ANALIZING TRAITIONAL-BASED TEACHING METHODS VERSUS TECHNOLOGY-BASED TEACHING METHODS IN COLLEGIATE AVIATION CLASSROOMS

ROBERT RHETT COLEMAN YATES

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by Robert Rhett Coleman Yates

Lynn University

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U.M.I.
300 N. Zeed Road
Ann Arbor, MI 48106

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Student Name: Robert Rhett Coleman Yates Student ID: ____________

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Dissertation Committee Chair (Date) 12-6-04

William James Leary
Dissertation Committee Member (Date) 12/3/04

Adam Kornitzky, Ph.D.
Dissertation Committee Member (Date) 12/2/04

Recommended by the Director of the PH.D. Program

PH.D. Program Director (Date) 12/17/04

Cc. PH.D. PROGRAM DIRECTOR
STUDENT

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Abstract

This study is a comparative analysis of traditional-based teaching methods versus technology-based teaching methods in collegiate aviation classrooms. Education is in a transformational period. Technology use in the classroom is a major part of this transformation. However, this change in pedagogy is not occurring as rapid as one might believe. Out of ten undergraduate professors in the United States teaching in higher education, fewer than two seriously use computers and other technologies in their classrooms. Of the ten, four to five professors never use the machines at all. The same is true in collegiate aviation classrooms; technology-based teaching methods and technology use in the classroom for instructional purposes are in the early stages.

This study was conducted at a Florida university. The population was aviation students enrolled in a Florida university Aeronautics Program. The sample consisted students enrolled in the technology-based teaching methods course in the spring of 2004. The same course was taught once with traditional-based teaching methods in the spring of 2003. Ex-post facto data was used from the spring 2003 course.

The main purpose of the study was to understand how technology-based teaching methods affect student's overall final grade performance in an aviation course, at a Florida university. In the study, the final grade averages of the traditional-based teaching methods course were analyzed between the technology-based teaching methods course. In the spring 2004 (technology-based) the students' perceptions of technology-based teaching methods were correlated with their final grades, and a correlation analysis was run between the students' final grade and their total flight time experience as measured in

flight hours. The results of the statistical tests did not yield a statistic at the .05 alpha level or higher. However, perception survey question #5 did yield a .042 alpha level. The researcher concludes that technology-based teaching methods may not always improve a students' performance in the class but, it will not hurt a students' performance. The researcher also concludes that if a student perceives technology useful in learning school subjects, then that student will perform better in the specific aviation class than another student who does not believe technology is useful in learning school subjects. However, students' perceptions of technology need to be investigated further. The researcher is compelled to recommend that a qualitative and quantitative research study should be conducted to better understand the coursework performance of aviation students' before and after they become C.F.I.s in a collegiate aeronautics program.

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Chapter One: Introduction

Education is in a transformational period. Technology use in the classroom is a major part of this transformation. However, this change in pedagogy is not occurring as rapidly as one might believe. According to Spodark (2003), out of ten professors in the United States teaching undergraduates in higher education, fewer than two seriously use computers and other technologies in their classrooms. Of the ten, four to five professors never use the machines at all (Spodark, 2003). Zhao and Cziko (2001) found that relatively few professors use technology regularly in their teaching, and the impact of computers on existing curricula is still extremely limited. Jaffee (2003) estimates that 20.6% of all college courses are using Web-based management systems. In such systems, students can access course material online.

Philips Electronics (www.philips.com) expects to sell 10-15 million projectors in the next three years worldwide to use in classrooms with personal computers. According to "Classroom of the Future" (2002), an independent survey of 500 educators and media specialists in U.S. public schools, 22.4% of surveyed media specialists foresee a projector in every classroom within five years. However, schools need affordable, high-performing, highly versatile, and easy to use projectors (2002). Kunkel (2003) calculates an approximate cost of $15,000 for a "smart" (multi-media) system running with a personal computer and overhead projector able to connect to the Internet, browse web pages, play sound files, and view videos. Therefore, it is very expensive to a university to connect just one classroom.

Boston University (2003) has recently added 12 networked projectors to classrooms set up specifically for projection purposes. These projectors will allow for classroom access to the Internet, thereby opening up isolated classrooms to the wealth of online multimedia materials.

The same types of computer technology and teaching methods have just started to become popular in collegiate aviation curricula. In 2002, A. Skranstead, the University of North Dakota's (UND) Laptop Program Director, observes: "there are only a few universities that have implemented laptop programs for their students majoring in aviation (Skranstead, A., personal communication, April 18, 2002)." These programs require all students to use laptops in the classroom, and they also require professors to use technology-based teaching methods. The UND program has only been fully implemented within the last two years. With the use of technology, the structure of the traditional aviation classroom is changing every day.

Green (1998) reports that most aviation education research has been in the areas of flight training and simulation. Karp (1996) concludes that not enough research has been conducted on aviation education classrooms. "Because of the increasing sophistication of modern aircraft and high technology equipment, this topic underscores a need to examine, and restructure where necessary, the training options for potential airline employees (Karp, Turney, Green, Sitler, Bishop, & Niemczyk, 2001)." Green, Sitler, and Bishop (2001) elaborate further by stating that projected pilot shortages and low representation of women in career pilot positions suggest that aviation education should re-examine the structure and organization of the aviation knowledge transfer process. "Classroom enhancements could improve education methods to make them more efficient from the perspectives of increased knowledge retention, improved application to broader subjects, and reduce the loss to attrition of viable pilot candidates to enter the commercial pilot workforce" (Karp et al, 2001, p. 92). The research is suggesting that different teaching methods such as those that are technology-based enhance instruction and have the potential to enhance aviation education curriculums. However, the challenge is to understand how collegiate aviation students perform and perceive technology-based teaching methods prior to spending funds for new technology advanced classrooms. Mayer (2001) suggests that the passive task of viewing a multimedia presentation can lead to constructivist learning. "Thus, constructivism acknowledges the learner's active role in the personal creation of knowledge, the importance of experience (both individual and social) in this knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality" (Doolittle & Camp, 1999, p.6). Vygotsky (1978) also believes that interaction is one of the most important concepts of the learning experience. In the aviation industry, simulators are used throughout an individual's flight training. These simulators create flight environments in which students gain experience and knowledge of flying without being in an actual airplane.

Although it makes sense for educators in the field of aviation to expose aviation students to this high technology arena because of the highly advanced industry in which they intend to work, in collegiate aviation classrooms, technology-based teaching methods and technology for instructional purposes are in early stages. According to Ehrmann (1998), there are many examples of different uses of technology. However, these do not constitute a revolution in education. The cost of implementing such programs and transforming classrooms is very high. This expense deters many universities from establishing high technology classrooms. Ehrmann (1998) points out that the main barrier for college educators to use technology has been economic (cost). To justify costs, many administrators across academic areas are asking how teaching with technology in collegiate classrooms affects students' academic success. Kunkel states: "In general, direct comparisons of traditional-approach and computer-assisted (technology-based) courses conclude students generally are favorable about the integration of computer technology into a course; however, the gains to the student outcomes are modest, if at all" (Kunkel, 2003, p.86). Kunkel concludes: "Previous literature appears, at best, unclear about student performance advantages of computer assisted instruction (technology-based)" (Kunkel, 2003, p.86).

The Indiana State University Department of Aerospace faculty faced the same question (Schwab, 2002): How are students benefiting from technology-based teaching methods used in their new state-of-the-art classroom? Because research did not exist, the Aerospace Departmental Chair requested a comparison of student performance when using traditional versus technology-based teaching methods. Schwab (2002) researched this question and concludes that there was a significant difference between the two groups. He found that students tend to perform better when utilizing the newer technology and delivery style of instruction. He also concludes that a follow-up study is needed to access which delivery styles students might prefer and what, if any, differences there are among students who might prefer one method to another (Schwab, 2002).

The researcher has faced similar situations in the last five years while teaching in five different collegiate aviation programs. Only two of these programs have multi-media classrooms in which technology-based teaching methods could be used. Therefore, the question is: How will a student's performance increase with technology-based instruction in collegiate aviation classrooms, and how will the student perceive this type of instruction? If the research demonstrates an increase in students' performance and shows that students perceive the implementation of technology in a favorable way, the data will support and justify the costs of the transformational change of implementing multi-media classrooms into collegiate aviation programs. Specific research questions include:

1. What is the difference of the students' final grade when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)?
2. What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)?
3. What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

Purpose

The purpose of this research study was to understand how different styles of teaching methods, traditional-based versus technology-based, in aviation classrooms, affected a student's performance whose major is aviation. Second, this research attempted to understand the perceptions of the students to technology-based teaching styles. Third, the study investigated the correlation between the students' final grades and their total flight time in a technology-based classroom. The researcher taught the Aviation Economics course, AM 302, in the spring semester of 2004. Ex-post facto data was used from the spring 2003 Aviation Economics course. The spring 2003 class was taught using traditional teaching methods. The spring 2004 class was taught using technology-based teaching methods. Both courses were taught under similar conditions for the duration of one semester at a university in North Florida. The instructor presented the same curriculum and notes to both classes using the two different teaching methods. Both groups of students took the same tests and quizzes. The spring 2003 course was taught using a traditional teaching method, using the chalkboard for notes and lecture. The other course (spring 2004) was taught using technology-based teaching methods which consisted of using technology based equipment, such as Power Point presentations, the Internet, and television (news reports and weather) for notes and lecture. A perception survey and a student informational survey were given to the technology-based spring 2004 students at the end of the semester to collect data and examine students' perceptions of the course.

This study was supported by the prior quantitative research findings of Schwab (2002), which consisted of experimental and control groups at two different facilities to compare traditional-teaching methods versus technology-based teaching methods. In the Schwab (2002) study, three tests grades from both classrooms were compared. The current study was more in-depth and was carried out for a semester. The researcher used a *t* test to evaluate the students' mean grade average from the technology-based teaching methods course to the traditional-based teaching methods course. A Spearman Correlation Analysis was used to evaluate the students' perceptions in the technology-based course to their final course average. A Pearson Correlation Analysis was run to correlate the students' final grades and their total flight time experience in a technology-based collegiate aviation classroom.

Problems/Questions

This study attempted to better understand the use of technology in one aviation related course. The research questions are: What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)? What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)? What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

There are numerous factors that are related to this research topic. The review of literature provides a more detailed discussion. In the past, the United States collegiate aviation classrooms have mainly used traditional-teaching methods. Farfell (2000) states, there has been widespread use in technology instruction in the United States, but most professors continue to teach using lecture to impart information. The lecture method of transmitting information is not supported by constructivism.

A 2001 research study by Karp, Turney, Niemczyk, Green, Sitler, and Bishop, which was administered to 390 collegiate aviation students (195 men and 195 women), found that the learning styles of men and women are very similar. When combining the men and women, the study found that 30.0% of all 390 collegiate aviation students were dominant visual learners and 44.9% were dominant hands-on learners (Karp et al., 2001). This finding suggest that men and women collegiate aviation students might excel in aviation classes taught with hands-on and visual teaching methods, i.e., technology-based teaching methods. As Schwab concludes in his study, "These data served to answer the research question in that there was a difference between the final grades mean test for students completing the course that were exposed to the newer technology delivery style as compared to students enrolled in the same course using the traditional methods (Schwab, 2002, p.71)."

Research Questions

The main research questions are:

1. What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)?
2. What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)?
3. What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

These questions can also be stated as null hypotheses:

1. There is no difference in mean scores in the required course between the two groups (spring 2003 and spring 2004) receiving instructions using two different delivery styles (alpha level=.05).
2. There is no correlation between the students' perceptions and their final grades (spring 2004) after receiving technology-based teaching instructions (alpha level=05).

3. There is no correlation between students' final grades and their total flight experience (spring 2004) after receiving technology-based teaching instructions (alpha level=.05).

Theoretical Framework

The theoretical frame of reference is based upon constructivism learning theory and the teachings of Vygotsky. "Objectivism has dominated the field of education for several years" (Vrasidas, 2000, p. 340). Vrasidas states: "Most of the traditional approaches to learning and teaching are based on behaviorist and cognitive theories, and share philosophical assumptions that are fundamental and objective" (p.340). This theory is similar to traditional-based teaching methods. Fosnot (1996) explains that learners who construct their own knowledge from experience are termed constructivist. Vrasidas states that knowledge does exist independently of the learner; knowledge is constructed within the learner (Vrasidas, 2000). "Thus, constructivism acknowledges the learner's active role in the personal creation of knowledge, the importance of experience (both individual and social) in this knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality" (Doolittle & Camp, 1999, p.6). Vygotsky (1978) identifies interaction as one of the most important concepts of the learning experience. Technology-based teaching method increases this interaction between students, classmates, and the professor. By using the Internet, showing films, and creation of visual power point slides, a professor can create a more interactive classroom. By integrating purposeful discussions into these activities, a student in a technology-based teaching classroom will gain a more interactive experience versus a student in a traditional-based classroom where information is being transmitted in a lecture format. The more engaging experiences created for the student result in increased knowledge and meaning for the learner. This will create a greater transfer of knowledge or learning that will be internalized. According to Cormier and Hagman (1987) transfer of learning is application of skills and knowledge learned from one context to another context. Vygotsky (1978) explains that the most significant movement in the course of intellectual development occurs when speech and practical activity converge. Technology-based teaching methods encourage both dialogue and practical application through real world examples.

The study replicated studies by Schwab (2002), Kunkel (2003), and Jeffries, Linde, and Woolf (2003) of collegiate students using technology-based teaching methods and adds another dimension. Mayer (2001) explains how the passive task of viewing a multimedia presentation can lead to constructivist learning. In each of the above studies the researchers concluded that the mean final grade of the technology-based teaching methods class was statistically higher than the same class taught with traditional-based teaching methods. In the spring of 2003, the aviation economics course was taught by the researcher using traditional-based teaching methods. Chalkboard, handouts, and lectures were the only forms of communication for this course. This course consisted of three tests and five quizzes. The data used in the research was ex-post facto. In the spring of 2004 the same course was taught using technology-based teaching methods. This course used Power Point instead of the chalkboard for lecture notes. This course also used handouts for support information; films, television, and the Internet were incorporated at least once a week into class mini-lectures. This allowed the instructor to present more supplemental information via different technology mediums into class mini-lectures.

Data Analysis

The researcher analyzed the data collected using the SPSS Version 9.0 computer program. After the data were entered, the researcher used the program to determine mean, median, mode, distributions, standard deviations, percentage tables, variations, beta weights, and the statistical significance of the variables. A *t* test was run to compare students' mean average for the technology-based versus the traditional-based classes. A Spearman Correlation Analysis was run to evaluate the students' perceptions of technology-based teaching methods to their final course grade (spring 2004). A Pearson Correlation Analysis was run to understand the relationship of the students' final grade to their total flight time (spring 2004).

