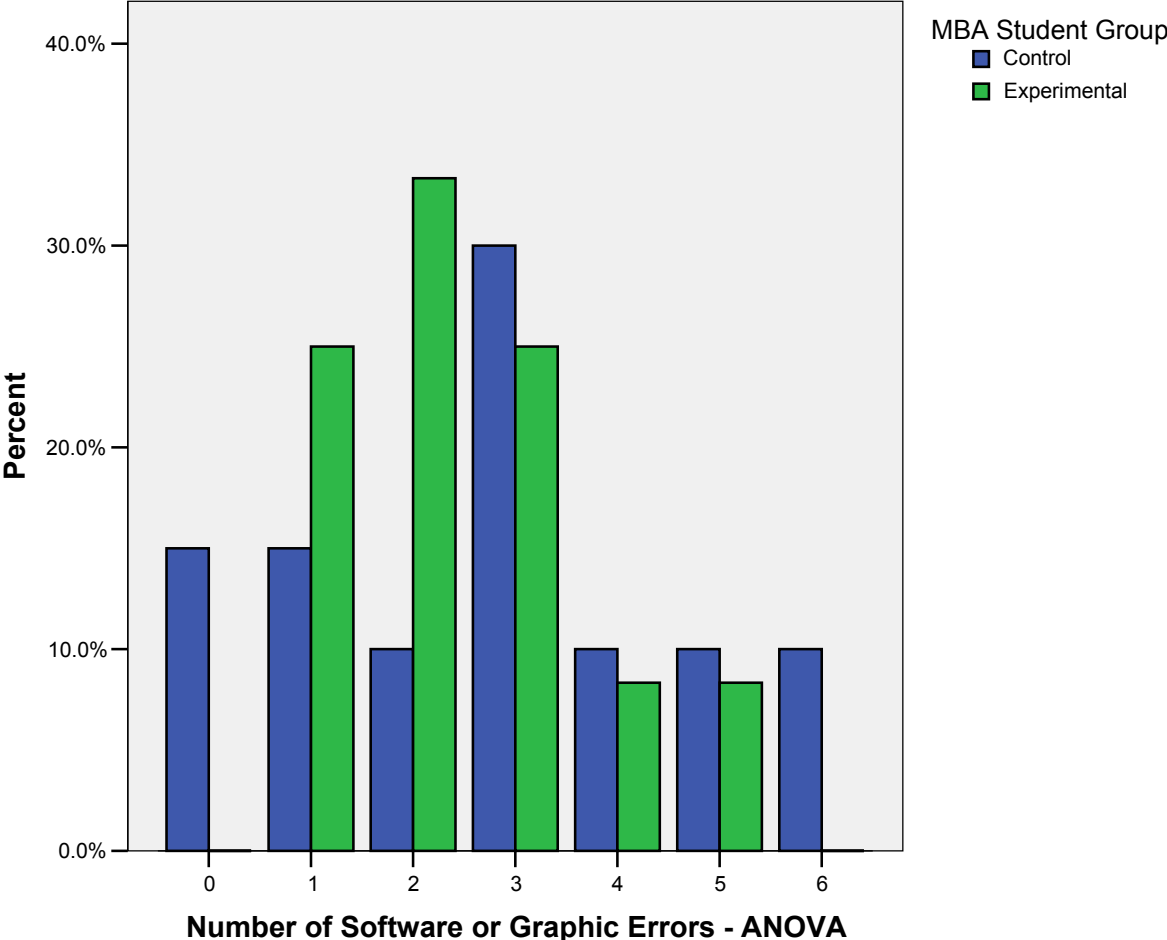
