

## ABSTRACT

DAVIS, DONNA ELIZABETH. Best of Both Worlds: Do Hybrid Courses Have Better Outcomes Than Distance Only Courses in the North Carolina Community College System? (Under the direction of J. Conrad Glass, Jr.)

The purpose of this research was to compare the outcomes of hybrid courses, which require a certain degree of classroom participation, with distance only courses, which involve no classroom contact. Tinto's theory of retention indicates that academic integration is an important factor in student persistence. Hybrid courses have been touted as the best of both worlds, combining the flexibility of distance learning with varying degrees of classroom interaction. This research used secondary data to examine grades and retention in hybrid and distance only courses from three semesters at four community colleges in the North Carolina Community College System. Traditional courses were examined as a benchmark. No significant difference was found in retention rates between hybrid and distance only courses examined in this study, but when divided by gender, males had significantly higher retention rates in hybrid courses than in distance only courses. Traditional courses had significantly higher retention rates, but this held true only for females when gender was accounted for. Grades for both genders were significantly better in hybrid courses than in distance only courses. Age was found to have a positive relationship with retention in both hybrid and distance only courses and there was no significant gender difference. When course types were examined independently for differences in gender, females had significantly higher retention rates and better grades in distance only. In hybrid courses, male and female students were found to have no significant differences in retention, but females had significantly higher grades. Overall, hybrid courses saw better outcomes than distance only courses in this study.

Best of Both Worlds:  
Do Hybrid Courses Have Better Outcomes  
Than Distance Only Courses  
in the North Carolina Community College System?

By

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DEDICATION

To my grandmothers,

**Aldeen Barnes Moore and Vina Thompson Davis,**

whose wit, wisdom, grace and determination

made me who I am today.

From them I learned to love life and to love learning.

## BIOGRAPHY

Donna Elizabeth Davis was born in Kinston, NC. She completed an associate degree in liberal arts (AA, 1991) at Lenoir Community College while working as an admissions counselor at a regional hospital. Her work at the hospital, particularly witnessing the burden of preventable disease, inspired her to pursue a bachelor's degree in school and community health education (BS, 1993) at East Carolina University. After graduating and working with a children's health insurance program, she entered the executive master's program in health policy and administration (MPH, 1998) at the University of North Carolina at Chapel Hill. While studying at the School of Public Health, she worked as a local health educator in a rural NC community, as a patient educator at an urban non-profit clinic, and as a school based telehealth coordinator for the northeast region of NC. After completing her graduate degree in public health, Donna became the first executive producer and director of Public Health Grand Rounds, a national satellite broadcast and webcast series aimed at raising awareness of public health issues. She produced twenty-seven programs while working towards her doctoral degree.

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## Chapter I

### Introduction

Until recently, one of the big questions in distance education was whether it delivered comparable outcomes to traditional classroom instruction (MacFarland, 1998a, 1998b; Patterson, 2002; Russell, 1999; Searcy, 1993; Sims & Schuman, 1999). Now, the question generating research and discussion is why not have the best of both worlds? Hybrid instruction, which blends the two methods, is an emerging trend that seeks to give students the advantages of each (Dziuban, Hartman, & Moskal, 2004; Graham, 2005; Martyn, 2003; Young, 2002). Perhaps one of the best reasons to develop hybrid courses is they provide a viable option for students who seek the flexibility of distance only courses but also prefer to have some contact with faculty and peers in a classroom setting. In providing this option, institutions may improve their retention rates.

It is widely accepted that retention rates for distance education students fall lower than those for traditional classroom students (Carr, 2000; IHEP, 1999; Kember, 1995; Phipps & Merisotis, 1999; O. Simpson, 2003). Vincent Tinto (1993), who is extensively cited in college retention research, would argue that the reason retention rates are lower is because there is less student-faculty and student-student contact. Tinto (1993) believed that part of the problem of student attrition lay with the environment and that the institution should make changes to become more student centered.

#### Statement of the problem

An example of a community college system that is changing to provide more student centered learning is the North Carolina Community College System (NCCCS), an organization

comprised of 58 community colleges and a central administrative office (McGraw, 1999). In 2003, NCCCS announced an institutional move to a greater emphasis on hybrid instruction (NCCCS, 2003). Among the goals that the administrators hoped to achieve were:

- Mixture of the advantages of face-to-face instruction with those of distance instruction.
- Increased interaction of students, particularly those reluctant to participate in a classroom.
- Reduction in the crowding of classrooms and other campus facilities.
- Increased flexibility in scheduling and reduction of commuting for students.

(NCCCS, 2003)

This dissertation compares the retention rates and grades of students enrolled in hybrid courses with those in comparable distance only courses within NCCCS. The results of this study have the potential to impact the development of hybrid courses and provide a basis for greater investment in blended instructional methods.

### Research Hypothesis

The fundamental difference between hybrid courses and distance only courses is the degree of classroom time. Distance only courses obviously include no face-to-face contact and do not require students to travel to the physical campus. Hybrid courses require traditional classroom participation in varying degrees. Tinto (1993) believed that classrooms are at the intersection of faculty and students' college lives, and that the best opportunity to enhance student effort is in what he referred to as the "heart" of the institution, the classroom. Supported by Tinto's (1993) theory of student involvement, the central hypothesis of this dissertation was

that retention rates and subsequently grades are significantly higher in hybrid courses than in distance only courses.