Institutional Implications

The rationale for conducting this study was that many universities are in the process of constructing new buildings. If the results of the proposed study are similar to studies investigated in this study, the findings will stress the importance of implementing high technology equipment, Internet access, and wireless systems into the classrooms where the aviation courses will be taught. Also, the findings draw conclusions and implications for aviation faculty using technology-based teaching methods in their courses. This Florida university aviation program wants to broaden its use of technology in the next four years and implement a "laptop program". With this type of program, the aviation faculty will have to use technology-based teaching methods. This program will be similar to the aviation program at the University of North Dakota, a leader in the field of aviation. In 1998, the University of North Dakota's John D. Odegard School of Aerospace Sciences implemented the first undergraduate aviation laptop program in the nation. Other university aviation departments will be making decisions on the kind of technology to add to the classrooms. Currently, there are no studies to determine the effects of the program at the University of North Dakota where a significant amount of money has been spent on technology enhancements to all the university's aviation classrooms (Skranstead, A., personal communication, April 18, 2002).

Scope and Limitations

The scope of this research was limited to the Aviation Economics class, AM 302, at a Florida university. Due to limited resources, the researcher taught both classes. The researcher is the only full-time professor who teaches aviation management classes at the university. The Aviation Economics class was used because the researcher has taught this particular class ten times over the past four years. The materials, tests, and quizzes have been well refined. The university limits the size of its classrooms. Therefore, the sample consisted of 29 students from the traditional-based course and 27 from the technology-based course. There are 230 aviation students at this university, and the two classes combined represent 24% of its population.

Definitions of Terms

Aviation Economics: A course that explains the legislative history of the airlines and the economic impact that the aviation industry has on the United States economy.

Traditional-based Teaching Method: Using chalkboard to teach.

Technology-based Teaching Method: Using technology-based equipment (i.e. Power point presentations, Internet, and television) to teach.

Collegiate Aviation Students: College students majoring in Aviation.

Visual Learners: People who learn by seeing.

Hands-On Learners: People who learn by doing.

Laptop Program: A program in which each student will be required to have a laptop computer and use it in class.

Wired: How the facility is set up to use technology.

F.A.A.: Federal Aviation Administration.

SPSS Version 9.0 Computer Program: A program used to provide statistical analysis for research.

Survey: A questionnaire given to each student to collect data about his/her age, gender, school status, etc.

Pilot's Licenses Held: Any F.A.A. issued license that an individual has received.

Dependent Variable: A variable assumed to depend on or be caused by another.

Independent Variable: A variable with values that are not problematical in an analysis but are taken as simply given.

Final Grade: The course grade each student will receive based on a 400-point scale.

Chapter Two Summary

Chapter Two of this proposal presents a review of literature. The review explains past research of technology-based teaching methods in aviation classrooms and pinpoints areas that need to be explored further.

Chapter Three Summary

Chapter Three describes the design of the study, including the data sources, collection, organization, verification methods, sampling, institutional review board approval, and data quality concerns. This section also includes descriptive and inferential techniques and their results.

Chapter Two: Review of Literature

The review of literature shows that there are numerous ways to look at the research questions: What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)? What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)? What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

Learning Theory

First, the researcher analyzed students' performance style of learning. According to Mayer (2003), during its 100-year history, educational psychology has derived three distinct visions on how students learn; 1. learning is response strengthening, 2. learning is knowledge acquisition, and 3. learning is knowledge construction. The author described the role of technology for each vision. The role of technology for response strengthening is to provide drill and practice on basic skills; technology provides access to information such as databases and hypermedia for knowledge acquisition; and technology allows for guided participation in academic tasks for knowledge construction (Mayer, 2003). The underlying construct behind this study was learning as knowledge construction. "In constructivist learning, learners engage in active processing such as paying attention to relevant incoming information, mentally organizing it into a coherent structure, and integrating it with existing knowledge" (Mayer, 2003, p.141).

Constructivism versus Objectivism

"Objectivism has dominated the field of education for several years" (Vrasidas, 2000, p. 340). Vrasidas observes: "Most of the traditional approaches to learning and teaching are based on behaviorist and cognitive theories, share philosophical assumptions that are fundamental and objective (p. 340)." This theory is similar to traditional-based teaching methods. Fosnot (1996) explaines that learners who construct their own knowledge from experience are termed constructivists. Vrasidas notes that knowledge does exist independent of the learner; knowledge is constructed (Vrasidas, 2000). "Thus, constructivism acknowledges the learner's active role in the personal creation of knowledge, the importance of experience (both individual and social) in this knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality" (Doolittle & Camp, 1999, p.6). Vygotsky (1978) also recognizes that interaction is one of the most important concepts related to the learning experience. Technology-based teaching methods increase this interaction between students, classmates, and the professor. By using the Internet, showing films, and creating visual Power Point slides, a professor can create a more interactive classroom; therefore, more interactive experiences will be gained by a student in a technology-based teaching classroom versus a traditional-based classroom. Technology-based teaching methods represent the transfer that Vrasidas (2000) refers to as moving from objectivism or traditional-based to constructivism (technology-based). The more experiences created for the student means more knowledge and meaning is gained. This will create a greater transfer of knowledge or learning. According to Cormier and

Hagman (1987), transfer of learning is applying of skills and knowledge learned from one context to another context.

Constructivism has both strengths and weaknesses. Constructivism provides a broader and plausible vision of learning and recognizes the learner's contributions (Mayer 2003). On the negative side, it is not the only viable conception of how learning works (Mayer 2003). Mayer explains: "According to the constructivist view of learning, instructional technology should help guide learners in their efforts at making sense of new material" (p. 142). Technology-based teaching methods that use multimedia presentations can help students connect presented material with existing data (Cognition and Technology Group at Vanderbilt, 1996).

"While constructivist theory has gained recent popularity, it is not completely new, but rather has emerged as a convergence of some underlying ideas that have been around for several years" (Donaldson & Knupfer, 2002, p. 31). For example, constructivism supports Vygotsky's belief in social interaction. Donaldson and Knupfer explain, "When students experience and discover important concepts by thinking on their own and within socially meaningful situations, they learn and remember more about those concepts than they would if a teacher simply presented the same concepts as fact" (p. 31). Therefore, using technology-based teaching methods will create more experiences in the classroom helping the students to learn and remember more about the course material.

"Nearly as soon as the digital electronic computer was invented (circa 1945-1950), there was an interest in applying it to education" (Chipman, 2003, p. 31). However, early computers were no more than just expensive research devices, and no major efforts were made to apply computers to education for many years (Chipman, 2003). By 1980, computers had become more common in the workplace. The concurrent growth in computer-related job opportunities created a new movement to implement computers into schools (Chipman, 2003). Although the initial excitement about the new computer age has passed; the idea of providing computers for schools continues to be popular. In 1997, there was one computer for every 10 students in U.S. schools (Chipman, 2003). "The prevalence of computers in the larger society is bringing about redefinitions of traditional skills that have consequences for the curriculum" (Chipman, 2003, p. 34). Aviation is a great example. There are software packages for flight planning and aviation management forecasting, and there are Internet sites explaining F.A.A. regulations and aviation legislation. "Database programs, equation solvers, and graphic generators are other examples of sophisticated software tools that have been developed for the commercial market but may be adaptable to various educational uses" (Chipman, 2003, p. 36). Chipman further notes that in the early 1980s, many believed that the introduction of computers would bring significant change. However, this question is still being researched. According to Carnevale (2004), educational technology has not lived up to its promise of revolutionizing the classroom.

Technology-based teaching methods versus Traditional-based teaching methods

In 1997, Ohio State University found overwhelming student support for technology-based teaching methods language classes versus traditional-based classes. About 75% of the students said the classroom experience was superior (McBride, 1997). In a 1997 California State University at Northridge study, students who were taught in a virtual classroom scored 20% higher on tests than those taught in traditional classrooms (McCollum, 1997).

Many research studies have been conducted outside the field of aviation to compare technology-based teaching methods to traditional-based teaching methods. Jeffries, Linde, and Woolf (2003) conducted a study analyzing teaching methods in the field of nursing, using a sample of 77 baccalaureate students at a large mid-western university who had been recruited for the research. The students were split into two groups. One group received technology-based instruction on how to perform a 12-lead ECG, while the other group received the traditional-based instruction on the same material. The traditional-based teaching involved lecture and demonstration by the instructor followed by hand-on experience using a plastic mannequin. Technology-based instruction used interactive, multi-media equipment. This teaching style was also supplemented with a self-study module. In this study, the researchers implemented a pre-test and a post test to measure the performance of both classes. The conclusions were that the improvements of both classes were statistically significant to the .01 level which is less than the level of significance of .05. The mean of the traditional-based teaching methods class was 26 and the mean for the technology-based teaching class 26.9 (Jeffries et al. 2003). The study also analyzed the students' satisfaction with their learning method. Satisfaction was measured by using a five-item Likert-type response scale, with response options ranging from strongly agree to strongly disagree. The mean score for the traditional-based teaching methods course was 18.4. The mean score for the technology-based course was 17.6. The authors report that "the Fisher's Exact Test show no significant differences between their ratings" (Jeffries et al., 2003, p.73). Jeffries, Linde, and Woolf conclude that more research was needed because little research had been conducted on teaching strategies related to 12-lead ECG (Jeffries et al., 2003).

In the criminal justice field, Kunkel (2003) compared three different courses using technology-based teaching versus traditional-based teaching. Kunkel reported: "The material presented in each respective course remained constant; however, the pedagogical techniques varied between types and sections in each course" (Kunkel, 2003, p.91). Kunkel was the only instructor for the courses. Kunkel taught the technology and traditional-based courses: Causes of Crime and Delinquency (CAS 320), Criminal Courts in Society (CAS 360), and Crime, Class, Race, and Justice (CAS 415). This research took approximately two years and yielded different results from class to class. In this study, Kunkel examined both student performance outcomes and student evaluations of the courses. The performance outcomes were derived from the average mean scores of the class. The student evaluation and students' perceptions of the courses were determined through a university standardized 18-item evaluation form. Kunkel determined that there were six "computer-use relevant" items on this form and used these six items for teaching method evaluation.

The average mean scores for the Causes of Crime and Delinquency (CAS 320) classes were 79.03 for technology-based teaching methods and 78.23 for traditional-based teaching methods. The student evaluations reflected very little difference between the two teaching methods.

The average mean scores for the course Criminal Courts in Society (CAS 360) were 79.63 for technology-based teaching methods and76.69 for the traditional-based teaching methods class. Kunkel reports that the student evaluations show the technology-based teaching methods had more favorable responses to all six computer-related areas.

The average mean scores for the Crime, Class, Race, and Justice (CAS 415) course were 83.84 in the technology-based teaching methods and 79.67 in the traditional-based teaching methods sections. For the student evaluation of the course, Kunkel's results show the technology-based teaching methods course had a more favorable mean in five of the six computer-related areas. Kunkel also adds: "The overall performance mean for computer-assisted sections was 80.1 compared to an overall mean in traditional-approach sections of 77.48" (Kunkel, 2003, p.92). This statistic is significant to the .02 level which is less than the level of significance of .05 (Kunkel, 2003).

Student Perception

Kunkel concludes that there is some evidence that technology-based teaching methods benefit his courses, although there were only modest gains in student achievement and attitudes toward the courses (Kunkel, 2003). The study findings show that the students' final grades only increased minimally with the implementation of technology-based pedagogy. The students' perceptions also increased a very minimal amount over the semester. Two out of three classes derived favorable responses to technology-teaching methods. One class showed very little difference in preferences of either teaching method. This study shows that in the criminal justice field the implementation of technology had positive affects in three different classrooms. It is very important to understand the affects of technology across disciplines. Although, the perceptions of the new pedagogy increased a very minimal, it is important to understand student's perceptions and performance when examining aviation curriculums.

Lewis (1999) similarly concludes that students' perceptions of technology need to be further researched. This study will determine how students' perceptions correlate to the final grade in the technology-based teaching methods class. Additionally, Kunkel concludes that computer-assisted techniques may not always enhance performance, but neither do they diminish performance (2003). Kunkel urges that "subsequent research should examine individual students as the unit of analysis" (Kunkel, 2003, p.102). Kunkel describes possible predictor variables such as GPA, age, sex, race, or even ACT scores.

Differences among Men and Women

Horton and Witiw (1996) conducted a pilot study with students in an aviation meteorology class who had access to technology and compared their success to those enrolled in a control group. The study ran a regression model that used the students' SAT score, Grade Point Average, and class standing to help determine a predicting equation for determining final course grades. A summary of the regression model showed that the SAT variable had a cumulative R^2 of .394*, the GPA variable had a cumulative .557**, and the CS variable had a .570** cumulative R^2 value. These results indicate that each variable has a positive statistical effect on the students' final grade. The study concludes: "For this particular group (students with access to technology), it does appear that technology may have made a positive difference" (Horton & Witiw, 1996, p.25). However, the authors note that no inferences could be made because the experimental group was very small and only consisted of five students. Another limitation of this study was that the experimental group consisted only of males and native English-speakers. Horton and Witiw (1996) recommend more research in this area.

Roy and Elfner (2002) surveyed 215 students about the helpfulness of various IT (instructional technology) tools in achieving higher or lower order learning domains. Their analysis conclude that IT tools are more effective in achieving lower order learning domains which include: learning objectives of knowledge, understanding, and application. This study's conclusions also support the claim that that instructional technology will benefit a student's learning in the classroom.

Variables

This study replicated, with some variations, a 2002 study by Schwab entitled: Comparison of Student Success In Different Technology-Based Classrooms. Schwab stated that his study presented two groups of students with identical lessons, one via traditional methods and the other using all available classroom technology. Schwab found that: "Students who received the same teaching materials, but used the newer technology, showed a statistically significant higher score as compared to those students who completed the same course using traditional methods" (p.61). Schwab's dependent variable was defined as the average final course grade. The researcher used the same criteria for this study's dependent variable. Schwab used the two teaching methods in each classroom for his independent variables. The past research has demonstrated that there are additional areas that Schwab did not include in his research that could affect a collegiate aviation student's grade. For this study, additional independent variables studied were students' perceptions of technology-based teaching methods and students' total flight time in hours.

To begin, one must examine studies that have researched the use of technology in collegiate aviation classrooms. In 1993 at a Unidata workshop meeting, a research roundtable discussed the effects of technology in improving learning among students. The researchers conclude the general feeling was that technology-based teaching methods did improve learning; however, no specific examples were given (Byrd, DeSouza, Hingerhut, & Murphy, 1994).