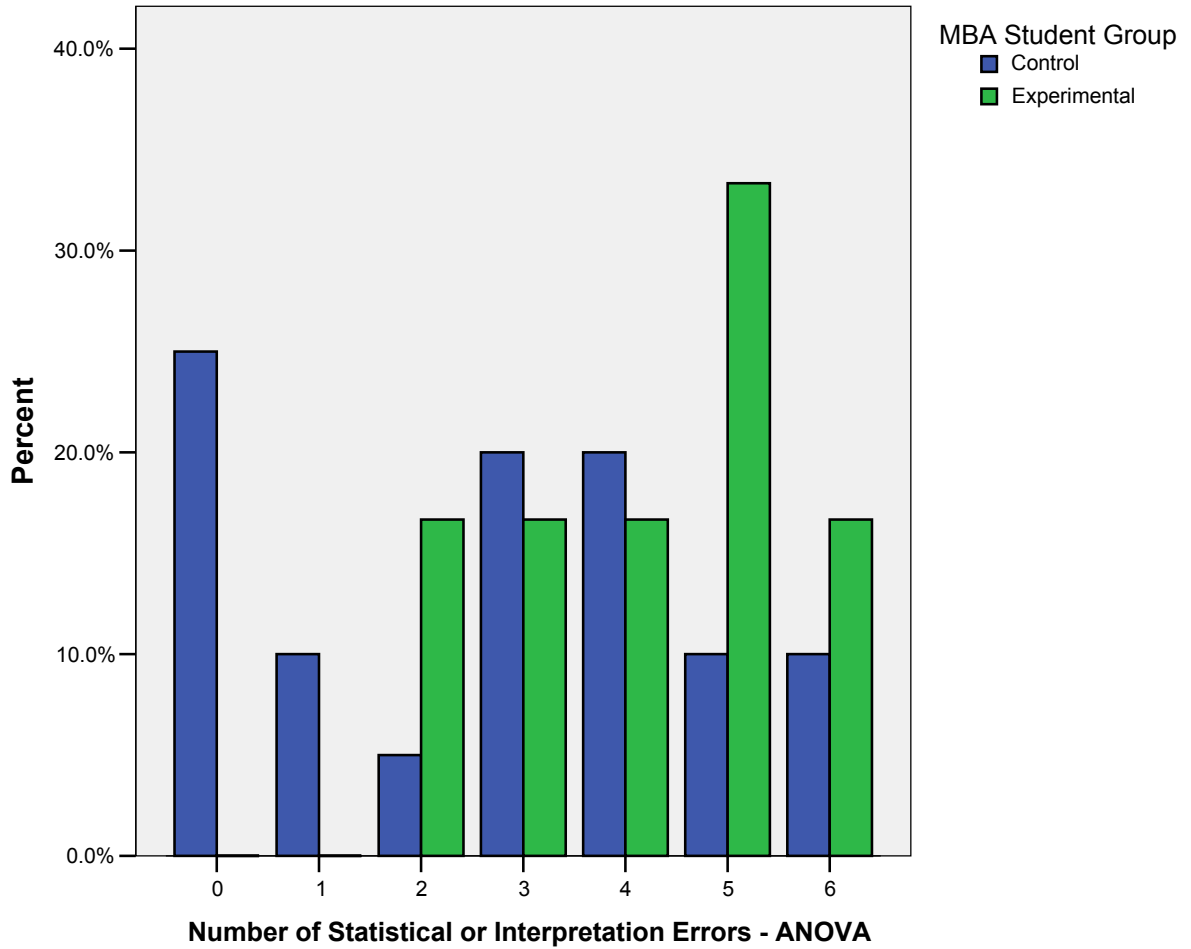