### Significance of the Study

The hybrid model of instruction may or may not be a new concept in teaching. Much like distance learning, it has been categorized, utilized and branded in many different ways. However, unlike distance learning, there has been little comparative research on the outcomes for students enrolled in hybrid courses (Haytko, 2001). One outcome that is of concern to all institutions of higher education is retention. Despite the popularity of distance education and its acceptance by most modern institutions of learning, the problem of retention remains a concern when compared with traditional classroom instruction. Berge (2004) identified three groups of stakeholders that are likely to benefit from retention research: policymakers and administrators concerned with lowering attrition and increasing institutional effectiveness; faculty and staff who desire to understand the factors or conditions that influence students' decisions to withdraw; and most importantly, students who seek to realize their goals through positive learning experiences.

Are retention rates lower for distance only courses than hybrid courses, which increase students' interaction with the physical campus? Are the grades of students completing hybrid courses better than those of their distance only counterparts? To answer these questions and contribute to the small but growing body of literature on hybrid instruction, this study compared the retention rates and grades of hybrid courses with those of distance only courses in the North Carolina Community College System. The results of this research have the potential to leverage funding for hybrid courses and encourage the development of this type of instruction in institutions serving adult learners.

### Limitations of the Study

This study looks at retention within three consecutive semesters; therefore the conclusions are not applicable to longitudinal views of student departure from higher education. Also, the students self selected their instruction method by choosing either the hybrid course or the distance only course. Ormond (2003) addressed self-selection by explaining, “when a particular service is offered to students, those who take it up may well be those who are already well integrated and more likely to succeed” (p. 140). He acknowledged that “if a retention effort relies on students selecting themselves in some way – such as running face-to-face induction workshops – then these efforts may be attracting students who are more assertive, more confident in the company of other students, have access to good transport and for all those reasons are already better bets for retention” (p. 140). It is possible that students choose a course because it is required and they do not have the option of choosing the method of instruction. This study does not address the impact of choice on retention or grades.

### Definition of Terms

Hybrid: “Hybrid courses are courses in which a significant portion of the learning activities have been moved online, and time traditionally spent in the classroom is reduced but not eliminated” (§ 1) (Garnham & Kaleta, 2002).

Blended: Courses that “combine face-to-face classroom instruction with online learning and reduced classroom contact hours (reduced seat time)” (p. 2) (Dziuban et al., 2004).

Distance only: For the purposes of this research, “distance only” represents instruction that requires no classroom participation on the part of the student. This term distinguishes

courses from those that require varying degrees of classroom participation.

**Online:** In the North Carolina Community College System, “online” courses are those that require no classroom participation and are delivered at a distance only.

**Traditional:** In the North Carolina Community College System, “traditional” courses require full classroom participation corresponding with the number of credit hours per course.

**Distance learning/education:** When the “instructor delivers the course in some place at some time while the student is learning the course outcomes at another place and time” (p. 2) and this includes internet independent study (paper based) and video delivery methods (J. Simpson & Head, 2000). Also, distance learning generally is identified as all types of formal instruction that are conducted when teachers and learners are not located in the same place (S. W. Gilbert, 1995).

**Attrition:** The “decline in the number of students from the beginning to the end of the course, program, institution, or system under review” (¶ 6) (Berge & Huang, 2004).

**Retention:** The “continued student participation in a learning event to completion, which in higher education could be a course, program, institution, or system” (¶ 6) (Berge & Huang, 2004).

**Persistence:** The “result of students' decisions to continue their participation in the learning event under analysis” (¶ 6) (Berge & Huang, 2004).

**Incongruence:** Lack of institutional fit (Tinto, 1993).

**Isolation:** Absence of sufficient interactions whereby integration may be achieved (Tinto, 1993).

**Dropout:** A person who fails to obtain a college degree within a specified period of time (Astin, 1975; Tinto, 1993).

Student involvement: “The amount of physical and psychological time and energy that the student devotes to the academic experience” (p. 297) (Astin, 1984)

## Chapter II

### Literature Review

#### Introduction

In 1999, Thomas Russell sought to put to rest the controversy of whether distance education was better, worse, or the same with his book titled “No Significant Difference Phenomenon.” In his book, he provides documentation of studies dating back to 1928, which conclude that there are no significant differences in the outcomes of distance learning students and those taking classes by traditional methods in the classroom (Russell, 1999). Yet, there is still widespread belief that dropout rates for distance education are 10 to 20 percentage points higher than traditional classroom education (Berge & Huang, 2004; Carr, 2000; Stumpf, McCrimon, & Davis, 2005).

Despite lower retention rates, distance education is rapidly expanding and becoming incorporated at colleges and universities around the world. Convenience is often cited as the one of the most appealing attributes of distance learning (Young, 2002). Access has also been a driving force in the development of distance education. The foundations of distance learning clearly show it evolved from a need to expand opportunities for learning to those unable to attend class at a fixed time and place.

#### Hybrid Instruction

An emerging trend in higher education is the blending of online course instruction with traditional classroom instruction (Ely, 2003; Young, 2002). Young (2002) quotes the president of Pennsylvania State University as describing the merger between online and residential

instruction as “the single-greatest unrecognized trend in higher education today” (p. A33). The reasons behind the move stem from both institutional and student needs.

In the business world, courses offering this type of instruction mix are referred to as “blended learning”(Graham, 2005; Martyn, 2003). Dziuban (2004) states that the very fact that multiple terms are used to describe this type of learning leads to the conclusion that there is no definitive model. Reduced seat time is a common theme among all models of hybrid instruction (Dziuban et al., 2004; Garnham & Kaleta, 2002; Koohang & Durante, 2003; Young, 2002).