Schwab (2002) used an experimental and a control group to compare traditional-teaching methods versus technology-based teaching methods. Schwab compared the test grades (three total) from each class. The final average score for the technology-based teaching methods course was 221.13 points out of 300. This score was 14.31 points higher than the traditional-based teaching methods class which final average was 206.82. A *t* test was used to analyze the scores and found them to be statistically significant at the .04 level which is less than the level of significance of .05 . He concludes: "These data served to answer the research question, and the results indicated there was a difference between the final grades mean test for students completing the course (Air Transportation) that were exposed to the newer technology delivery style as compared to students enrolled in the same course using the traditional methods" (Schwab, 2002, p.71). This study supports technology-based teaching methods and their effectiveness on the student's final grade in the Air Transportation course. This also supports that technology in collegiate aviation classrooms could have a positive impact on the final grades of students who are majoring in the field of aviation.

Schwab's (2002) study examined only the grades of each student, but did not include other factors such as race, age, or gender differences. Schwab reported that 95% of the study participants were male and that all students attended each class. Similarly, such factors were not analyzed by Kunkel (2003), but recommendations for future research include analyzing the students' G.P.A., age, sex, race, and even ACT scores. The current study included analyses of several of these variables.

Learning Style

One way to better understand the importance of technology-based teaching methods in collegiate aviation undergraduate programs is to examine Gardner's learning style theory (1991). Gardner states: "The broad spectrum of students--and perhaps the society as a whole--would be better served if disciplines could be presented in a number of ways and learning could be assessed through a variety of means" (Gardner, 1991, p. 12). Gardner's theory explains the ways people learn best; this analysis is important to remember when developing and delivering collegiate aviation courses (Karp, Turney, Niemczyk, Green, Sitler, & Bishop, 2001). "Learning style is a gestalt combining internal and external operations derived from the individual's neurobiology, personality and development, and is reflected in learner behavior" (Keefe & Ferrell 1990, p. 16).

A research study involving 390 collegiate aviation students (195 men and 195 women) demonstrated that the learning styles of men and women were similar (Karp et al., 2001). Of the 195 women surveyed, 75.4% were either dominant visual or hands-on learners; 31.8% were found to be dominant visual learners, and 44.6% were dominant hands-on learners. Among the 195 men surveyed, 73.8% were dominant visual or hands-on learners; 28.7% were dominant visual learners, and 45.1% were dominant hands-on learners. Combined together, 74.9% were either dominant visual or hands-on learners. Of the 390 participants, 30.0% were dominant visual learners, and 44.9% were dominant hands-on learners (Karp et al., 2001). The findings suggest that the majority of collegiate aviation students are visual hands-on learners who would respond well to technology-based teaching methods. Consequently, teaching with this type of pedagogy could improve the students' overall performance in the classroom.

Another study conducted by Kanske and Brewster in 2001 drew similar results. This study used the Kolb Learning Style Inventory. The sample size was taken from aviation students in the Oklahoma State University system. The conclusions drawn from the students surveyed were very similar to the results of a U.S. Air Force pilot study (Kanske & Brewster, 2001). In the study, 67.8% of the U.S. Air Force students studied and 61.5% of the University students studied were found to learn by assimilator or converger learning styles (Kanske & Brewster, 2001). An assimilator is an abstract thinking introvert combining abstract conceptualization and reflective observation. A converger is an abstract thinking extrovert combining abstract conceptualization and active experimentation (Kolb, 1984). These combined percentages are very similar to the total combined percentages of visual and hands-on learners from the other studies. The totals from all studies ranged between 61.5% of the Oklahoma students to a high of 74.9% of the participants in the first study (Karp et al., 2001).

These studies provide additional support that approximately three out of four male and female collegiate aviation students are predominantly visual or hands-on learners. However, there are some variations in learning styles among males and females.

Gender is a variable analyzed in the current study, in response to recommendations that gender be considered in evaluating the impact of traditional and specific technology-based teaching methods.

Flight Experience

Aviation is a highly advanced and technical industry with a unique culture. Understanding the culture and dynamics of the aviation field develops during training, building flight time experience, and qualifying for a pilot's license. Therefore, a research question to be addressed is whether the amount of aviation experience will influence the student's performance in a class taught with traditional teaching methods compared to one taught using technology-based teaching methods.

A 1999 quantitative research study was conducted with 117 pilots ranging from private to F-16 (military) pilots. The purpose for the study was to explore learning style theories and potential ways to reconstruct aviation academic programs (Karp, Turney, & McCurry, 1999; Karp, Condit, & Nullmeyer, 1999). As in the previously-discussed gender-related findings, the findings of this learning style assessment conclude that 44.4% of the pilots were hands-on learners while 32.5% were visual learners. Of the 117 pilots, all of whom had considerable prior exposure to the aviation culture, 76.9% are visual or hands-on learners, a slightly higher percentage than the male and female collegiate aviation students who may or may not have obtained a pilot's license. Therefore, the study findings suggest that people exposed to the aviation culture are more likely to prefer a class being instructed using computer technology which is much more visual and hands-on than traditional-teaching methods that transmit information through lecture.

An individual's total flight time in hours details how much experience a student has in an airplane cockpit; with each additional hour, there is increased exposure to the aviation culture. In describing the silent language of learning, Hall (1990) summarized a child's informal learning patterns: "Whole clusters of related activities are learned at a time, in many cases without the knowledge that they are being learned at all or that there are patterns or rules governing them" (Hall, 1990, p.68). The aviation industry has a language of its own, made up of hundreds of acronyms and technical terms. As the number of flight hours increase, aviation trainees gather more experience and exposure to the aviation culture and increase their understanding the field of aviation. By using technology in the classroom, the aviation language and culture can be better describe and constructed to the aviation students with websites, television, and films.

Age

Another factor which Kunkel (2003) and Schwab (2002) excluded in their studies was age or year in college. When determining how collegiate aviation students perform in classes taught by traditional-teaching methods versus technology-based teaching methods, differences according to the year in college may be found. Within collegiate aviation programs, the total flight time increases with the number of years in the aviation degree program. As previously reported, Kanske and Brewster (2001) found similarities in learning styles between university aviation students and Air Force pilots. Additionally, the study shows a shift in learning styles among collegiate aviation students over the course of years enrolled in college. When using the Kolb learning style inventory, Kanske and Brewster (2001) found that 58.3% of freshman students had diverger and accommodator learning styles. The sophomores were made up of 77.8% convergers and assimilators. The junior class had 64.3% convergers/assimilators learning styles while the senior class had 61%. Of graduate students in the study, 66.7% had convergers/assimilators learning styles. The researchers note, "The small sample size of the sophomores is a cause for concern, and future data must be obtained before this distribution can be considered truly significant" (Kanske & Brewster, 2001, p.66). These findings do suggest, however, that as students advance in their programs and accumulate flight hours, there will be a shift of learning styles from their freshman year. This could play an important role when technology-based teaching methods are implemented into the classroom since these methods are quite different from traditional-teaching methods. Therefore, a more mature or older aviation student with more experience and a different learning style may more readily adapt to technology-based teaching and excel in upper-level aviation courses.

F.A.A. Certificates

In the aviation industry experience is measured in many ways. Two of the main ways to measure a person's aviation experience are to identify which F.A.A. certificates the person has acquired and to consider their total flight time hours. In this study, correlational analyses have been performed to compare students' experience in flight hours versus the students' final grades in their courses.

Theory

The underlying theory for this study is on the transition from objectivism using traditional-based teaching methods, to constructivism, relying on technology-based teaching methods, in collegiate aviation classrooms. The same course was taught with both types of pedagogies. A comparison was made to see if the students in either of the courses benefited more when receiving instruction using one pedagogical method or the other. The way students perceive technology-based pedagogy and how this perception affects their final course grade was analyzed. Kunkel (2003) concludes that there is some evidence that technology-based teaching methods benefit his courses, if only by providing modest gains in student achievement and attitudes or perceptions toward the course (Kunkel, 2003). Experience or total flight time of the students is evaluated and compared with their final grades. Schwab (2002) and Kunkel (2003) both conclude that subsequent research should examine individual students as the unit of analysis. Knowing each student's total flight time provided the researcher with a better understanding of each individual's experience in the aviation field.

Conceptual Framework

The conceptual framework of the study consisted of teaching the aviation economics course twice, once with traditional-based teaching methods and the other with technology-based teaching methods. Ex-post facto data were used from the spring 2003 traditional-based pedagogy class. The spring 2004 aviation economics course was taught with technology-based teaching methods.

Research Design

The research design was quasi-experimental with a non-probability sample. This is similar to the studies by Jeffries et al. (2003), Schwab (2002), and Kunkel (2003). Babbie (2001) states: "Quasi experiments are distinguished from "true" experiments primarily by the lack of random assignment of subjects to an experimental and a control group" (p.339). Although this research has aspects of a true experiment it lacks the random sampling to be designated as one. Any student majoring in aviation at a Florida university is able to register and take the aviation economics course. Therefore, the sample is a non-probability sample.

The three research questions for this study were:

1. What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)?

2. What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)?

3. What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

Summary

In summary, the theory for the research comes from the constructivism theory described by Mayer (2003) as providing a broader and more plausible vision of learning and recognizing the learner's contributions. Technology-based teaching pedagogy is an example of this type of theory. As multimedia equipment is increasingly being installed in collegiate aviation classrooms, it is important to understand how this type of teaching method affects collegiate aviation students. It is also important to understand how the students perceive this type of pedagogy and whether their perceptions affect their final grades. Finally, it is important to understand how a student's aviation experience, measured in total flight time, will affect the student's performance in a technology-based collegiate aviation classroom.

Chapter Three: Research Design and Methodology

Introduction

The project design was quasi-experimental. "Quasi experiments are distinguished from "true" experiments primarily by the lack of random assignment of subjects to an experimental and a control group" (Babbie, 2001, p. 339). For this study, the researcher used non-probability sampling and therefore, was unable to randomly select the sample. Although this research has aspects of a true experiment it lacks the random sampling to be designated as one. Any student majoring in aviation at a Florida university is able to register and take the aviation economics course. Therefore, the sample is a non-probability sample. The sample consisted of students registered for the Aviation Economics (AM 302) course in the spring of 2004. The researcher used the grade averages from an aviation economics course taught in the spring of 2003 using traditional-based teaching methods as retrospective data in the study. The research design was constructed from six classes that had been taught using both technology-based teaching methods and traditional-based teaching methods, which were examined in the review of literature. The course design is detailed below.

Quizzes were given after chapter lectures 2, 3, 5, 7, and 16 had been completed in the *Air Transportation, A management Prospective* by Alexander Wells. In the spring of 2004, the technology-based aviation economics course was offered. This course used PowerPoint instead of a chalkboard for lecture notes. This course used handouts for support information. Films, television, and/or the Internet were incorporated at least once a week into class lectures. This allowed the instructor to present more specific information through different technology mediums into mini-class lectures. Refer to Appendix I for the Aviation Economics course syllabus.

For security purposes, each student created his/her own four-digit pin number. Using a four-digit number made it highly improbable that any student would have the same number. The instructor then took the pin numbers and created a spreadsheet to match the pin numbers to the students' class grades. A spreadsheet was used for this research to ensure anonymity for students who were willing to participate in the study.

Post-surveys were administered after the semester's classes ended and the final exam had been taken. Students were asked to write their pin numbers on their post-surveys. This allowed the students to remain anonymous when the researcher matched pin numbers of both final course grades from the spreadsheet and the completed post-surveys. The post-survey consisted of a consent form (see Appendix A), a perceptions survey (see Appendix B), and an informational survey (see Appendix C). These surveys were used to collect data on the different variables analyzed. A secretary from the College of Business passed out the letter and survey instruments after the final exam. A box was placed in the secretary's office and those students willing to participate in the study placed the documents in the box once they were completed. The secretary relayed the post-surveys to the researcher. The researcher maintains all collected data in a locked file cabinet in his office.

The reliance on available subjects sample consisted of 30 total students enrolled in the spring 2004 aviation economics course. Twenty-eight students chose to participate in the study by filling out and returning approval letters and questionnaires at the end of the semester. The sample was drawn from the approximately 230 students that are enrolled in the university's aviation program located in Florida.

The operational definition for the term technology-based teaching methods is defined as: Teaching with methods that consist of a lecture accompanied with state-of-the-art technology-based equipment such as Microsoft Power Point presentations, Microsoft Word documents, Internet access, and television reports of news and weather. Power Point and Word documents were used for all lecture notes. The Internet was used at least once a week for supporting material, and television was incorporated whenever possible to add further support for lectures.

The operational definition for traditional-based teaching methods was: Teaching with methods that consist of a lecture accompanied by notes on a chalkboard, which is still customary in undergraduate education.

Research Questions

The objective of this study was to answer the following research questions as they apply to the AM 302, Aviation Economics Classes, taught at a Florida university. There are three main research questions investigated:

1. What is the difference in the students' final grade when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)?
2. What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)?
3. What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

These questions can be stated as null hypotheses:

1. There is no difference in final grade mean scores in the required course between the two groups (spring 2003 and spring 2004) receiving instruction using two different delivery styles (alpha level=.05).
2. There is no correlation between the students' perceptions and their final grades (spring 2004) after receiving technology-based teaching instructions (alpha level=.05).
3. There is no correlation between students' final grades and their total flight time experience (spring 2004) after receiving technology-based teaching instruction (alpha level=.05).

Sources of Data

Two sources of data were taken from two AM 302 Aviation Economics classes taught at the university. The traditional-based teaching method class was taught in the spring 2003 semester while the technology-based teaching method class was taught in the spring 2004 semester. The researcher controlled the following variables. Each class was offered on Tuesday and Thursday from 3:00 pm to 4:20 pm. The same material and notes were given to both classes. There were three tests, which were identical, administered to each class. Five identical quizzes were given to each class. The final grade was based on percentages given to each test and a percentage given to the combined average of the quizzes. Each test accounted for 25% of the total grade. The quiz average accounted for 25% of the total grade. These percentages totaled 100% for the total course grade.

The final class grades were used as ex-post facto data from the spring 2003 semester. Surveys and consent forms were administered to each student at the end of the spring 2004 semester. This was a non-probability sampling technique. The researcher relied on available subjects. "Clearly, this method does not permit any control over the representativeness of a sample (Babbie 2002, p. 179)." A student's confidential pin number was matched with the students' grades and the completed surveys. This ensured students' anonymity. The final course averages were used from the spring 2003 traditional-based teaching methods course. Mean averages from both classes were analyzed. The students' perception and total flight time data were correlated for the spring 2004 technology-based teaching methods course.

Variables

The dependent variable was the final course grade for each participant. The independent variables included technology-based teaching methods, traditional-based teaching methods, and total flight time in hours.

To determine the students' perceptions of technology-based teaching versus traditional-based teaching methods, the mean average of ten questions was analyzed from the Perception Survey adapted from O'Malley and McCraw 1999 (see Appendix B). These questions pertain to the use of teaching methods in the classroom. These questions were scored on a 5-point Likert scale. The score of 5 indicates strongly agree, 4 agree, 3 not sure, 2 disagree, and 1 strongly disagree.