Figure 6
Number of Statistical and Interpretation Errors
Assignment 3 - ANOVA



Hypothesis Tests: Did the use of individual HP Tablet PCs in the classroom by MBA students make a significant difference in software or statistical skills?

In the following hypothesis tests, a critical test value of .05 was set. In order to be declared significant, the probability of a Type I error must be less than or equal to .05.

However, when multiple comparisons on the same sample groups are conducted, the chance increases that a result will be declared statistically significant when, in fact it is not. This chance increases as the number of comparisons increases.

Therefore, all of the hypothesis test results and the associated significance levels were adjusted for the 6 comparisons (t-tests), following the method of Johnson and Wichern (1988).

Desired alpha / number of tests.

$$.05 / 6 = .0083$$

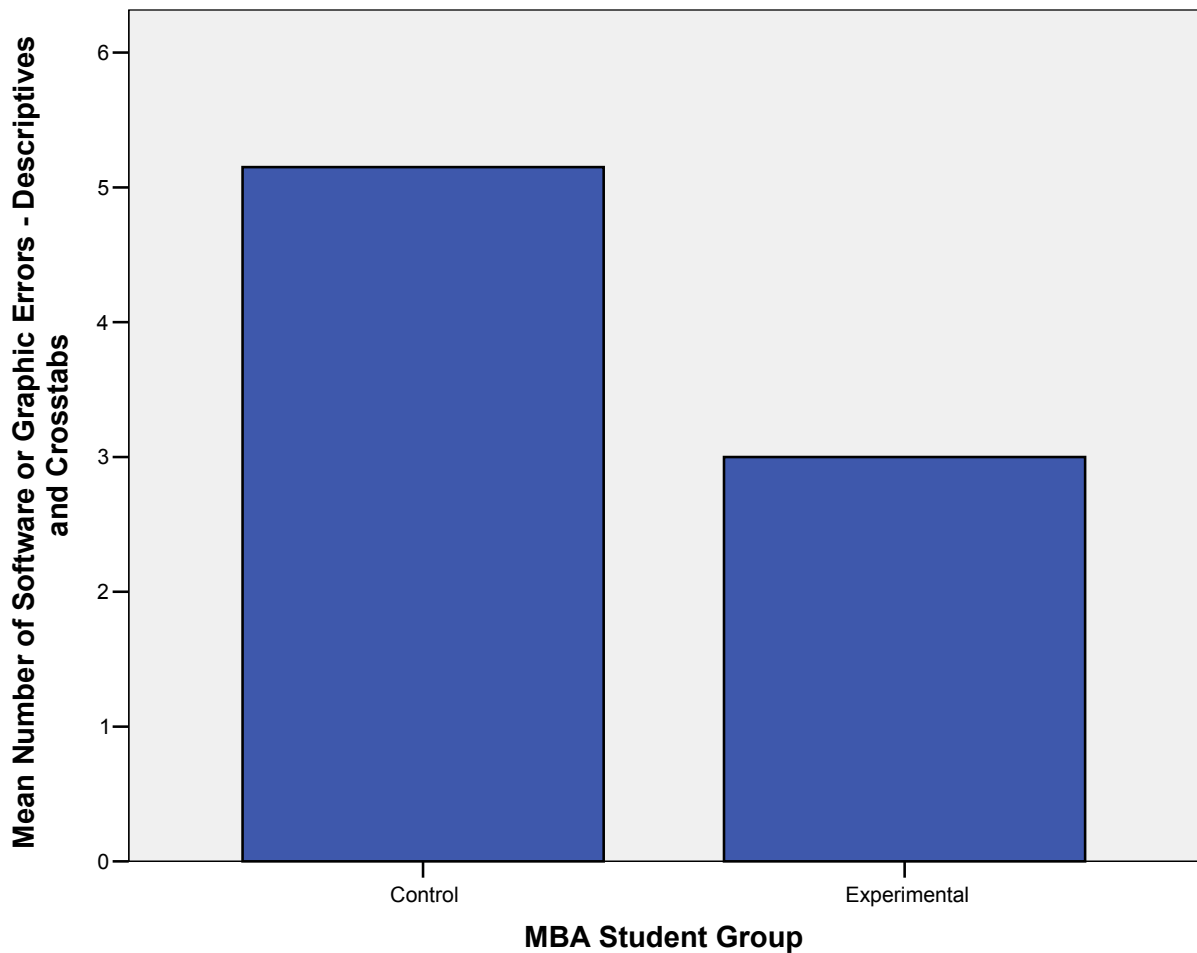
In order to reject the null hypotheses that follow, the observed test probability must be less than or equal to .0083, in order for the test result to be significant at the .05 level.

Ho 1: There is no difference in average software/graphic errors on Assignment 1 – Descriptive and Crosstab Statistics between the two groups.

Ho1 Result: Reject the null hypothesis (t = 3.461; sig. = .002)

Students with tablets made significantly fewer software and graphic errors (on average) on Assignment 1 - Using Descriptive and Crosstab Statistics in Analysis