Dziuban (2004) states that the concept is not new, but rather the attention and research in the area is. Dziuban is the director of the Research Initiative for Teaching Effectiveness (RITE) at The University of Central Florida (UCF), a leading institution in hybrid instruction. He further attributes the new attention to a transformation in education that is being fueled by the advances in pedagogy, where paradigms are shifting from teaching-centered to student-centered instruction methods. UCF offers a continuum of instructional models, from face-to-face to fully online, with web-enhanced courses and blended courses in between (Dziuban et al., 2004)

Dziuban’s (2004) research reveals that, from the 2001 Spring semester to the 2003 Spring semester, blended courses at UCF exceeded the retention rates of fully online courses each semester. The retention rates of fully face-to-face courses were only slightly better than the hybrid courses. Dziuban concluded that the success rates were comparable and therefore provided a good alternative to fully face-to-face instruction. As for grades, the percentages of students succeeding with a grade of A, B, or C, was consistently higher in blended courses when compared to fully online courses, and equal to if not greater in some semesters than fully face-to-face courses (Dziuban et al., 2004). Martyn (2003) cites a two-year study conducted by Thompson Learning that looked at the outcomes for 128 learners from both industry and higher

education. They were divided into two groups, one that received instruction via blended learning and one that received the online-only version of the course. The study found that the group that received some face-to-face instruction performed tasks 31 percent more accurately and 40 percent faster than the online-only group (Kiser, 2002)

In addition to improved outcomes and satisfaction, blended courses also make efficient use of the physical campus by expanding its capacity, as well as reducing on-campus traffic and the need for additional parking. There is also a reduction in instructional delivery costs (Dziuban et al., 2004). Martyn (2003) indicates that the development of hybrid courses allowed her institution to maintain its mission of providing “quality education with a person touch.”

The real beneficiaries of hybrid teaching are the students and the instructors. The schedule of coursework is flexible and there is less time spent commuting and finding parking. Because of this, an older student population that often has more responsibilities, such as job and family, may be drawn to hybrid courses. Flexibility is by far the most popular feature (Garnham & Kaleta, 2002). Some authors have stated that the time in between classes actually increases the occurrences of student-faculty and student-student contact (Garnham & Kaleta, 2002; Koohang & Durante, 2003; Young, 2002).

### Retention Theories

In 1975, Astin wrote “Dropping out of college is a little like the weather: something everyone talks about but no one does anything about” (p.1). He further points out that colleges and universities in the 1970’s were concerned about enrollment because their budgets were based on tuition and fees, therefore, the number of students often dictated the amount of government funds they received. He proposed that resources be devoted to addressing attrition rather than

aggressive recruiting because anything that helps a student complete college is a real service to them, whereas recruiting efforts will only influence their choice in schools (Astin, 1975).

Since Astin (1975) made this proposal, retention has become one of the most researched topics in higher education. A substantial amount of this research concludes that the degree and quality of personal interaction with other students, faculty, and staff, are critical factors that influence the decision to persist (Astin, 1975; J M Braxton, Milem, & Sullivan, 2000; John M. Braxton & Mundy, 2001; E. T. T. Pascarella, Patrick T., 1980; Tinto, 1982, 1993). Vincent Tinto (1993) is responsible for much of this research. Braxton (2000) describes Tinto's interactionist theory of college student departure as having a near "paradigmatic status" (p. 569) with "more than 400 citations and 170 dissertations pertaining to his theory" (p. 569) as of the year 2000.

In developing his retention theory, Tinto (1993) drew ideas from two areas of research, rites of passage and suicide. Van Gannep (1960) believed that the theory of rites of passage were relevant when a person moves from one group to another. He identified three stages in the rites of passage: separation, transition, and incorporation (Van Gannep, 1960). Incorporation is the stage where students are integrated into the social and academic environment of the institution of higher education. Durkeim's (1966) research on suicide established four categories, altruistic, anomic, fatalistic, and egotistical. It is the final category of egotistical suicide, which relates to how a college's social and intellectual communities could influence a student's willingness to persist (Kember, 1995). Kember (1995) explains that egotistical suicide could occur if one becomes isolated from society's communities and is unable to integrate and establish membership. Tinto (1993) believes that isolation and incongruence are at the roots of student attrition. Isolation occurs when a student feels disconnected or removed from the daily life of

the institution. The result is usually incongruence or the feeling of being at odds with the institution, which further perpetuates the isolation by avoiding integration (Tinto, 1993).

Simpson (2003) summarized Tinto's theory as "a longitudinal process of interactions between the individual and institutional systems during which the individual's experiences – as measured by their integration with those systems – modify his or her goals and commitments in ways that lead to persistence or dropout" (p. 7). A shorter-term perspective comes from Quigley (1995), as cited by Dixon (2003), in a study in which "reluctant learners" dropped out of college during the first few weeks of classes if they felt they were not receiving enough attention from the instructor. It is perhaps the amount of "attention" a student receives that makes the difference between persisting and dropping out.

Gilbert (2000) synthesized the models of Spady (1971), Tinto (1987), Bean and Metzner (1985), and Kember (1995) and concluded that all of them emphasized the element of social and academic integration in their theories of retention. Their models described the decision making process of students that led to either persistence or attrition. They concluded that the stronger the student-institutional "fit" or the attachment to the institution, the more likely it is that the student will remain at the institution (W. A. Gilbert, 2000). While Astin (1975) covered many of the student or learner characteristics that lead to dropping out of college, he also addressed the institution side of the equation. He stated, "if ways can be found to involve students more in the life and environment of the institution, their chances of staying in college are improved" (p. 148). Among the possible intervention techniques were tutoring, programmed instruction, special courses to develop study skills, and self-paced learning (Astin, 1975). Thirty years later, it is the latter that comes closest to describing the hybrid model.

### Community College Students

The heterogeneous nature of the community college system is one of its best features and one of its greatest challenges. As shown in Table 2.1, community colleges have a greater number of older students, female students, and minority students than four-year institutions. These are the students that research has shown to be at greatest risk for attrition (Bryant, 2001; Santos, 2004; Sullivan, 2001; Weiss, 1999; Weissman, Bulakowski, & Jumisko, 1998; Wild & Ebbers, 2002).