1. Most people believe that teaching with multi-media equipment (technology-based teaching methods) in the classroom is more effective than traditional-based teaching methods (chalkboard and text). 1 2 3 4 5
2. I feel more comfortable taking notes from computer-based equipment than from the chalkboard. 1 2 3 4 5
3. If I had a choice, I do not want to be taught with any kind of computer device. 1 2 3 4 5
4. I feel comfortable with my abilities to work with computers. 1 2 3 4 5
5. I do not think multi-media equipment will be useful in learning school subjects. 1 2 3 4 5
6. I would rather read a textbook than learn from a computer lecture. 1 2 3 4 5
7. I believe the use of computers (technology-based teaching methods) is not an effective method of instruction and would make the same grade in a traditional-based teaching methods class. 1 2 3 4 5
8. Power Point lectures are more exciting than traditional (chalkboard) lectures. 1 2 3 4 5
9. I would prefer to learn in a traditional-based class rather than in a technology-based class. 1 2 3 4 5
10. The layout of the Power Point lectures makes it easy to follow the content of the lesson. 1 2 3 4 5

Instrumentation

In the spring of 2004, the aviation economics course was taught using technology-based teaching methods which include using state-of-the-art technology such as Microsoft Power Point presentations, Microsoft Word documents, Internet access, and television news and weather reports. There were five quizzes consisting of 10 true/false questions each. There were a total of 3 tests. Each test consisted of fifty multiple choice and true/false questions. Each test accounted for 100 points and the five quizzes were averaged and accounted for 100 points. The final grade was based on a 400-point system.

Each student created his/her own four-digit pin number. Using a four-digit number made it highly improbable that any student had the same pin. The instructor collected the pin numbers and created a spreadsheet matching the pin numbers to the students' class grades. The new spreadsheet was used for this research. This study ensured anonymity for students willing to participate in the study.

Each student willing to participate in the study filled out two surveys and returned them to a designated box. The first survey consisted of personal questions about the student and the student's experience in aviation (see Appendix C). The researcher generated a 15 question survey that helped provide information about each variable described in Chapter 2. The survey was tested for validity and reliability among aviation faculty members at Jacksonville University. Qualitative feedback was given to the researcher from these members. The second survey instrument used was a 10 question survey pertaining to students' perceptions of technology. This survey was adapted from an O'Malley and McCraw 1999 study titled: Students Perception of Distance Learning and the Traditional Classroom. In this study the survey consisted of 32 questions. The questions were related to the students' perceptions of the effectiveness and advantages of distance learning and online education compared to traditional classrooms. For this research 10 questions were chosen and adapted from the O'Malley and McCraw 1999 study. The first question on the 10 question survey was adapted from Table 3 Item Number 1 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of 3.89 at the level of .001 which is less than the level of significance of .05. The second question on the 10 question survey was adapted from Table 3 Item Number 3 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of 4.43 at the level of .000. The third question on the 10 question survey was adapted from Table 2 Item Number 6 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of 1.81 at the level of .072. The fourth question on the 10 question survey was adapted from Table 2 Item Number 7 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of -3.38 at the level of .001. The fifth question on the 10 question survey was adapted from Table 3 Item Number 2 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of 3.43 at the level of .001. The sixth question on the 10 question survey was adapted from Table 3 Item Number 3 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of 4.43 at the level of .000. The seventh question on the 10 question survey was adapted from Table 1 Item Number 5 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of -2.60 at the level of .010. The eighth question on the 10 question survey was adapted from Table 2 Item Number 13 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of -2.98 at the level of .003. The ninth question on the 10 question survey was adapted from Table 3 Item Number 3 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of 4.43 at the level of .000. The tenth question on the 10 question survey was adapted from Table 3 Item Number 2 (O'Malley and McCraw, 1999) (see Appendix K). This question had a *t*-value of 3.43 at the level of .001.

Population and Sample

The population consisted of the 230 students who are aviation majors at this Florida university. The students enrolled in the technology-based teaching methods class, aviation economics, relied on available participants who chose to enroll in the class, thereby constituting a non-probability sample selection. Registration for the classes was open to any student majoring in aviation.

Thirty students enrolled in the Spring 2003 traditional-based teaching methods course. The students' final grades were used as ex-post-facto data in this study. A box plot was used to identify outliers based on the students' final course averages for this class (see Appendix I). One student was identified as an outlier and was excluded from this sample. Therefore, the sample from the Spring 2003 traditional-based teaching methods class consisted of 29 subjects. Thirty students enrolled in the Spring 2004 technology-based teaching methods class. Twenty-eight students chose to voluntarily complete post-surveys, after the semester was over, which allowed the researcher to include the students in the study. A box plot was calculated on this class to identify outliers based on their final course averages (see Appendix I). One student was omitted from this sample because the student changed majors and was not majoring in aviation.

The box plot rendered no outliers and the Spring 2004 technology-based teaching methods sample consisted of 27 students.

The samples taken from the population are non-probability or convenience samples. The samples do not allow for each member to have the same chance to be enrolled in the courses. Therefore, conclusions could be suspect. These samples do not allow for inferences to be made to the population. Inferences can only be made to the class itself.

Data Collection

The collection of data was managed specifically by the researcher (professor) who taught the course, with the exception of giving the post-surveys. Tests, quizzes, and surveys were distributed and collected by the professor during class. At the end of the semester after the final exam was taken, a secretary distributed a post-survey and a consent form to each student. All tests, quizzes, and surveys were identical. The professor ensured that the time limits for tests and quizzes were equal by allowing the students an hour and twenty minutes to take each of the three tests and twenty minutes for each of the five quizzes. No student was allowed to take home any test or quiz at any time. All tests and quizzes were taken at the appropriate time. The researcher maintains all students' work in a locked file cabinet in a secure location.

Data Analysis

The primary tool for data analysis was the Statistical Package for Social Sciences (SPSS Version 9.0) computer software program. The researcher closely reviewed and screened the data for accuracy such as missing data and typing errors. Next, central tendencies tables and distribution tables were compiled from the data. The mean, median, and mode were found for the different variables. Dispersions and standard deviations were performed on each variable. Skewness and kurtosis of each variable were evaluated through histograms. A *t* test was run to analyze the students' grade averages for the spring 2003 class and the spring 2004 class. A Spearman Correlation analysis was performed to examine the students' perceptions' of technology-based teaching methods with their final class grade. Finally, a Pearson Correlation Analysis was performed to understand the relationship of the students' final grades in the technology-based teaching methods class and their total flight times. To ensure that the statistical findings were not chance occurrences, a significance level was set in compliance with the researcher's home institution's required level of .05 which is less than the level of significance of .05.

Chapter Four: Results

Introduction

The purpose of the study was to compare technology-based teaching methods and traditional-based teaching methods in collegiate aviation classrooms. The problem investigated was how changes in pedagogy affected the aviation students' final grades. In addition, the study examined the students' perceptions' of technology-based pedagogy and how prior total flight time correlated to the students' final grades. Two survey instruments were developed for the study. Each student willing to participate in the study filled out two surveys and returned them to a designated box. The first survey consisted of personal questions about the student and the student's experience in aviation (see Appendix C). The researcher generated a 15 question survey that helped provide information about each variable described in Chapter 2. The survey was tested for validity and reliability among aviation faculty members at Jacksonville University. Qualitative feedback was given to the researcher from these members. The second survey instrument used was a 10 question survey pertaining to students' perceptions of technology. This survey was adapted from an O'Malley and McCraw 1999 study titled: Students Perception of Distance Learning and the Traditional Classroom. In this study the survey consisted of 32 questions. The questions were related to the students' perceptions of the effectiveness and advantages of distance learning and online education compared to traditional classrooms. The informational survey (see Appendix C) was created to gather more data on some of the variables identified by Kunkel (2003) as recommended factors to be analyzed, including age, year status in college, gender, F.A.A. licenses held, relatives' work experience, preference of PowerPoint or chalkboard, G.P.A., and student membership in a campus-based aviation organization.

Organization of Data Analysis

The data are presented in the following order. First, the sample population of the study was clearly defined, tabulated from the descriptive data gathered in the informational survey. Second, research question #1 was analyzed. For this question a *t* test was run to compare the final grade average of the traditional-based teaching methods class versus the technology-based teaching methods class. Third, research question #2 was analyzed. A Spearman Correlation Analysis was used to determine if there was any correlation between questions 1-10 on the perception survey to the students' final grades in the technology-based teaching methods class. Fourth, research question #3 was analyzed. A Pearson Correlation analysis was performed to analyze a potential correlation between the students' total flight time in hours and their final grades in the technology-based teaching methods class. Finally, explanations of results are provided for each research question and its findings.

Description, Analysis, and Interpretation of Results

Of the 30 students in the technology-based teaching methods class, 28 students responded and completed the informational and the perception survey. One student was identified as not majoring in aviation and was omitted from the sample. The range of flight hours for the 27 who responded was from 5 to 540 flight hours. The mean was

266.96 with a standard deviation of 145.28. Table 1 lists the flight times reported in hours.

Table 1

Participants' Reported Flight Times in Hours

	N	Minimum	Maximum	Mean	Std. Deviation
HOURS	27	5.00	540.00	266.9630	145.2842
Valid N (listwise)	27				

The age of the sample population ranged from 18 to 33. The mean age of the student was 22.19 years old with a standard deviation of 3.50. The statistics of ages are shown in Table 2.

Table 2

Ages of Participants

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	27	18	33	22.19	3.50
Valid N (listwise)	27				

Among the students, there were one sophomore, 13 juniors, and 13 seniors. Only two (8%) were female. Twenty-five out of twenty-seven students held some type of F.A.A. certificate. The frequencies for each certificate are shown in Table 3.

Table 3

F.A.A. Certificates Held by Participants

License	Frequency	Percent	Cumulative Percent
Private pilot license	1	4	4
Instrument rating	6	24	28
Commercial license	8	32	60
Certified flight instructor training	10	40	100
Total	25	100	

Four (15%) of the students reported having a close relative who works in the field of aviation. The other 23 (85%) students did not have a direct relative who works in aviation. When asked if the student preferred to take notes, in the classroom from PowerPoint or the chalkboard, 24 prefer PowerPoint and three prefer the chalkboard.

The mean grade point average for the sample was 3.33 on a 4.0 scale. The range was from 2.60 to 3.85, and the standard deviation was 0.3442. These stats are shown in Table 4.

Table 4

Grade Point Averages of Participants

	N	Minimum	Maximum	Mean	Std. Deviation
GPA	27	2.60	3.85	3.3344	.3442
Valid N (listwise)	27				

Of the 27 participants, 10 (37%) are currently members of an aviation organization on campus. The other 17 (63%) students in the spring 2004 technology-based teaching methods course are not members of any aviation organization at the university.

Histograms were run on the hours, age, year in school, and G.P.A. variables (see Appendix D). None of the variables display normal distributions. Non-parametric statistics were used when examining the research questions. The research can only be applied to the class itself.

Research Question # 1

What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)?

Ex-post facto data from the spring 2003 traditional-based teaching methods class were used to analyze this question. There were 29 scores averaged from this class. The average class score was 84.82 and the grades ranged from 70.5 to 93.75. The standard deviation for the spring 2003 traditional-based teaching methods class was 6.81. These statistics are shown in Table 5.

Table 5

Final Grades Of Students In Spring 2003 Course Taught With Traditional-Based Teaching Methods

	N	Minimum	Maximum	Mean	Std. Deviation
AVERAGE	29	70.50	93.75	84.8276	6.8185
Valid N (listwise)	29				

In the spring 2004 technology-based course, the average grade in the course was 85.92. The scores ranged from 76 to 94. The standard deviation was 4.79. The distribution is shown in Table 6.

Table 6

Final Grades of Students in Spring 2004 Course Taught with Technology-based Teaching Methods

	N	Minimum	Maximum	Mean	Std. Deviation
AVERAGE	27	76.00	94.00	85.9259	4.7952
Valid N (listwise)	27				

A *t* test analysis was performed comparing the final grades in the spring 2003 traditional-based teaching methods course and the spring 2004 technology-based teaching methods course. Although the average of the spring 2004 technology-based teaching methods course was 85.92, which is 1.10 points higher than the spring 2003 traditional-based teaching methods course mean grade of 84.89, the significance of the two-tailed test was .492 with equal variances assumed and when equal variances were not assumed was .487 (see Appendix E). Since these two statistics are higher than the alpha level of .05, the test results yielded that there was not a statistical significance between the two courses. For this particular aviation course there is not a statistical significance between the mean grades achieved with traditional-based pedagogy and the technology-based pedagogy. As a result the null hypothesis is not rejected. This test does not reject the null hypothesis which states: There is no difference in mean scores in the required course between the two groups (spring 2003 and spring 2004) receiving instructions using two different delivery styles ($p < .05$).

Research Question # 2

What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)?

Respondents from the spring 2004 technology-based teaching methods course were asked to complete a Perception Survey (see Appendix B). This survey asked 10 questions about how they perceived technology-based teaching methods in collegiate aviation classrooms. Each question was scored on a Likert scale. The score of 5 indicated strongly agree, 4 agree, 3 not sure, 2 disagree, and 1 strongly disagree. A Spearman Correlation Analysis was performed comparing the answers of each question on the Perception Survey of the students in the sample group from the spring 2004 technology-based course to their final averages in the class (see Appendix F). A Spearman analysis was used because the data are not normally distributed and the Perception Survey questions are valued on a Likert scale. The results for each question and analysis are discussed separately.

Perception Survey question #1: Most people believe that teaching with multi-media equipment (technology-based teaching methods) in the classroom is more effective than traditional-based teaching methods (chalkboard and text). The mean answer for this question was 3.92; the Correlation Coefficient = -.028, and Sig. (2-tailed) = .891. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #1 and the students' final course averages.

Perception Survey question #2: I feel more comfortable taking notes from computer-based equipment than from the chalkboard. The mean answer for this question was 3.96; the Correlation Coefficient = -.123; and Sig. (2-tailed) = .54. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #2 and the students' final course averages.

Perception Survey question #3: If I had a choice, I do not want to be taught with any kind of computer device. The mean answer for this question was 2.18; the Correlation Coefficient = -1.50; and Sig. (2-tailed) = .454. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #3 and the students' final course averages.

Perception Survey question #4: I feel comfortable with my abilities to work with computers. The mean answer for this question was 3.88; the Correlation Coefficient = .232; and Sig. (2-tailed) = .254. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #4 and the students' final course averages.

Perception Survey question #5: I do not think multi-media equipment will be useful in learning school subjects. The mean answer for this question was 1.92; the Correlation Coefficient = -.394; and Sig. (2-tailed) = .042. There was a statistical significance, at the .05 alpha level, between the students' perception in Perception Survey question #5 and the students' final course, averages. The correlation coefficient shows their grade would be negatively affected if the students' agreed with this question, suggesting that multi-media equipment was not useful in learning school subjects.