**Figure 7
Average Software Errors on Assignment 1**

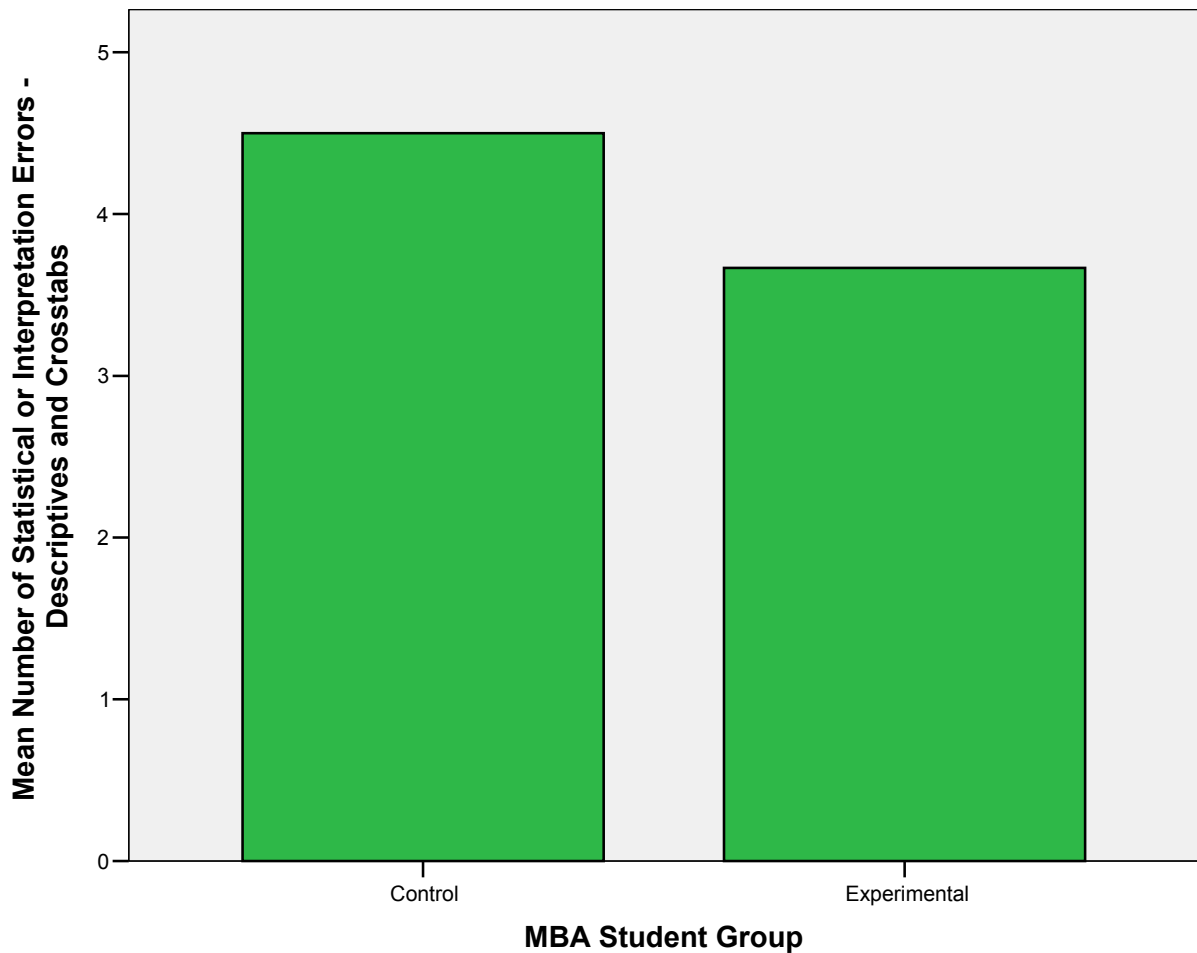


Ho 2: There is no difference in average statistical/interpretation errors on Assignment 1 – Using Descriptive and Crosstab Statistics in Analysis - between the two groups.

Ho 2 Result: Fail to reject the null ($t = 1.383$; $sig. = .177$)

There was no significant difference in average statistical/interpretation errors on Assignment 1 – Using Descriptive and Crosstab Statistics in Analysis