Table 2.1

Percentage distribution of undergraduates' age group, gender, and race/ethnicity for students attending community colleges and 4-year institutions: 2003–04

<u>Student characteristics</u>	<u>Community Colleges</u>	<u>Four-Year Institutions</u>
Total	100.0	100.0
Age as of 12/31/03		
23 years or younger	47.0	69.7
24-29 years	18.2	14.5
30 years or older	34.8	15.8
Gender		
Male	40.9	45.1
Female	59.1	54.9
Race/ethnicity		
White	59.9	69.3
Black	15.3	11.2
Hispanic	14.4	9.8
Asian	5.3	5.3
American Indian	1.0	0.8
Pacific Islander	0.7	0.4
Multiple races	2.1	2.0
Other	1.3	1.2

National Center for Education Statistics (2004)

Add distance to diversity and the challenges multiply. A study by Sullivan (2001) confirmed the conclusion formed by numerous researchers of online learners, “male and female college students experience the online environment differently” (p. 805). The study was based on the answers to two questions added to online course evaluations:

1. Is there anything about the online classroom that has made it easier for you to learn, achieve your academic goals, or participate in class discussions (as compared to a traditional classroom)?
2. Is there anything that made it harder? (Sullivan, 2001)

The answers from these two questions revealed that female students have a greater need for flexibility; therefore, the online classroom made it easier for them to achieve their academic goals. Specifically, female students were more likely to mention family or children in positive responses about aspects of online instruction. At the same time, both male and female responses indicated that the lack of face-to-face interaction was a negative aspect of the online environment. Female students provided the larger percentage of these responses (Sullivan, 2001)

In Kramarae’s 2001 report, “The Third Shift: Women Online”, three reasons are given for increasing research on women’s experiences with distance education. First, women are the primary users of distance education, yet they are underrepresented in the technology sector that designs the online software and the higher education administration that delivers the instruction. Second, the barriers to higher education that women confront are not usually experienced by men, at least not to the same degree. They often are juggling job, community, and family responsibilities along with their academic work. Finally, women make up the largest market segment targeted by higher education institutions. Even as the institutions try to provide their

students with more options to help them succeed, they are also trying to attract students to keep the distance learning programs going (Kramarae, 2001).

Non-traditional students in general are more likely to have more responsibilities than their traditional counterparts. While this may make them ideal candidates for distance only classes, it may also prevent them from interacting with the learning institution and therefore less likely to persist. Research shows higher rates of attrition in older students, who work full-time and attend school part-time (Weiss, 1999). If these students are minorities, they may also feel a greater sense of incongruence or isolation, both of which were identified by Tinto (1993) as factors in student attrition (Weissman et al., 1998).

### Theoretical and Conceptual Framework

Andreu (2002) acknowledged two of the most difficult challenges in studying retention at community colleges. One is reading and synthesizing the massive amounts of literature on the topic. Another is identifying components of existing theories that can be applied to community colleges. This is a problem because most theories were developed with four-year residential institutions in mind. Wild and Ebbers (2002) dismissed all of the well known models of student retention (Astin, 1975, 1993; E. T. T. Pascarella, Patrick T., 1980; Tinto, 1975, 1993), but singled out Tinto's theory as one that would be useful in developing a model to predict student persistence at community colleges.

Several researchers have successfully applied Tinto's theory of persistence to community colleges or other two-year institutions (Grosset, 1989; Guarino & Hocevar, 2005; Halpin, 1990; Mutter, 1992; Napoli & Wortman, 1998; Ernest T. Pascarella & Chapman, 1983; Starks, 1987; Wortman & Napoli, 1996). Pascarella & Chapman (1983) applied the Tinto model of student

departure to four-year residential, four-year commuter and two-year commuter colleges. The results revealed differences in social and academic integration across institutions with the latter being particularly relevant to two-year commuter colleges. Halpin (1990) tested the Tinto model of student attrition on community college students and found it to be an accurate predictor of student persistence or exit outcomes. He stated that “while little can be done to influence ‘background characteristics’ or ‘environmental’ circumstances of community college students, the creation of institutional mechanisms to maximize student/ faculty contact is likely to result in greater levels of integration and hence persistence” (p. 8). Halpin (1990) explained why Tinto was able to bridge the differences in four-year and two-year institutions.