Perception Survey question #6: I would rather read a textbook than learn from a computer lecture. The mean answer for this question was 1.92; the Correlation Coefficient = -.044; and Sig. (2-tailed) = .827. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #6 and the students' final course averages.

Perception Survey question #7: I believe the use of computers (technology-based teaching methods) is not an effective method of instruction and would make the same grade in a traditional-based teaching methods class. The mean answer for this question was 2.07; the Correlation Coefficient = -.259; and Sig. (2-tailed) = .192. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #7 and the students' final course averages.

Perception Survey question #8: Power Point lectures are more exciting than traditional (chalkboard) lectures. The mean answer for this question was 3.96; the Correlation Coefficient = .256; and Sig. (2-tailed) = .198. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #8 and the students' final course averages.

Perception Survey question #9: I would prefer to learn in a traditional-based class rather than in a technology-based class. The mean answer for this question was 2.22; the Correlation Coefficient = .092; and Sig. (2-tailed) = .648. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #9 and the students' final course averages.

Perception Survey question #10: The layout of the Power Point lectures makes it easy to follow the content of the lesson. The mean answer for this question was 4.00; the Correlation Coefficient = -.059; and Sig. (2-tailed) = .770. There was no statistical significance at the .05 alpha level between the students' perception in Perception Survey question #10 and the students' final course averages.

For questions one through four and questions six through ten, the analysis did not reject the null hypothesis, which states: There is no correlation between students' perceptions and their total flight experience (spring 2004) after receiving technology-based teaching instruction ($p = .061$). For perception survey question number five the analysis rejects the null hypothesis that states: There is no correlation between the students' perceptions and their final grades (spring 2004) after receiving technology-based teaching instructions (alpha level=.05).

Research Question # 3

What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

Respondents from the spring 2004 technology-based teaching methods course were asked, on question #7 of the informational survey, to indicate the total number of flight hours they have accumulated in their lives. Under Federal Aviation Regulations Part 141 and through the Delta Connection Academy in which these Florida university students train, the specific licenses or ratings and approximate flight hours required to obtain them are: Private Pilot License (50 hours), Instrument rating (80 hours), Commercial License (130 hours), and Certified Flight Instructor (150 hours).

The total number of flight hours reported by the students in the technology-based aviation class ranged from 5 hours to 540 hours, a difference of 535 hours. The mean statistic for the sample group was 266.9 hours. The standard deviation for their total flight hours was 145.20.

A Pearson Correlation Analysis was performed comparing the total flight hours of the students in the spring 2004 technology-based course to their final averages in the class. According to Babbie (2001), a correlation will define if there is an empirical relationship between the two variables. This Pearson Correlation Analysis is used when comparing interval continuous variables. In this example, total flight hours and grade average are these types of variables. Using this method to compare the 27 total students in the sample, the Pearson Correlation yielded a -.219 statistic. This would show that there was a negative relationship between total flight hours and the students' final average in the course when using technology-based teaching methods. However, the statistical significance of .272 was not within the level limit of .05. Therefore, the test results indicated that there is not a statistical significance at the .05 alpha level. This analysis does not reject the null hypothesis which states: There is no correlation between students' final grades and their total flight experience (spring 2004) after receiving technology-based teaching instructions (alpha level=.05).

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Summary of Results

Research Question #1

The *t* test results for the first research question: What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003), yielded a .492 2-tailed significance with equal variances assumed and a .487 when equal variance were not assumed. This test does not reject the null hypothesis which states: There is no difference in final grade mean scores in the required course between the two groups (spring 2003 and spring 2004) receiving instruction using two different delivery styles ($p < .05$).

Research Question #2

A .05 alpha level was not satisfied for nine out of the ten questions on the perception survey. However, question #5, in the student perception survey, yielded a .042 level of significance and a correlation coefficient of -.394. This statistic is at the .05 alpha level and the researcher believes it should be further analyzed. If a student agreed with the statement, I do not think multi-media equipment will be useful in learning school subjects, his/her grade would be negatively affected. This means for a student in the technology-based aviation class, a lower grade than the class average would likely be achieved if the student did not think multi-media equipment would be useful in learning school subjects.

Research Question #3

The Pearson Correlation analysis yielded a -.219 correlation and a 2-tailed significance of .272. This analysis does not reject the null hypothesis, which states: There is no correlation between students' final grades and their total flight time experience (spring 2004) after receiving technology-based teaching instruction (alpha level=.05).

Summary

The results for the statistical *t*-tests and the Pearson correlation analysis calculated for research questions number one and three have rejected the null hypotheses indicating that none of the results have a statistical significance at the .05 alpha level. Survey question #5 in the perception survey indicate a .05 level of significance and should be further analyzed. Chapter Five will discuss the researcher's findings, conclusions, and implications of these results.

Chapter Five: Findings, Conclusions, and Implications

Introduction

This chapter discusses and summarizes the findings, conclusions, and implications of the study. A summary of the study is included. Conclusions the researcher has drawn from the study are analyzed. The researcher provides recommendations for future research and implications of the results.

Summary

The research was a comparative analysis of traditional-based teaching methods versus technology-based teaching methods in collegiate aviation classrooms. Education is in a transformational period. "Objectivism has dominated the field of education for several years" (Vrasidas, 2000, p.340). Vrasidas states: "Most of the traditional approaches to learning and teaching are based on behaviorist and cognitive theories and share philosophical assumptions that are fundamental and objective" (p.340). This theory is similar to traditional-based teaching methods. With the onslaught of technology in today's society, new theories of learning are being used in education. Fosnot (1996) explains that learners who construct their own knowledge from experience are termed constructivist learners. Vrasidas writes that knowledge does exist independent of the learner; knowledge is constructed (Vrasidas, 2000). "Thus, constructivism acknowledges the learner's active role in the personal creation of knowledge, the importance of experience (both individual and social) in this knowledge creation process, and the realization that the knowledge created will vary in its degree of validity as an accurate representation of reality" (Doolittle & Camp, 1999, p.6). Vygotsky (1978) also asserts that interaction is one of the most important concepts of the learning experience. Technology-based teaching methods enhance this interaction between students, classmates, and the professor. By using the Internet, showing films, and creating visual PowerPoint slides, a professor has the potential to create a more interactive classroom. Therefore, a student in a technology-based teaching classroom versus a traditional-based classroom, where lecture is the primary method for transmitting information to students, will experience more interactive experiences. Mayer (2003) concludes: "According to the constructivist view of learning, instructional technology should help guide learners in their efforts at making sense of new material" (p. 142).

This change in pedagogy is not occurring as rapidly as one might believe. According to Spodark (2003), out of ten undergraduate professors in this country in higher education, fewer than two seriously use computers and other technologies in their classrooms. Of the ten, four to five teachers never use the machines at all (Spodark, 2003). Zhao and Cziko (2001) state that relatively few teachers use technology regularly in their teaching and that the impact of computers on existing curricula is still extremely limited.

The same trend is found in collegiate aviation classrooms. Green (1998) reports that most aviation education research conducted to date has been in the areas of flight training and simulation. Karp (1996) concludes that not enough research has been conducted in the classroom of aviation education. "Because of the increasing sophistication of modern aircraft and high technology equipment, this topic underscores a need to examine, and restructure where necessary, the training options for potential airline employees" (Karp, Turney, Green, Sitler, Bishop, & Niemczyk, 2001). Green, Sitler, and Bishop (2001) elaborate further by stating that projected pilot shortages and low representation of women in career pilot positions suggest that aviation education should re-examine the structure and organization of the aviation knowledge transfer process. "Classroom enhancements could improve education methods to make them more efficient from the perspectives of increased knowledge retention, improved application to broader subjects, and reduce the loss to attrition of viable pilot candidates to enter the commercial pilot workforce" (Karp et al, 2001, p. 92). Therefore, the need to understand how technology-based teaching methods affect collegiate aviation students is important. It is also important to understand how the students perceive this change in pedagogy from traditional objectivism to constructivism.

Kunkel (2003) compared these methods in collegiate criminal justice courses and concludes: "In general, direct comparisons of traditional-approach and computer-assisted (technology-based) courses conclude students generally are favorable about the integration of computer technology into a course; however, the gains to the student outcomes are modest, if at all" (Kunkel, 2003, p. 86). Kunkel further notes: "Previous literature appears, at best, unclear about student performance advantages of computer assisted instruction (technology-based)" (Kunkel, 2003, p. 86).

In 2002, the Indiana State University Aerospace Departmental Chair requested a comparison of student performance when using traditional versus technology-based teaching methods. Schwab (2002) researched this issue and concluded that there was a significant difference between the two groups. He states: "Students tend to perform better when utilizing the newer technology and delivery style" (Schwab, 2002, p. 72). He also concludes that a follow-up study is needed to access which delivery styles students might prefer, and what, if any, differences there are among students who might prefer one method to another (Schwab, 2002).

This research study is unique. This study analyzes traditional-based teaching methods versus technology-based teaching methods in collegiate aviation classrooms. It also measures the correlation between the students' perceptions of technology and their total flight time to their final grades in the technology-based course.

Three research questions were investigated:

1. What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)?

2. What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)?

3. What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

The sample for the study was drawn from the population of approximately 230 collegiate aviation majors at a Florida university. Thirty of these students were enrolled in the spring 2004 technology-based Aviation Economics course. Out of the 30 students enrolled in the course, 28 completed the survey materials to volunteer for the study, and 27 were used as the sample in the study. One of these 28 students was not majoring in aviation and this person was dropped from the study. There were no outliers determined to be in the sample. Ex post facto data were used to examine the first research question; these data were derived from the spring 2003 traditional-based teaching methods

Aviation Economic course. The final grades of 29 students from this course were analyzed in a *t* test which compared them to the grades of the 27 students (sample) in the spring 2004 technology-based Aviation Economics course. The average grade in the technology-based course was 85.92. The scores ranged from 76 to 94. The standard deviation was 4.79. Although the final grade mean for the spring 2004 technology-based teaching methods course was 1.10 points higher than that of the spring 2003 traditional-based teaching methods course (84.82), the significance of the two-tailed test was .492 with equal variances assumed and .487 when equal variances were not assumed (see Appendix E). Since these two statistics are higher than alpha level .05, they therefore are not statistically significant. The research did not reject the null hypothesis which states: There is no difference in final grade mean scores in the required course between the two groups (spring 2003 and spring 2004) receiving instruction using two different delivery styles ($p < .05$). However, the researcher believes these findings presented are similar to Kunkel's (2003) research. Kunkel ran a *t* test between six total courses; three were taught with technology-based teaching methods and three were taught with traditional-based teaching methods. Kunkel did not test between individual scores from each section. Kunkel did find a statistical significance to the .02 level between different class sections which is less than the level of significance of .05. However, Kunkel only compared the means of each course from the same course taught with technology-based teaching methods to traditional-based teaching methods. The course average for each of the three courses, when comparing the technology-based to traditional-based, increased from one to four points when using technology-based teaching methods. For this study the students in the technology-based pedagogy course had an average final grade 1.10 points higher than that of the students in the traditional-based taught course, which was similar to Kunkel's 2003 findings. In this case one can derive a similar conclusion. Kunkel (2003) concludes: computer assisted techniques may not always enhance performance, but they do not diminish performance.

Research question #2 examined the perceptions of the students in the spring 2004 aviation economics course to the use of technology-based teaching methods. A ten-question perception survey was used and a Spearman Correlation analysis was run between each question on the perception survey to the students' final grades. For nine out of ten perception survey questions the analysis produced no results with a correlation at the .05 significance level, therefore not rejecting the null hypothesis which states: There is no correlation between students' final grades and their total flight experience (spring 2004) after receiving technology-based teaching instructions (alpha level=.05). However, perception survey question #5 did produce a significance of .042. The correlation coefficient shows their grade would be negatively affected if the students' agreed with this question, suggesting that multi-media equipment is not useful in learning school subjects.

For Research Question #3, a Pearson Correlation Analysis was performed to compare the total flight hours of the sample population in the spring 2004 technology-based course to their final averages in the class. According to Babbie (2001), a correlation will define if there is an empirical relationship between the two variables. This Pearson Correlation Analysis is used when comparing interval continuous variables. In this example total flight hours and final grades are these types of variables. Using this method to compare the 27 total students in the sample, the Pearson Correlation of -.219

was achieved. The statistical significance of this correlation was .272 level, which is not at the 05 alpha level. Therefore, the Pearson Correlation showed that there was not a correlation between a students' total flight hours and the students' final average in the course when using technology-based teaching methods. This analysis did not reject the null hypothesis which states: There is no correlation between students' final grades and their total flight experience (spring 2004) after receiving technology-based teaching instructions (alpha level=.05).

However, with further evaluation the researcher discovered that the final grades of the certified flight instructors were lower than those of students with fewer flight hours. Although the Pearson Correlation Analysis did not satisfy the .05 alpha level, the researcher believes that this is an unexpected finding. The researcher believes more research is needed and an alternative interpretation should be provided to understand how the flight instructor's average was lower than any other combine certificate or flight rating. At this Florida university, the majority of aviation students are enrolled in a four-year degree program in which they concurrently obtain their pilot licenses. After graduation a student must have a minimum of 1,000 total flight hours experience to obtain a flying job with ComAir Airlines through Delta Connection Academy, with which the University is partnered. One of the fastest ways to accumulate these hours is to become a Certified Flight Instructor and work for the Academy teaching students flying lessons. At this point the C.F.I. is not paying for flight time, but is actually getting paid to teach the underclass students how to fly. The C.F.I. license is generally acquired in a student's junior or senior year and at this point a student is able to work for the Academy. In the spring 2004 technology-based teaching methods class there were 10 C.F.I.s in the sample of 27 students. The researcher believes that the C.F.I. students, who have higher amounts of flight hours than the other students in this class, could have been negatively affected in a few ways. First, if the student starts working as a flight instructor, the student is taking on added responsibility and stress, which might negatively affect course grades. Second, once a student becomes a C.F.I., his/her priority might change from classroom work to obtaining the requisite flight time and their new job. Third, the C.F.I. might believe that he/she can study less and be equally effective because of having vast experience in aviation. The mean grade for the 10 C.F.I. students in the class was 84.7, which was 1.54 points below the class average of 86.24. The grades ranged from 76 to 94, with a standard deviation of 4.8.There were 25 students who held F.A.A. certificates and flight rating in the course. The distribution of the students' final grades by licenses and ratings held are shown in Table 7. Since the mean final grade for every rating is higher than that of the certified flight instructors, the researcher suggests further examination of this variable to determine its adverse affects upon grades.