**Figure 8
Average Statistical Errors on Assignment 1**

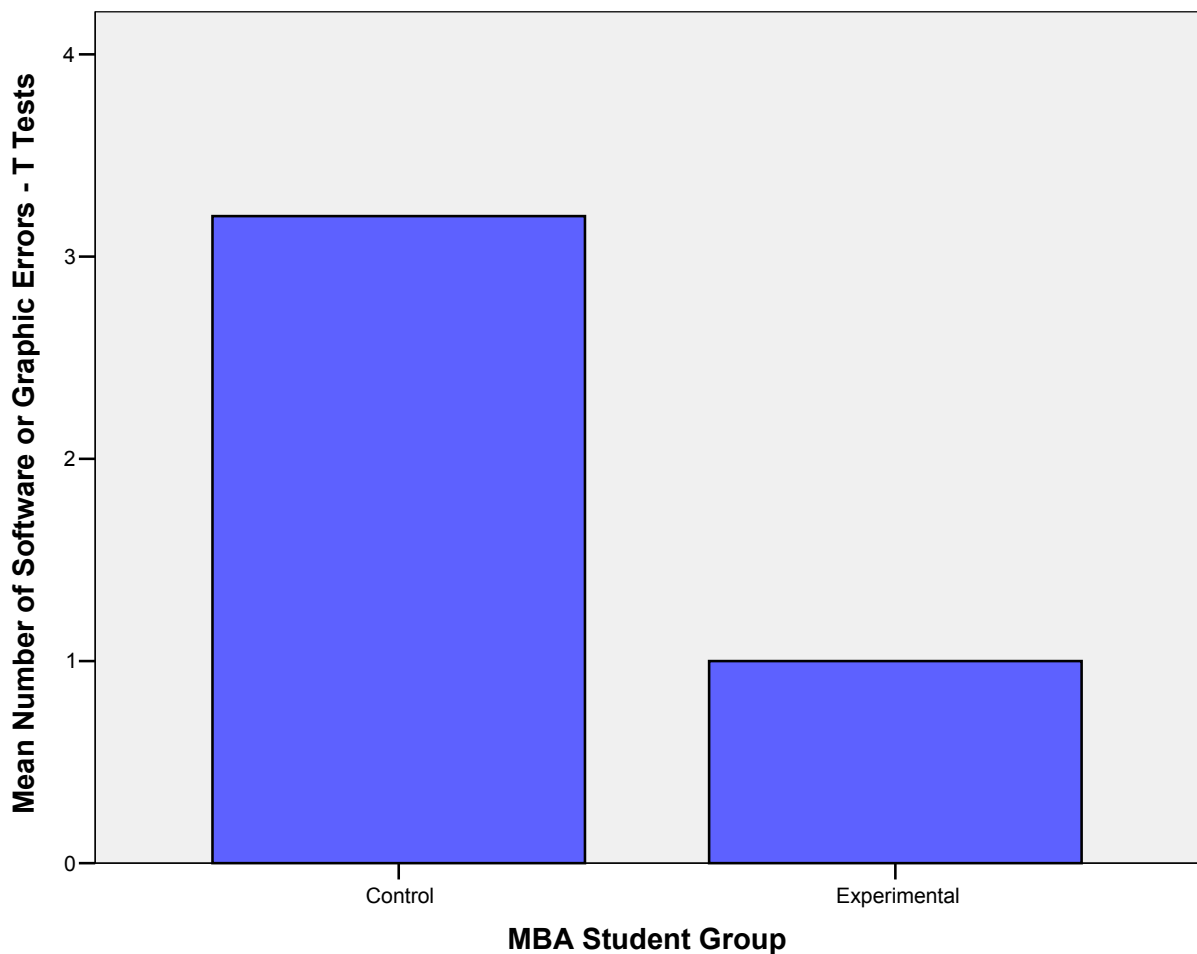


Ho 3: There is no difference in average software/graphical errors on Assignment 2 – Basic Hypothesis Testing Using T Tests – between the two groups.

Ho 3 Result: Reject the null ($t = 4.524$; $sig. = .000$)

Students with tablets made significantly fewer software and graphical errors (on average) on Assignment 2 - Basic Hypothesis Testing Using T Tests