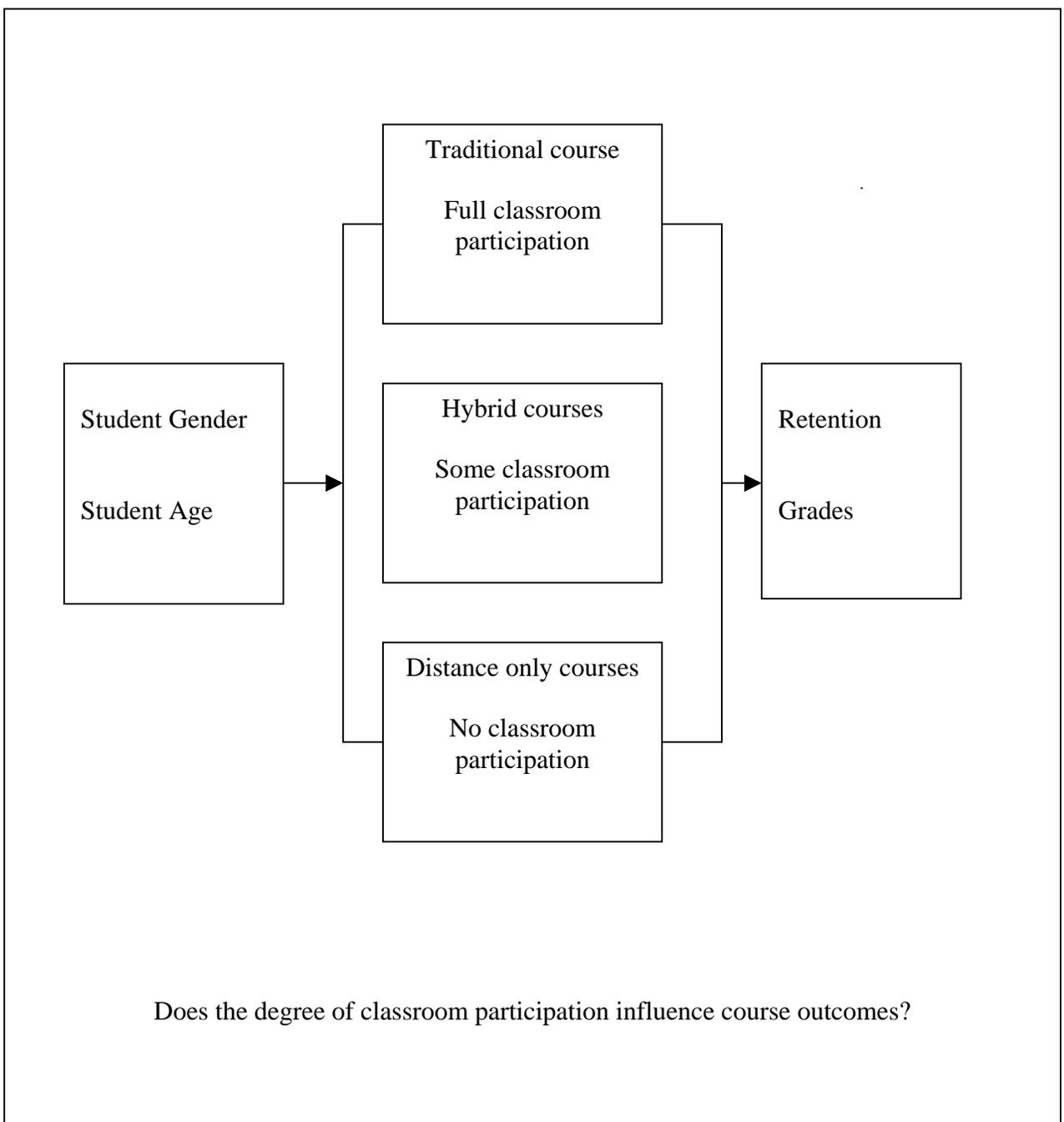
The fact is that the Tinto model, particularly the academic integration aspect, does predict persistence or exit outcomes. This attests to the explanatory power of the model. Perhaps the explanation for the predictive power of the model and the importance of academic integration for this population has to do with the fact that the academic systems of commuter and residential colleges are more similar than the respective social systems. For instance, academic systems in all cases are comprised of classes, professors, advisors, books, grades, papers and examinations (p. 7).

Several studies have confirmed the predictive value of the academic integration component of Tinto’s model (Liu & Liu, 2000; Mutter, 1992; E T Pascarella & Terenzini, 1979; Starks, 1987; Terenzini & Pascarella, 1977; Wortman & Napoli, 1996).

The theoretical framework for this study was based on Tinto’s model of student attrition, particularly the component of academic integration. While most of Tinto’s research is based on longitudinal research, this study examined course departure. The central hypothesis of this research was that hybrid courses have better retention rates and subsequently better grades than

distance only courses. By requiring some degree of classroom participation, hybrid courses provide the academic integration that Tinto's theory has shown to be a predictor of student persistence. The conceptual map that framed this research is shown in table 2.2.

Table 2.2  
Conceptual framework



### Purpose of the Study/Research Questions

The purpose of this study was to determine whether hybrid courses result in better outcomes than distance only courses. Traditional courses were examined as a benchmark to determine if hybrid course outcomes are comparable. The following questions were studied:

1. Is there a significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in distance only courses?
2. Is there a significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in traditional courses?
3. Is there a significant difference in the grades of students enrolled in hybrid courses and those enrolled in distance only courses?
4. Is there a significant difference in the grades of students enrolled in hybrid courses and those enrolled in traditional courses?
5. Is there a relationship between age and retention in hybrid courses?
6. Is there a relationship between age and retention in distance only courses?
7. Is there a significant difference between male and female retention in hybrid courses?
8. Is there a significant difference between male and female retention in distance only courses?
9. Is there a significant difference between male and female grades in hybrid courses?
10. Is there a significant difference between male and female grades in distance only courses?

### Null and Alternative Hypotheses

The central hypothesis of this research was that retention rates and subsequently grades are significantly higher in hybrid courses than in distance only courses. O’Sullivan, Rassel, and Berner (2003) state that proving “that a hypothesis is true requires two types of evidence: confirming evidence, based on inductive reasoning, and disconfirming evidence, based on deductive reasoning” (p. 362). For each research question, a null and alternative hypothesis was formed:

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H<sub>0</sub>1: There is no significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in distance only courses.

H<sub>A</sub>1: The retention rates for students enrolled in hybrid courses are greater than those enrolled in distance only courses.

---

H<sub>0</sub>2: There is no significant difference in the retention rates of students enrolled in hybrid courses and those enrolled in traditional courses.

H<sub>A</sub>2: The retention rates of students enrolled in hybrid courses are greater than the students enrolled in traditional courses.

---

H<sub>0</sub>3: There is no significant difference in the grades of students enrolled in hybrid courses and those enrolled in distance only courses.

H<sub>A</sub>3: The grades for students enrolled in hybrid courses are greater than those enrolled in distance only courses.