Table 7

Distribution of Final Grades by Licenses and Ratings Held

License	*N*	Minimum	Maximum	Mean	Standard Deviation
Private Pilot	1	89	89	89.00	
Instrument Rated	6	82	90	85.83	26.4
Commercial Pilot	8	78	94	88.13	5.7
Certified Flight Instructor	10	76	93	84.70	4.8

Conclusions

The first research question was: What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)? Although the final grade mean (85.92) for the spring 2004 technology-based teaching methods course was 1.10 points higher than the final grade mean (84.24) for the spring 2003 traditional-based teaching methods course, the *t* test yielded no statistical significance between the two courses. Based on these results, no statistically significant difference was found in the final grade means for this particular aviation course taught with traditional-based pedagogy and technology-based pedagogy. This test does not reject with the null hypothesis which states: There is no difference in mean scores in the required course between the two groups (spring 2003 and spring 2004) receiving instructions using two different delivery styles (alpha level= .05).

The researcher concludes that there are three reasons for the *t* test not rejecting the null hypothesis. First, the instructor of the courses has consistently achieved high student evaluations for his teachings. This indicates that students respond well to the instructor's very dynamic teaching style, which yields comparable results whether using traditional or technology-based teaching methods. Second, the researcher concludes that because the content of the two classes was nearly identical, the inclusion of technology-based teaching methods would not significantly impact the final grade means of the students in either class. Third, the researcher in the role of the instructor may have affected the results.

The researcher also concludes that teaching with technology-based teaching methods is a positive attribute for collegiate aviation students. For this particular study, the research demonstrates that the students in the technology-based teaching methods course did not have a statistically significant advantage over the traditional-based course. However, the researcher agrees with Kunkel's 2003 research which concludes that technology might not always improve performance, but it will not hinder a student's performance.

Research question two stated: What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)? For nine out of ten questions, the results indicated that there is not statistical significance at the .05 alpha level between the students' perceptions and the students' final grades. For these nine questions the analysis does not reject null hypothesis which states: There is no correlation between students' final grades and their total flight experience (spring 2004) after receiving technology-based teaching instruction. However, Perception Survey question #5 yielded a .042 level of significance. This question stated: I do not think multi-media equipment will be useful in learning school subjects. The correlation coefficient was -.394. This statistic means that the final grades of students who agree with the statement would be negatively affected. The researcher concludes for this particular course, when a student likes technology and feels that it helps in coursework, and a professor uses technology in the classroom, the student is likely to perform better than students who perceive that technology will not help them in their coursework.

Research question three asked: What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)? Since the Pearson Correlation Analysis did not satisfy the .05 alpha level (.272), the null hypothesis is not rejected, stating there is no correlation between students' final grades and their total flight experience (spring 2004) after receiving technology-based teaching instructions (alpha level=05). The researcher concludes that technology-based teaching methods did not have a positive or negative on a student who has generated high amounts of flight time.

However, further analysis shows that the final grades of the certified flight instructors, enrolled in the technology-based teaching methods course, were lower than the final grades of students with lesser ratings and fewer flight time hours. The researcher concludes that as a student starts working as a flight instructor, student priorities shift from coursework to teaching flight lessons and building total flight hours. This student instructor may have less time to prepare for classes since he/she is working, giving flight lessons, and still enrolled in collegiate coursework. The researcher suggests more research and analysis to understand this finding.

Strengths of the Study

The major strength of the study was that the researcher has a vast knowledge of the subject matter of the aviation economics course, which was the course being taught using two different methods and analyzed in the study. The researcher has taught the course several times using both traditional-based and technology-based pedagogies within the past four years. In the 1999-2000 school year, the researcher was a professor at

St. Cloud State University in Minnesota, and taught the aviation economics course four times using traditional-based teaching methods. Traditional-based pedagogy was used since the classrooms in which the courses were taught were not equipped with multi-media technology. The following year the researcher worked at the University of North Dakota where the classrooms were equipped with state-of-the-art technology and the researcher was asked to implement technology-based teaching methods in the aviation economics course. The researcher taught this course using technology-based pedagogy four times over the 2000-2001 school year.

The researcher believes that this past experience contributed positively to this study. First, it has given the researcher experience teaching with both traditional-based and technology-based pedagogies. Further, the experience has enabled the researcher to keep the course content consistent while using two different teaching methods. Finally, this experience has led to the development of suitable valid and reliable quizzes and tests for the course.

Another strength was the use of ex-post facto data, consisting of the final grades from the 2003 technology-based teaching methods class. This class was held in a classroom without multi-media equipment. Therefore, the researcher had to use traditional-based teaching methods. The approval for the use of this data added to completing the research in a timelier manner (see Appendix H).

The length of the study was also considered a strength of this study. Over the course of the semester the researcher had many opportunities to evaluate how the students were performing in the class. Five quizzes and three tests were given during the 15-week semester, which were averaged into the final course grades. Therefore, the final grade was not based on just one exam but on a series of tests and quizzes, which is a more reliable and valid way to evaluate a student's performance.

Another strength of the research was the examination of several variables which had not been considered in the Schwab (2002) and the Kunkel (2003) studies. The informational survey (see Appendix C) that the 2004 technology-based course participants completed generated information about the students' ages, genders, class status, F.A.A. certificates held, relatives' work experience, G.P.A., preference of classes taught with chalkboard or Power Point, and membership in an aviation organization on campus. Analyses related to these variables generated the most important findings of the study.

Limitations

The major limitation of the study was the sample. Although, the sample from the 2004 technology-based teaching methods course consisted of 27 students which accounted for 12% of the population, it was a non-probability sample. This convenience sample did not allow for each member of the population to have the same chance to be enrolled in the course therefore, conclusion of the research could be suspect.

Another limitation of the study was that the researcher was the instructor for both the traditional-based and technology-based aviation economics courses. There is a small aviation faculty at the university; the researcher is the only full-time aviation management faculty member qualified to teach the course. Although, the researcher had experience teaching the courses with both teaching methods, the researcher had to maintain an unbiased pedagogical approach while teaching each of the classes. The study might have produced more reliable results with two different professors teaching the courses.

Another limitation of the study was that the statistics of each of the variables, hours, age, year in school, and G.P.A., displayed characteristics of skewness and kurtosis. Therefore, the findings could not be generalized to other similar courses or to other universities. The findings can only be generalized to the technology-based 2004 aviation economics course taught at this specific university.

Recommendation for Further Research

For future research, this study could be replicated, but the courses should be taught by an instructor who is not also the researcher. The focus should involve an aviation course taught with a greater use of technology-based teaching methods.

A qualitative study should also be implemented to better understand how students' perceive and prioritize coursework in relationship to acquiring more flight hours. This study should also examine how students perceive the value of educational technology used in the classroom.

Another study should be conducted to focus on the students who have their certified flight instructor (C.F.I.) licenses. The researcher believes that faculty and administrators of universities with aviation programs should examine the academic performance of students before and after they acquire a C.F.I. license and become flight instructors at the university to determine if a student's classroom performance in hindered once the student becomes a flight instructor for the university.

Implications

One implication of this research is that faculty and administrators need to conduct research in their own collegiate aviation classes and implement focus groups to determine facility requirements. Because of the changing environments of higher education, faculty needs to study and understand how different pedagogies can improve their courses. Administrators should schedule training through a variety of venues such as: roundtable discussions, seminars, and hands-on training for faculty members. Focus groups should be designed for on-going data collection. These groups can also help fine tune more research questions about the use of classroom technology. Although, in this study, there was no statistical significance found between traditional and technology-based pedagogies, faculty and administrators must understand how technology-based techniques could have the potential to change classroom environment, enhance the delivery of content information, and demonstrate useful strategies for learning. University administrators should carefully plan for future advancements in technology when constructing new facilities or classrooms.

Final Summary

The purpose of this study was to analyze final grade differences and student perceptions of university aviation courses taught using traditional-based teaching methods and technology-based teaching methods. The study also examined how collegiate aviation students perceive technology-based pedagogy, and correlated students' grades in a technology-based aviation classroom to their total flight time. The three research questions to be investigated were: What is the difference in the students' final grades when integrating technology-based teaching methods in an aviation (spring 2004) course versus traditional-based teaching methods (spring 2003)? What is the correlation between students' perceptions and their final grades in a technology-based collegiate aviation classroom (spring 2004)? What is the correlation between students' final grades and their total flight experience in a technology-based collegiate aviation classroom (spring 2004)?

The sample group was drawn from the population of aviation majors at a university in north Florida. The sample was a non-probability sample taken from the spring 2004 technology-based aviation economics course. Of 30 students in the class, 28 completed the survey information, and 27 were used in the sample. Consent forms, perception surveys, and informational surveys were given to the sample group after the semester ended. Ex post facto data from the spring 2003 traditional-based aviation economics course were also used. There were 29 students in the sample from course.

A *t* test was calculated for the first research question. The results of this test failed to show any statistical significance between the changes in pedagogical methods in the aviation economic classes in the spring terms of 2003 to 2004.

A Spearman Correlation Analysis was calculated for the second research question. This test also failed to show any statistical significance between nine out of the ten perception survey questions and the students' final grades. However, question #5 on the perception survey, I do not think multi-media equipment will be useful in learning school subjects, had a two-tailed significance of .042. The correlation coefficient of -.394 suggested that students who agreed with this statement and did not value learning with multi-media equipment were likely to have lower grades in classes taught using technology methods.

A Pearson Correlation analysis was calculated for the third question. This test failed to show a statistical significance between the students' final grades and their total flight time. The test's yielded a .272 level of significance, which did not reject the null hypothesis. However, with further evaluation the researcher discovered that the final grades of the certified flight instructors were lower than those of students with fewer ratings and fewer flight hours. This unexpected finding may have more to do with changes in academic priorities once students are able to start working as flight instructors and are accumulating the total number of hours that will lead to aviation careers upon graduation.

In conclusion, the researcher recommends additional research to clarify the questions and the findings of this study. Based on the literature review and the findings of this study, the researcher concurs with others that technology-based teaching methods may not always improve a students' performance in the class, but they will not hurt a students' performance. However, further investigation should focus on the impact of students' perceptions of technology-based instruction. Finally, given the unexpected finding of lower grades among the certified flight instructors, the researcher is compelled to recommend that both qualitative and quantitative research be conducted to better understand the academic performance of students both before and after they qualify to become certified flight instructors.

APPENDIXES

Appendix A: Consent Form

1627 Ashland Street
Jacksonville, FL 32207

May 28, 2004

Hello:

The purpose of this study is to examine the integration of technology in undergraduate aviation classrooms.

The surveys are completely voluntary. If you wish to participate in this study please complete the surveys and place them in the drop box designated in the Davis College of Business secretary's office. Should you not want to participate, please place uncompleted surveys in the designated box. The secretary, from the Davis College of Business, will collect them from the box and return them to the researcher. All information will remain confidential. The surveys should take you only a few minutes to complete. There is no explicit risk to you in taking these surveys.

Your confidentiality is assured through the use of your personal pin number. The pin number will only be used to match course grades to survey responses. Your responses are needed to compile quantitative data analysis: your responses and grades are completely confidential. Participants have the right to withdraw from the study at anytime. If a student wishes to withdraw, please contact the researcher Rhett Yates at (904) 256-7446. If you have any questions or concerns please contact the Chair of the Dissertation Committee, Dr. Cheryl Serrano (561) 237-7090, at Lynn University.

Completing these surveys will allow the researcher consent to use data.
Please answer all to the best of your ability.

Again, thank you so much for your assistance.

Regards,

R. Rhett C. Yates
Ph.D. Candidate
Lynn University, Boca Raton, Florida

Enclosures: Survey materials

I have read the above description and by completing the surveys, it indicates my voluntary consent to participate in this research. Please contact me at 904-256-7446 if you feel stress from this survey.

Appendix B: Perceptions' Survey

Perception Survey (Adapted from O'Malley and McCraw 1999)

These questions will be scored on a 5-point Likert scale. The score of 5 will indicate strongly agree, 4 agree, 3 not sure, 2 disagree, and 1 indicates strongly disagree.

1. Most people believe that teaching with multi-media equipment (technology-based teaching methods) in the classroom is more effective than traditional-based teaching methods (chalkboard and text). 1 2 3 4 5
2. I feel more comfortable taking notes from computer-based equipment than from the chalkboard. 1 2 3 4 5
3. If I had a choice, I do not want to be taught with any kind of computer device. 1 2 3 4 5
4. I feel comfortable with my abilities to work with computers. 1 2 3 4 5
5. I do not think multi-media equipment will be useful in learning school subjects. 1 2 3 4 5
6. I would rather read a textbook than learn from a computer lecture. 1 2 3 4 5
7. I believe the use of computers (technology-based teaching methods) is not an effective method of instruction and would make the same grade in a traditional-based teaching methods class. 1 2 3 4 5
8. Power Point lectures are more exciting than traditional (chalkboard) lectures. 1 2 3 4 5
9. I would prefer to learn in a traditional-based class rather than in a technology-based class. 1 2 3 4 5
10. The layout of the Power Point lectures makes it easy to follow the content of the lesson. 1 2 3 4 5

Appendix C: Informational Survey

Aviation Economics Survey

1. What is your Aviation Economics Pin Number?

2. How old are you?

3. How many years have you been attending JU and what year status are you (Freshman, Sophomore, Junior, Senior, 5th year Senior)?

    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. 5th year Senior
    f. Other

    Years-

4. What is your gender?
    a. Male
    b. Female

5. Do you possess an F.A.A. issued pilot's certificate?
    a. Yes
    b. No

6. If yes to 5, what licenses do you hold (circle the ones you hold).
    a. Private
    b. Single-engine land
    c. Multi-engine
    d. Instrument
    e. Commercial
    f. CFI
    g. CFII
    h. Other

7. Approximately how many total flight hours do you have?

8. Does your mother work in the aviation field?

   If yes, what type of work and how many years has she been in aviation (circle one)?

   Pilot or Management

   Years-

9. Does your father work in the aviation industry?

   If yes, what type of work and how many years has he been in aviation (circle one)?

   Pilot or Management

   Years-

10. If you answered yes to either #9 or #10 skip this question. Do your legal guardian/guardians work in aviation?

    If yes, what type of work and how many years have they been in aviation?