**Figure 9
Average Software Errors on Assignment 2**

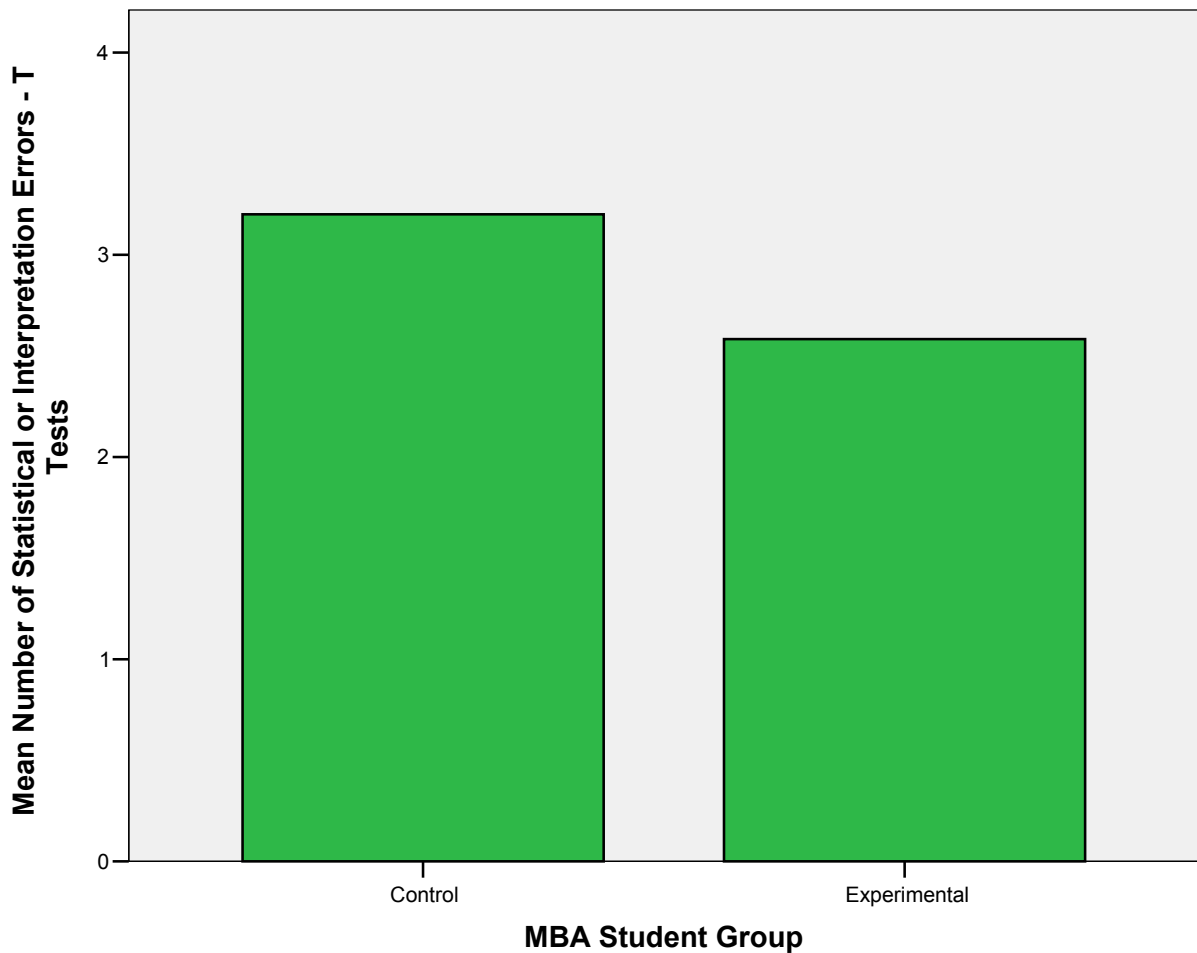


Ho 4: There is no difference in average statistical/interpretation errors on Assignment 2 – Basic Hypothesis Testing using T Tests – between the two groups.

Ho 4 Result: Fail to reject the null ($t = .997$; $sig. = .327$)

There was no significant difference in average statistical /interpretation errors on Assignment 2 - Basic Hypothesis Testing using T Tests – between the two groups.