---

H<sub>0</sub>4: There is no significant difference in the grades of students enrolled in hybrid courses and those enrolled in traditional courses.

H<sub>A</sub>4: The grades of students enrolled in hybrid courses are greater than the students enrolled in traditional courses.

---

H<sub>0</sub>5: There is no relationship between age and retention rates in hybrid courses.

H<sub>A</sub>5: There is a relationship between age and retention rates in hybrid courses.

---

H<sub>0</sub>6: There is no relationship between age and retention rates in distance only courses.

H<sub>A</sub>6: There is a relationship between age and retention rates in distance only courses.

---

H<sub>0</sub>7: There is no significant difference between male and female retention in hybrid courses.

H<sub>A</sub>7: There is a significant difference between male and female retention in hybrid courses.

---

H<sub>0</sub>8: There is no significant difference between male and female retention in distance only courses.

H<sub>A</sub>8: There is a significant difference between male and female retention in distance only courses.

---

H<sub>0</sub>9: There is no significant difference between male and female grades in hybrid courses.

H<sub>A</sub>9: There is a significant difference between male and female grades in hybrid courses.

---

$H_0$ 10: There is no significant difference between male and female grades in distance only courses.

$H_A$ 10: There is a significant difference between male and female grades in distance only courses.

## Chapter III

### Research Methodology

The site for this study was the North Carolina Community College System (NCCCS). This system is comprised of 58 community colleges and a textile institute. There is a central administrative office that provides some continuity throughout the system, but at the same time, each institution functions autonomously (McGraw, 1999). During the reporting term of fall 2005, the number of students enrolled in hybrid courses throughout NCCCS was 10,398 (NCCCS, 2005). For the purposes of this study, community colleges within NCCCS were identified based on the number of students enrolled in hybrid courses at each institution. Using data from the 2005 fall semester report “Total Students and FTE by Method of Instruction by College”, the community colleges in Table 3 were selected for this study based on the criteria of having 800 or more students enrolled in hybrid courses.

Table 3

Institutions and number of students enrolled in hybrid courses in NCCCS  
2005 fall semester

Institution	Number Students enrolled in Hybrid Courses
Caldwell Community College and Technical Institute	821
Forsyth Technical Community College	946
Gaston College	816
Wake Technical Community College	788

The purpose in identifying the institutions with the largest numbers of students enrolled in hybrid courses was to use the largest data sample possible from the smallest number of

institutions. These institutions were also more likely to have the largest number of distance only courses. This research utilized secondary data from the records of these community colleges.

### Research Design

A number of researchers who have studied student outcomes such as retention have chosen longitudinal designs to determine cause and effect (Astin, 1975; Tinto, 1993). For this study, the researcher chose a cross-sectional design. Terenzini (1982) defined “cross-sectional” as “the one-time collection of data from currently enrolled students” (p. 58). He further states that “this approach permits comparison of dropouts and non-dropouts on the same measures, taken at the same time and under similar conditions” (Terenzini, 1982). Three course types were examined from three semesters, with retention and grades measured cumulatively within each course type.

### Population and Sample

The population examined in this research included students enrolled in college transfer courses at four NCCCS institutions during the Summer 2005, Fall 2005, and Spring 2006 semesters. These courses were categorized as traditional, online, and hybrid. The grades and course completion rates of the students enrolled in the hybrid courses were compared to those enrolled in the online (distance only) courses. The grades and completion rates of students enrolled in traditional courses were examined as a benchmark. The independent variables of age and gender were examined to determine if there was a relationship to retention and grades in hybrid and online courses.

### Data Collection

The data used for this study was provided by the general administration office of NCCCS and obtained by Dr. Darryl McGraw, Chief Information Officer at Wake Technical Community College (WTCC) and committee member for this dissertation. In collaboration with Dr. McGraw and his staff, the researcher identified the data required for the research. The database administrator at WTCC created a query and placed the resulting data in an Excel spreadsheet. To obtain the same information from the remaining colleges, the query was sent to the general administration office.

### Variables and Data Analysis

Two statistical models were used to analyze the data in this study: logistic regression, proportional odds model. From each model, the hypotheses tests were conducted using Chi-Square tests corresponding to the model that was fit. O'Sullivan, Rassel, and Berner (2003) describe the logistic regression model as one in which there are two possible values assigned to the dependent variable. The equation "calculates the probability that the dependent variable will have one of two values for given values of the independent variable or variables" (p. 487) (O'Sullivan, Rassel, & Berner, 2003). In determining retention rates, there are only two possible answers, completion or non-completion. To analyze the relationship between course types and grades, a variation of logistic regression was used. The scale of value for grades ranges from 0 to 4, therefore the proportional odds model, which is better suited to ordinal data, was used to measure this relationship.

For each research question a Chi-Square test was conducted. Defined as "a test of statistical significance intended for use with nominal measures" (p. 484) (O'Sullivan et al., 2003), this

analysis was used to determine if the relationships between the response variables and the explanatory variables were significant. The researcher used a significance level of .05 in answering these questions.

In this study, the response variables of interest were retention rates and grades. The explanatory variables were course type, gender, and age. Before discussing the statistical methodology for analyzing the hypotheses outlined in this study, some notation is necessary. Let  $Y_1$  be the random variable used to denote retention and  $Y_2$  be the random variable used to denote grades. Then,

$$Y_1 = \begin{cases} 1 & \text{if student stayed in course} \\ 0 & \text{otherwise} \end{cases} \quad \text{and} \quad Y_2 = \begin{cases} 0 & \text{if course grade was F} \\ 1 & \text{if course grade was D} \\ 2 & \text{if course grade was C} \\ 3 & \text{if course grade was B} \\ 4 & \text{if course grade was A} \end{cases}$$

Additional details are provided for the explanatory variables. For the variable of most interest, course type, there are three levels: distance, hybrid, and traditional. Since traditional courses were used as a baseline, the coding of the variable was as follows:

$$X_1 = \begin{cases} 1 & \text{if course type is distance} \\ 0 & \text{otherwise} \end{cases} \quad \text{and} \quad X_2 = \begin{cases} 1 & \text{if course type is hybrid} \\ 0 & \text{otherwise} \end{cases}$$

The next variable of interest is gender. This variable takes on two levels, male and female, and was coded as the following:

$$X_3 = \begin{cases} 1 & \text{if female} \\ 0 & \text{otherwise} \end{cases}$$

Age is a continuous variable; therefore no coding was necessary. The random variable  $X_4$  was used to denote age.