    Pilot or Management

    Years-

11. As a student… would you prefer taking notes from the:
    a. Chalkboard
    b. Power Point

12. What is your G.P.A.?

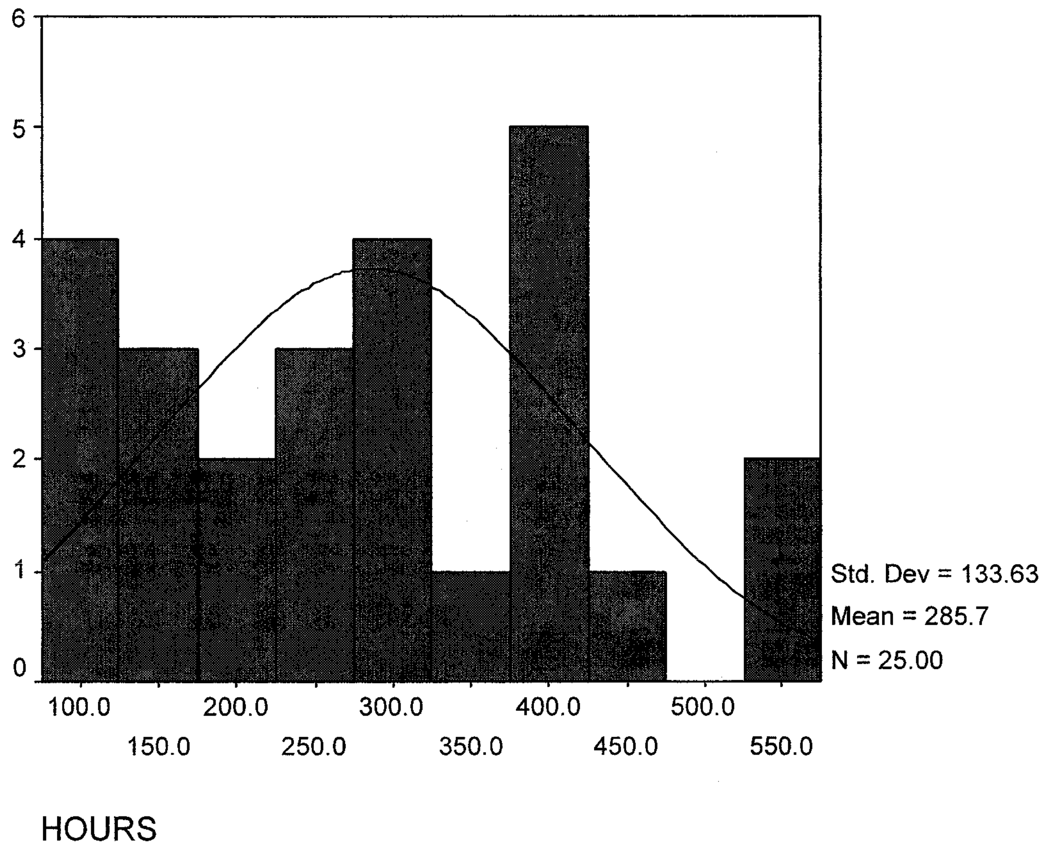
13. What was your high school S.A.T. score?

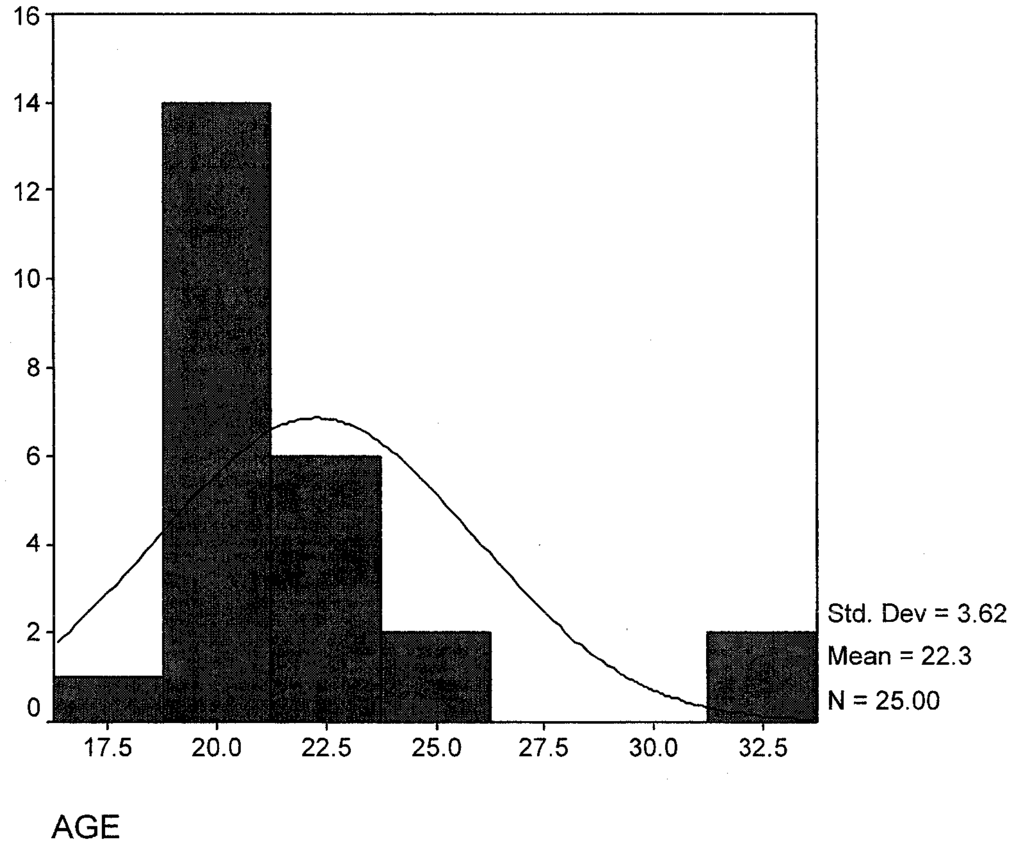
14. What was your high school A.C.T. score?

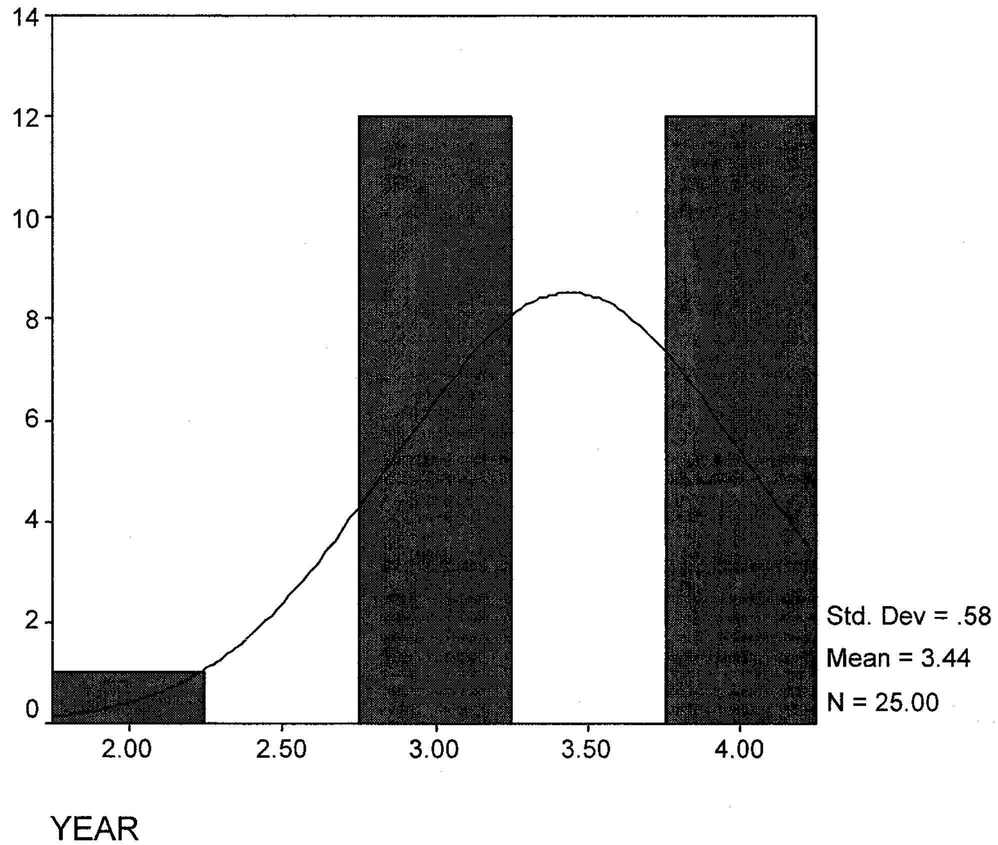
15. Are you a member of any aviation organization on campus?

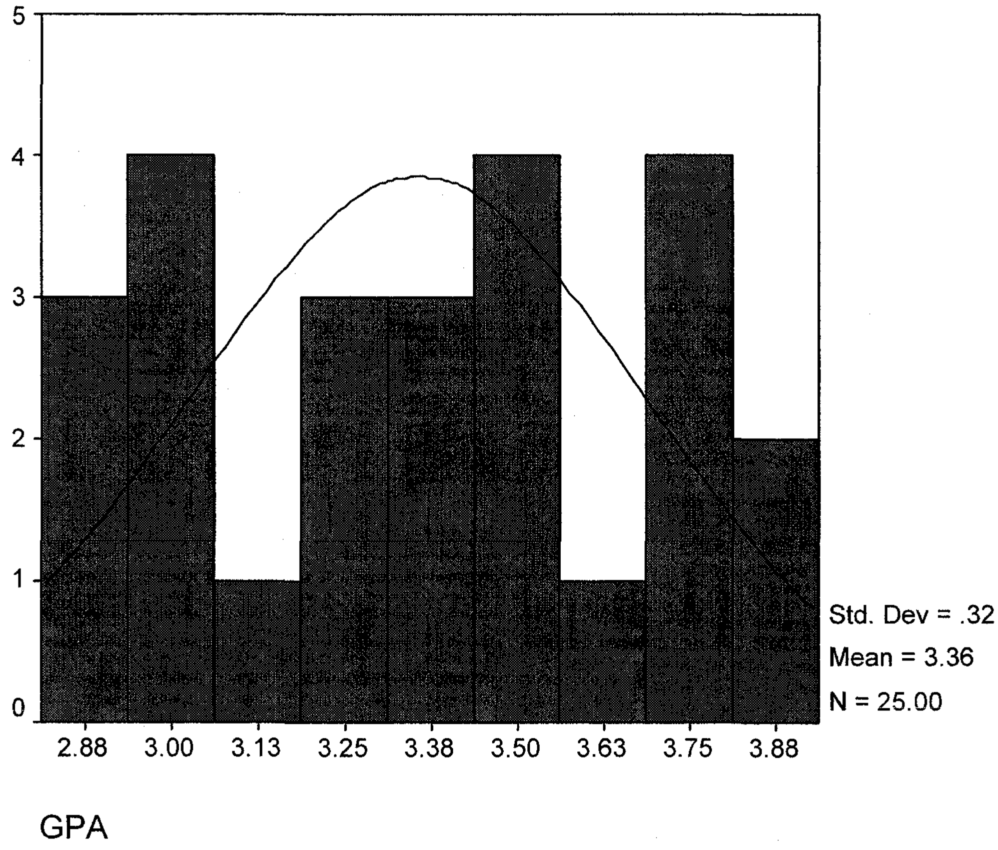
Any comments?

Appendix D: Histograms




16
14
12
10
8
6
4
2
0
17.5
20.0
22.5
25.0
27.5
30.0
32.5
Std. Dev = 3.62
Mean = 22.3
N = 25.00
AGE


14
12
10
8
6
4
2
0
Std. Dev = .58
Mean = 3.44
N = 25.00
2.00
2.50
3.00
3.50
4.00
YEAR



5
4
3
2
1
0
2.88
3.00
3.13
3.25
3.38
3.50
3.63
3.75
3.88
Std. Dev = .32
Mean = 3.36
N = 25.00
GPA

Appendix E: Results of *t* tests

Group Statistics

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
AVERAGE	0	29	84.8276	6.8185	1.2662
	1	27	85.9259	4.7952	.9228

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AVERAGE	Equal variances assumed	2.636	.110	-.692	54	.492	-1.0983	1.5862	-4.2784	2.0817
	Equal variances not assumed			-.701	50.349	.487	-1.0983	1.5668	-4.2448	2.0481

Appendix F: Spearman Correlations

		AVERAGE	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
	Correlation Coefficient	1.000	-.028	-.123	-.150	.232	-.394	-.044	-.259	.256	.092	-.059
	Sig. (2-tailed)	.	.891	.540	.454	.254	.042*	.827	.192	.198	.648	.770
	N	27	27	27	27	26	27	27	27	27	27	27
Q1	Correlation Coefficient	-.028	1.000	.695	-.147	.142	-.517	-.468	-.300	.628	-.525	.660
	Sig. (2-tailed)	.891	.	.000	.464	.490	.006	.014	.129	.000	.005	.000
	N	27	27	27	27	26	27	27	27	27	27	27
Q2	Correlation Coefficient	-.123	.695	1.000	-.274	.066	-.453	-.456	-.153	.524	-.543	.751
	Sig. (2-tailed)	.540	.000	.	.167	.747	.018	.017	.445	.005	.003	.000
	N	27	27	27	27	26	27	27	27	27	27	27
Q3	Correlation Coefficient	-.150	-.147	-.274	1.000	-.123	.457	.373	.243	-.285	.577	-.292
	Sig. (2-tailed)	.454	.464	.167	.	.548	.016	.055	.222	.150	.002	.139
	N	27	27	27	27	26	27	27	27	27	27	27
Q4	Correlation Coefficient	.232	.142	.066	-.123	1.000	-.261	-.310	.002	.098	-.131	.227
	Sig. (2-tailed)	.254	.490	.747	.548	.	.198	.123	.994	.633	.523	.264
	N	26	26	26	26	26	26	26	26	26	26	26
Q5	Correlation Coefficient	-.394	-.517	-.453	.457	-.261	1.000	.320	.479	-.696	.614	-.484
	Sig. (2-tailed)	.042	.006	.018	.016	.198	.	.103	.011	.000	.001	.010
	N	27	27	27	27	26	27	27	27	27	27	27
Q6	Correlation Coefficient	-.044	-.468	-.456	.373	-.310	.320	1.000	.540	-.294	.637	-.594
	Sig. (2-tailed)	.827	.014	.017	.055	.123	.103	.	.004	.137	.000	.001
	N	27	27	27	27	26	27	27	27	27	27	27
Q7	Correlation Coefficient	-.259	-.300	-.153	.243	.002	.479	.540	1.000	-.389	.543	-.331
	Sig. (2-tailed)	.192	.129	.445	.222	.994	.011	.004	.	.045	.003	.092
	N	27	27	27	27	26	27	27	27	27	27	27
Q8	Correlation Coefficient	.256	.628	.524	-.285	.098	-.696	-.294	-.389	1.000	-.488	.497
	Sig. (2-tailed)	.198	.000	.005	.150	.633	.000	.137	.045	.	.010	.008
	N	27	27	27	27	26	27	27	27	27	27	27
Q9	Correlation Coefficient	.092	-.525	-.543	.577	-.131	.614	.637	.543	-.488	1.000	-.707
	Sig. (2-tailed)	.648	.005	.003	.002	.523	.001	.000	.003	.010	.	.000
	N	27	27	27	27	26	27	27	27	27	27	27
Q10	Correlation Coefficient	-.059	.660	.751	-.292	.227	-.484	-.594	-.331	.497	-.707	1.000
	Sig. (2-tailed)	.770	.000	.000	.139	.264	.010	.001	.092	.008	.000	.
	N	27	27	27	27	26	27	27	27	27	27	27

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

Appendix G: Pearson Correlations

		AVERAGE	HOURS
AVERAGE	Pearson Correlation	1.000	-.219
	Sig. (2-tailed)	.	.272
	N	27	27
HOURS	Pearson Correlation	-.219	1.000
	Sig. (2-tailed)	.272	.
	N	27	27

Appendix H: IRB Approval Letter

LYNN UNIVERSITY
BOCA RATON, FLORIDA

May 25, 2004

Robert Rhett Coleman Yates
1627 Ashland Street
Jacksonville, FL 32207

Re: 2004 - 014

Dear Mr. Yates,

I have received the documentation of the requested revised consent form, research protocol, and permission letter from Jacksonville University for your proposal entitled " Analyzing the Use of Technology Teaching Methods in Collegiate Aviation Classrooms." You have approval of the Institutional Review Board to begin your research.