**Figure 10
Average Statistical Errors on Assignment 2**

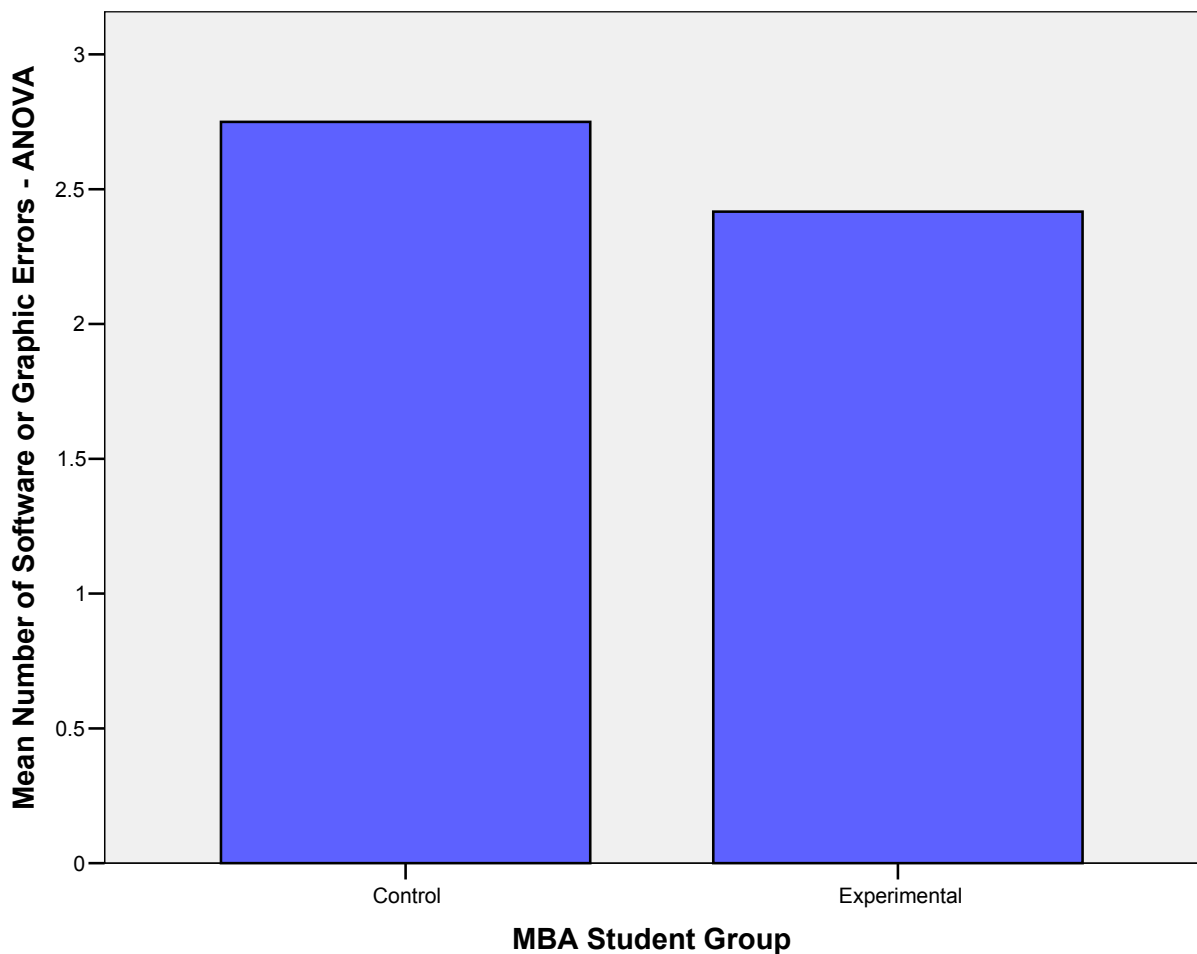


Ho 5: There is no significant difference in average software/ graphical errors on Assignment 3 - Advanced Hypothesis Testing using ANOVA – between the two groups.

Ho 5 Result: Fail to reject the null ($t = .543$; $sig. = .591$)

There was no significant difference in average software/graphic errors on Assignment 3 – Advanced Hypothesis Testing using ANOVA – between the two groups.