Using the variables defined above, a statistical model was developed. Due to the categorical nature of the variables, generalized linear models were used. The following descriptions provide further details regarding the statistical models chosen for this study. First, the model used to analyze retention rates is described followed by a description of the model used for grades.

### Retention Rate Analysis

Retention rate is a binary variable. The student can either complete the course or withdraw. It is important to clarify the definition of retention for the purposes of this study. *A student has retention in a course so long as the student stays enrolled in the course.* Since the response only takes two levels, the model of choice is logistic regression. The method gives the probability of the response taking on the value of 1 given the explanatory variables. More specifically,

$$\begin{aligned} \text{logit} \{P(Y_1 = 1 | X_1, X_2, X_3, X_4)\} = \\ \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_1 + \beta_6 X_1 X_3 + \beta_7 X_2 X_3 + \\ \beta_8 X_1 X_4 + \beta_9 X_2 X_4 + \beta_{10} X_3 X_4 + \beta_{11} X_1 X_3 X_4 + \beta_{12} X_2 X_3 X_4 + \varepsilon \end{aligned}$$

where  $\varepsilon \sim N(0, \sigma_\varepsilon^2)$ . This statistical model allows for up to three-way interactions between the explanatory variables. The reason for including the three-way interactions is to account for changes in effects of explanatory variables upon observing another level. Using the model above, an equation can be derived for any combination of course type and gender. For the hypotheses comparing two course types (hypotheses 1-2), the least square means were calculated and tested using their estimated variance-covariance matrix by means of Chi-Square tests. For

the hypotheses specifically focused on one course type (hypotheses 5-8), the model was reduced to only four terms. These hypotheses were then tested using the reduced model and observations for that specific course type. With these models, Chi-Square tests were conducted to test whether the effects were significant.

### Grades Analysis

Since the actual number grades were not available, a continuous response was not appropriate in this situation. Although linear regression was more appropriate than for retention, using it can yield predicted grades that fall outside of the 0 to 4 range. Therefore, a more powerful alternative was used, the proportional odds model, which uses ordinal responses. The proportional odds model is very similar to the logistic regression model except it models cumulative probabilities instead of individual ones. The model gives the probability of a grade taking on a value less than or equal to a fixed value  $y$ . More specifically the model can be written out as:

$$\begin{aligned} \text{logit} \{P(Y_2 \leq y | X_1, X_2, X_3, X_4)\} = \\ \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + \gamma_3 X_3 + \gamma_4 X_4 + \gamma_5 X_1 + \gamma_6 X_1 X_3 + \lambda_7 X_2 X_3 + \\ \gamma_8 X_1 X_4 + \gamma_9 X_2 X_4 + \gamma_{10} X_3 X_4 + \gamma_{11} X_1 X_3 X_4 + \gamma_{12} X_2 X_3 X_4 + \nu \end{aligned}$$

where  $y$  takes values (0,1,2,3,4) and  $\nu \sim N(0, \sigma_\nu^2)$ . Using this statistical model allowed for up to three-way interactions between the explanatory variables. Again, the reason for including the three-way interactions was to account for changes in effects of explanatory variables upon observing another level. For the hypotheses comparing two course types (hypotheses 3-4), Chi-Square tests were used. For the hypotheses specifically focused on one course type (hypotheses 9-10), the model was reduced to only four terms. As with the retention analysis, these

hypotheses were then tested using the reduced model and observations for that specific course type. Chi-Square tests were also conducted to test whether the effects were significant.

## Chapter IV

## Research Findings

Sample Description

The ages of the students examined in this study ranged from 16 to 76. They were enrolled in college transfer courses that were categorized as hybrid, online, or traditional. The student records were drawn from four community colleges in NCCCS and covered three semesters: Summer 2005, Fall 2005, and Spring 2006. The female students numbered 35,394 and the male students numbered 32,608. Tables 4.1 and 4.2 represent a snap shot of the student demographics.

Table 4.1 Population Demographics by Course Type and Gender

	Female	%	Male	%	Total	%
Hybrid	758	(2%)	682	(2%)	1,440	(2%)
Online	11,560	(33%)	10,450	(32%)	22,010	(32%)
Traditional	23,074	(65%)	21,468	(66%)	44,542	(66%)
Total	35,392		32,600		67,992	

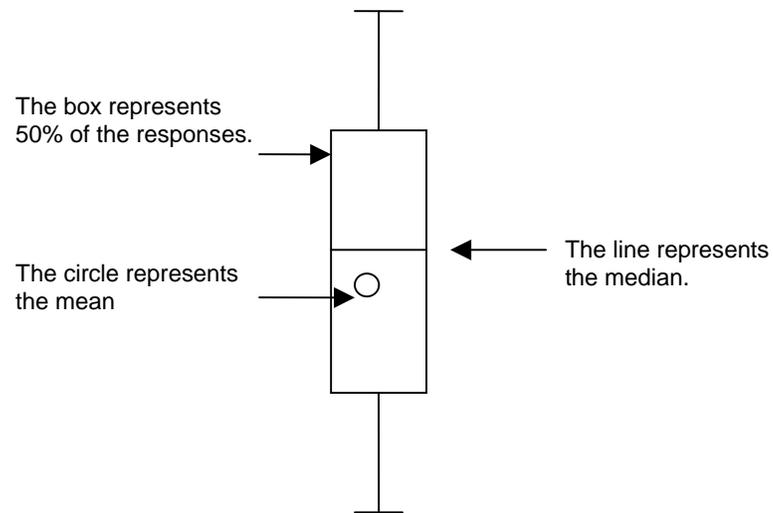
Table 4.2 Population Demographics by Course Type and Age