Sincerely,

Farideh Farazmand, Ph.D.
Chair, Institutional Review Board

cc. Dr. Cheryl Serrano
Dissertation Chair

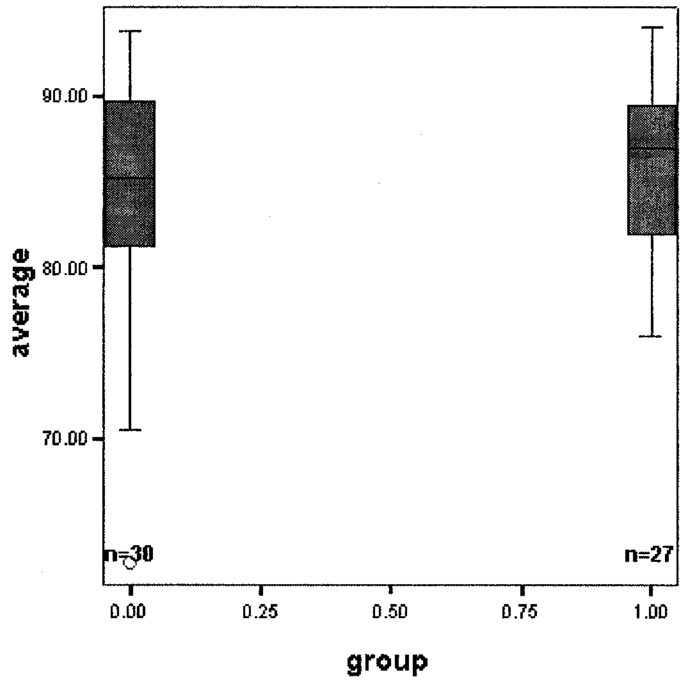
3601 North Military Trail, Boca Raton, Florida 33431-5598
(561) 237-7000 www.lynn.edu

Appendix I: Course Syllabus

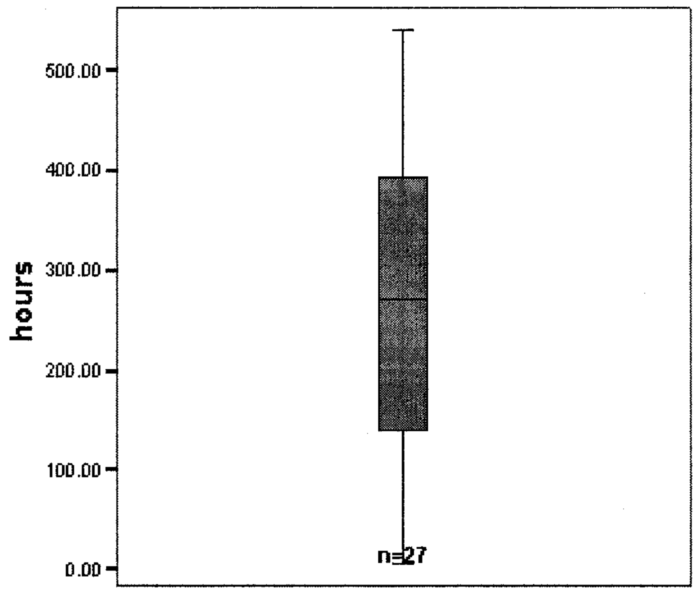
Topics and Test Schedule for Aviation Economics (AM 302)

Chapter (lectures)	*Description*
1- Wells	Aviation: An Overview
	The Aerospace Industry
	The Air Transportation Industry
2- Wells	Historical Perspective
	The Formative Period: 1918-1938
	The Growth Years: 1938-1958
	Maturity-Jets Arrive: 1958-1978
	Economic Developments Prior to Deregulation
	Federal Legislation and the Airlines
	Post-deregulation Evolution
	General Aviation
	TEST 1
3- Wells	Regulators and Associates
	The Department of Transportation
	The Federal Aviation Administration
	The National Transportation Security Administration
	The National Transportation Safety Board
	Major Aviation Associations
4- Wells	General Aviation
	General Aviation Statistics
	The General Aviation Support Industry
	The Available Market
	TEST 2
5- Wells	Airline Industry
	Structure of the Airline Industry
	Major and National Carriers
	Regional Carriers
	Airline Statistics
	Airline Certification
	Data Collection by the DOT
	Industry Agreements
	Traffic and Financial Highlights: 1960-2001
7- Wells	Airline Management and Organization
	Management
	Functions of Management
	Organization
	The Organizational Chart
	Staff Departments
	Line Departments
16- Wells	International Aviation
	The Question of Sovereignty in Airspace
	International Air Law
	The Formation of IATA
	The Bermuda Agreement
	From Bermuda to Deregulation
	The Pursuit of Open Skies
	Globalization
	Future Challenges
	TEST 3

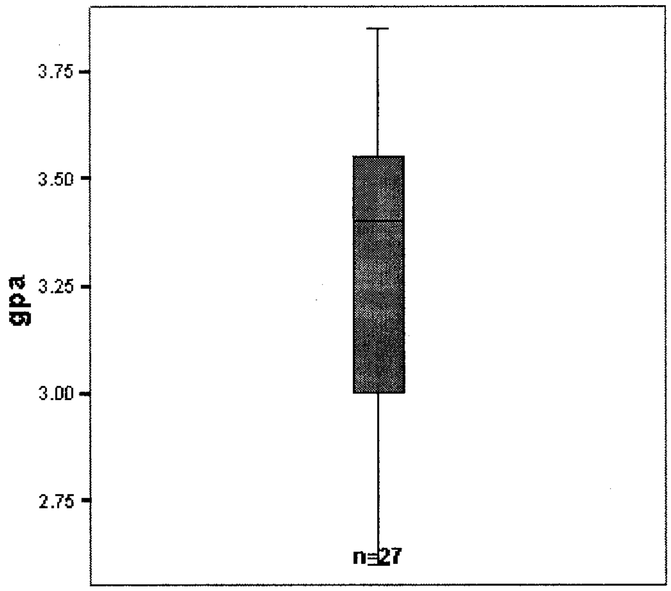
Appendix J: Box Plots



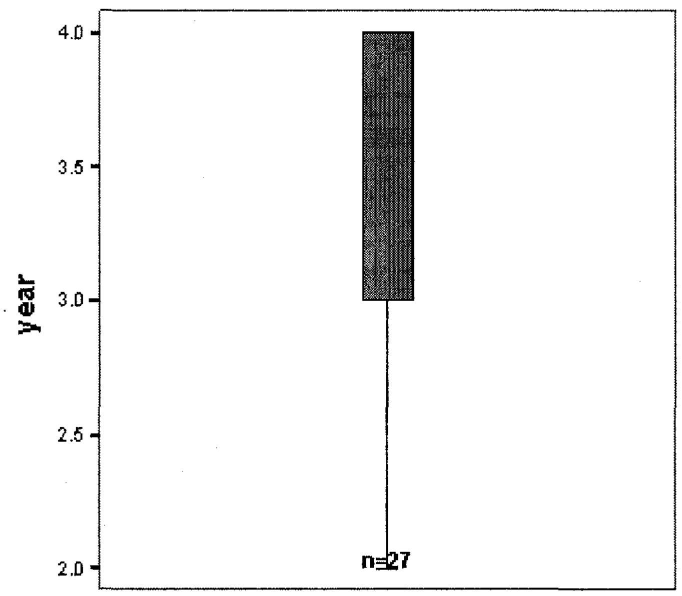
Class Averages



Flight hours



Grade point average



Year in school

Appendix K: O'Malley & McCraw

Table 1. Effectiveness of OL

Item Number	Questionnaire Items	t-value*	Alpha
1	Most people believe that OL is more effective than traditional methodologies.	.343	.732
2	In a course with both traditional and OL methodologies, I learn better through the OL portion.	1.761	.081
3	I prefer OL courses to traditional courses.	.272	.786
4	I believe that I can learn the same amount in an OL course as in a traditional course.	-1.386	.168
5	I believe that I can make the same grade in an OL course as in a traditional course.	-2.606	.010

Table 2. Relative Advantages of OL

Item Number	Questionnaire Items	t-value*	Alpha
1	I would benefit if there were more OL courses.	-3.907	.000
2	OL does not offer any advantages to me.	5.595	.000
3	OL requires significant changes by a student.	-4.552	.000
4	I believe that I can learn more or would learn more through on-line material than through lectures.	1.396	.165
5	I prefer on-line courses to traditional courses.	2.246	.027
6	On-line courses make me uncomfortable.	1.816	.072
7	I would feel comfortable taking courses on-line.	-3.381	.001

8	OL saves me time.	-6.054	.000
9	OL works well with my schedule.	-8.851	.000
10	OL enables me to attend classes more frequently than traditional courses.	-1.207	.230
11	It is difficult to contribute to class discussions in an OL course.	-4.075	.000
12	OL enables me to take more courses than the traditional methodology in a year.	-4.248	.000
13	I would like to have more courses taught using the OL methodology.	-2.980	.003

Table 3. Effectiveness of DL

Item Number	Questionnaire Items	t-value*	Alpha
1	Most people believe that DL is more effective than traditional methodologies.	3.489	.001
2	In a course with both traditional and DL methodologies, I learn better through the DL portion.	3.438	.001
3	I prefer DL courses to traditional courses.	4.437	.000
4	I believe that I can learn the same amount in a DL course as in a traditional course.	-.582	.562
5	I believe that I can make the same grade in a DL course as in a traditional course.	-2.352	.020

Table 4. Relative Advantage of DL

Item Number	Questionnaire Items	t-value*	Alpha
1	I would benefit if there were more DL courses.	.36	.160
2	DL does not offer any advantages to me.	.134	.894
3	DL requires significant changes by a student.	-3.093	.002
4	DL saves me time.	-.812	.419
5	DL works well with my schedule.	-2.310	.023
6	DL enables me to attend classes more frequently than traditional courses.	2.257	.026
7	It is difficult to contribute to class discussions in a DL course.	-4.475	.000
8	DL enables me to take more courses than the traditional methodology in a year.	.540	.590
9	I would like to have more courses taught using the DL methodology.	1.234	.220

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R. Rhett C. Yates **home: 904.398.7998** **cell: 904.254.2320**

Education

2001- Present **Lynn University** Boca Raton, Florida
Doctor of Philosophy in Educational Leadership

1996 – 1999 **LaGrange College** LaGrange, Georgia
Master of Business Administration
Courses completed include:
- Quantitative Methods of Management
- Marketing Management
- Financial Management

1990 – 1994 **Florida Institute of Technology** Melbourne, Florida
Bachelor of Science in Aviation Management/ Flight Technology
F.A.A. certifications and ratings include:
- Commercial Certificate
- Instrument Airplane
- Airplane Single-Engine Land
- Airplane Multi-Engine Land
- Advanced Ground Instructor (AGI)

Experience

2003- Present **Assistant Professor** Jacksonville, Florida
Jacksonville University
Responsible for teaching Aviation Economics, The Travel Industry, Civil Aviation Operations, and Airport Planning and Management
- Co-Advisor JU Flight Team
- Co-Advisor Alpha Eta Rho Aviation Fraternity

02 (Summer) **Guest Lecturer** Auburn, Alabama
Auburn University
Responsible for co-teaching Airline Management (Summer semester).

2001- 2002 **Adjunct Professor** Boca Raton, Florida
Lynn University
Responsible for teaching Air Transportation and Aviation History.

2000 – 2001 **Assistant Professor** Grand Forks, North Dakota
University of North Dakota
Responsible for teaching Air Transportation and General Aviation Management and Operations. Academic Advisor for more than one hundred aviation students.
- Recipient of the 2000-2001 Memorial Union Leadership Recognition Award
- Wilderness Pilot Association Advisor
- Pi Kappa Alpha Fraternity Advisor

1999– 2000 **Assistant Professor** St. Cloud, Minnesota
St. Cloud State University
Responsible for teaching Aeronautics 1, Airline Management, Air Transportation, Aviation Management, and General Aviation Management to two freshman classes, three sophomore classes, and three senior classes.
- Recipient of 1999-2000 College of Science and Engineering Teacher Recognition Award

1996 – 1998 **Operations Manager** LaGrange, Georgia
LaGrange Callaway Airport – Troup Air
Managed the daily operations of airport and FBO, including staff of seven, fuel services, rental car services, and customer service for general and corporate aviation. Yearly traffic average was 10,000 operations.

1994 – 1996 **Operations Agent/ Lineman** LaGrange, Georgia
LaGrange Callaway Airport – Troup Air
Performed all functions related to FBO operations, including managing cash ledger, fuel services, lineman duties, rental car activities, and unicom communications.

Courses Taught

Lynn University
Air Transportation and Aviation History

University of North Dakota
Air Transportation and General Aviation Management and Operations

St. Cloud State University
Aeronautics 1, Airline Management, Air Transportation, Aviation Management, and General Aviation Management and Operations

Advisees
100 + undergraduate students, UND

Institutional Service

- Pi Kappa Alpha Fraternity Advisor UND, 2000-2001
- Served on Assistant Chair Search Committee UND, 2000
- Wilderness Pilot Association Advisor UND, 2000-2001
- Aviation Explorer Post Advisor UND, 2000-2001
- Delta Sigma Phi Fraternity Advisor SCSU, 1999-2000
- Aviation Explorer Post Advisor SCSU 1999-2000
- Member Aviation Ambassadors SCSU, 1999-2000

- Member Local A.A.A.E. Chapter SCSU, 1999-2000
- Attended Oshkosh as Advisor with the St. Cloud, MN Explorer Post, 2000
- Oshkosh Air Venture Volunteer 2000

Professional Associations

- National Member A.A.A.E.
- National Member University Aviation Association

Awards

SRA Teacher Recognition Award for the College of Science and Engineering
St. Cloud State University, 1999-2000

2000-2001 Memorial Union Leadership Recognition Award for contributions to the Wilderness Pilot Association, University of North Dakota, 2000-2001