**Figure 11
Average Software Errors on Assignment 3**

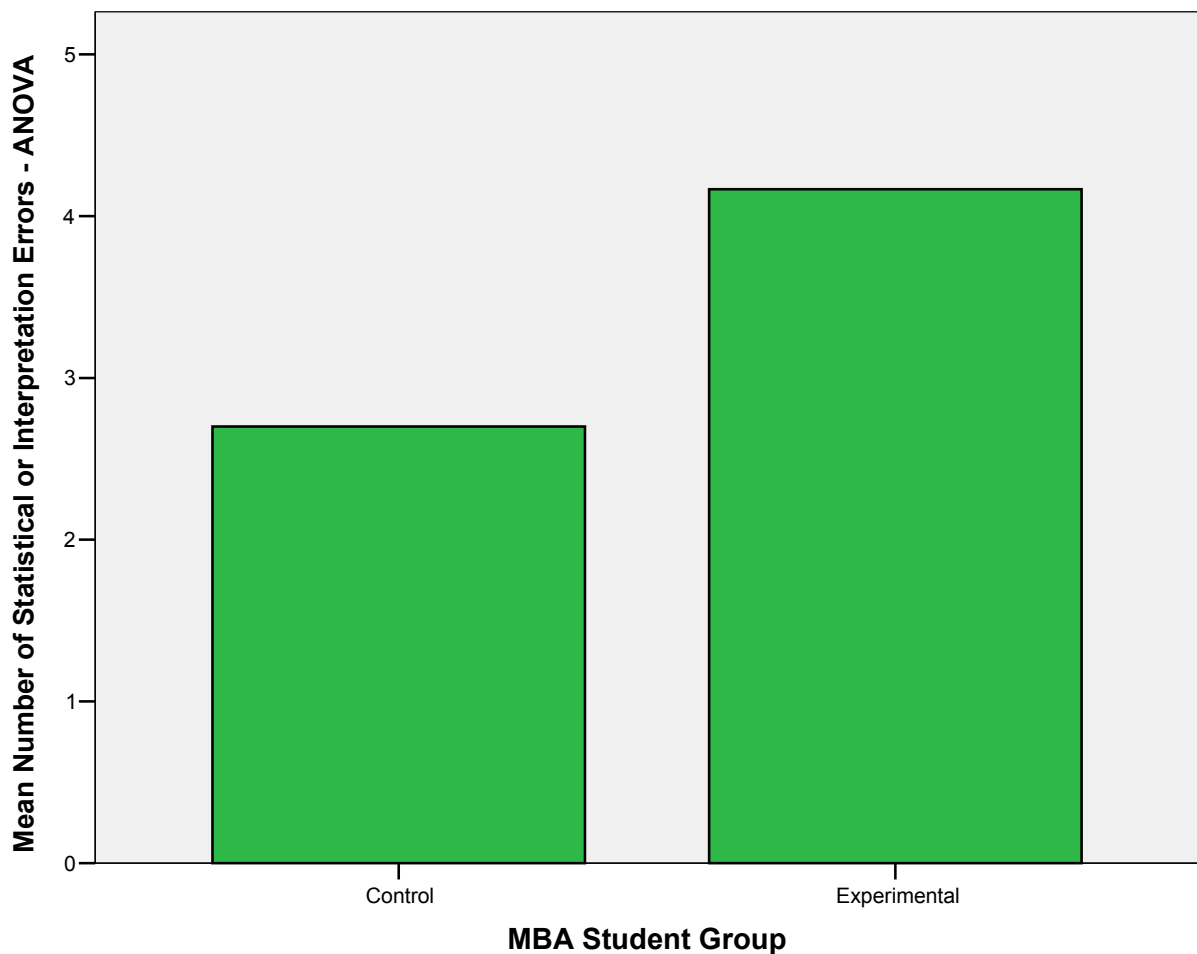


Ho 6: There is no significant difference in average statistical/ interpretation errors on Assignment 3 – Advanced Hypothesis Testing using ANOVA – between the two groups.

Ho 6 Result: Fail to reject the null ($t = -2.159$; $sig. = .039$)

There was no significant difference in average statistical or interpretation errors on Assignment 3 - Advanced Hypothesis Testing Using ANOVA.

**Figure 12
Average Statistical Errors on Assignment 3**



Study Limitations

All studies have limitations that should be revealed to the reader. These possible limitations include:

- 1. The control group students were enrolled in the semester immediately following Hurricane Katrina, which is a potential source of error. However, the experimental group students are also residents of the Mississippi Gulf Coast who continue the slow recovery process. The challenges faced by Coast residents continue, almost two years after the storm.**
- 2. The control group students were located in two classrooms on the Gulf Coast, linked by interactive video network technology. The experimental group students were located in a single classroom. This is another potential error source.**
- 3. Both groups are drawn from the same population, Gulf Coast MBA students. Analysis of their demographic and work characteristics indicates the groups were closely matched. However, a more precise matching of the two groups in future experimental designs might alter these findings.**

Conclusions and Observations

This was an exploratory study of the use of HP tablet technology in the MBA classroom. The project focused on the potential for enhanced learning and skills in two areas: technological skills/learning and mathematical skills/learning. The research was conducted in the MBA Analytical Decision Making class during two different semesters, by the Principal Investigator who was also the professor.

The results show that the use of HP tablet technology significantly affected the students' learning and skills in technology use on two of the three assignments. This is not a surprise to the Principal Investigator. Anecdotally, I observed an "immediate learning curve effect" in the experimental group. Their continuous, hands-on experience with the tablets and the

statistical software resulted in more proficient use of the software and its capabilities for analytical decision making. From the first assignment, there were very noticeable differences in the students' willingness to use a variety of subroutines in the software. In addition, students in the experimental group were much better at communicating graphically than were those in the control group, on the early assignments in the class.

It is also no surprise that the differences in mathematical learning and skills (dealing with the statistical procedures and interpretation of results) were not significant. In spite of the fact that most of the graphic analysis reveals a lower error rate in the experimental group, the differences were not statistically significant at a .05 level. These abilities are developed by a variety of student and professor efforts, and are higher-level learning outcomes. While technology is a necessary and valuable tool in this effort, it is not sufficient to develop these analytical and interpretation abilities. MBA students must use the most powerful computer to develop these skills – that being their minds.

It is also not surprising that the software and graphical skill differences were not significant on the third assignment. The third assignment occurred later in the semester, when all students (control and experimental) had much more experience with the technology and software. Students in the control group were “up the learning curve” by then.

These results lead to the following conclusion. The use of individual HP tablet technology in the MBA classroom significantly improved the students' technology skills/learning. The tablets generated a much faster learning curve in these skill areas, for the experimental group.