	Age $\leq$ 23	%	Age 24 – 29	%	Age $\geq$ 30	%
Hybrid	521	(1%)	297	(2%)	622	(4%)
Online	12,857	(33%)	4,323	(33%)	4,830	(31%)
Traditional	25,871	(66%)	8,625	(65%)	10,046	(65%)
Total	39,249		13,245		15,498	

### Research Questions

Using the statistical models outlined in Chapter III, each research question was analyzed and the results are discussed in this chapter. Charts have been developed to provide a visual representation of the results. Most charts are box plots that display the mean, median, and the variation in the response variable. The key to reading the box plot is as follows:

Table 4.3 Key to reading the box plot

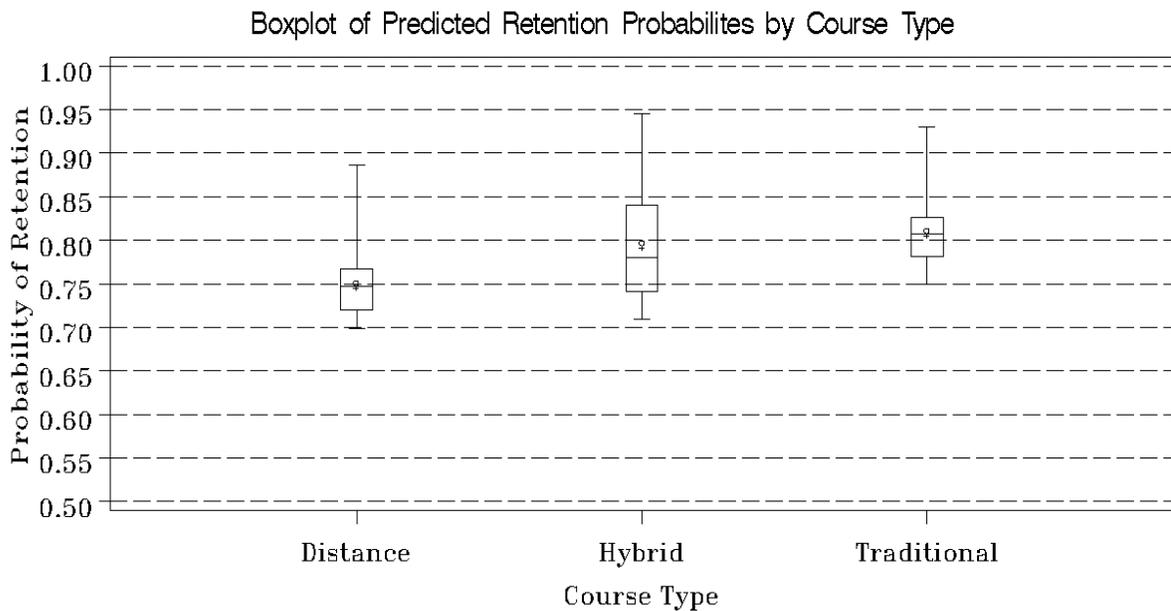


## Retention by Course Type

The first two research questions compare the predicted retention rates across hybrid, distance only, and traditional courses. A box plot provides a visual examination of the results.

1. Is there a significant difference in the retention rates for students enrolled in hybrid courses than those enrolled in distance only courses?
2. Is there a significant difference in the retention rates for students enrolled in hybrid courses than those enrolled in traditional courses?

Table 4.4



The graph in table 4.4 shows that the mean (represented by the small circle) and the median (represented by the middle line of the box) of retention values for hybrid courses are larger than those for distance courses, but smaller than those for traditional courses. However, there is greater variability in the retention rates for hybrid courses as indicated by the size of the box. The data appear to support the alternative hypothesis that hybrid courses have higher

retention rates than distance only courses, but have slightly lower retention rates than traditional ones. To provide a formal test of these hypotheses, a Chi-square test was performed. This test differentiates between random variation and true differences. Since the values for the hybrid courses vary more, the retention rates may not be significantly larger than the distance only courses or significantly lower than traditional ones.

The Chi-Square test for comparing equal retention rates between hybrid and distance only courses versus unequal rates yields a test statistic of 3.08 with a corresponding p-value of 0.0794. Based on this hypothesis, it seems that at  $\alpha = 0.05$  there is no significant difference in the retention rates of hybrid versus distance courses. The Chi-Square test statistic for comparing retention rates of hybrid with traditional courses is 11.87 with a p-value = 0.0006. Therefore it seems that at  $\alpha = 0.05$  the traditional courses have higher retention rates than hybrid courses.

Table 4.5 Retention Comparison by Course Type

Retention	Chi-Square	p-value
Hybrid vs. Distance	3.08	0.0794
Hybrid vs. Traditional	11.87	0.0006

Since subsequent research questions will focus on the effect of gender on retention, the researcher decided to divide this chi-square test by gender to determine if the results would change. If the results are altered, then gender is considered a lurking variable that needs to be accounted for in the hypotheses. Tables 4.6 and 4.7 represent the same box plot in 4.4 but the results are divided by gender.

Table 4.6

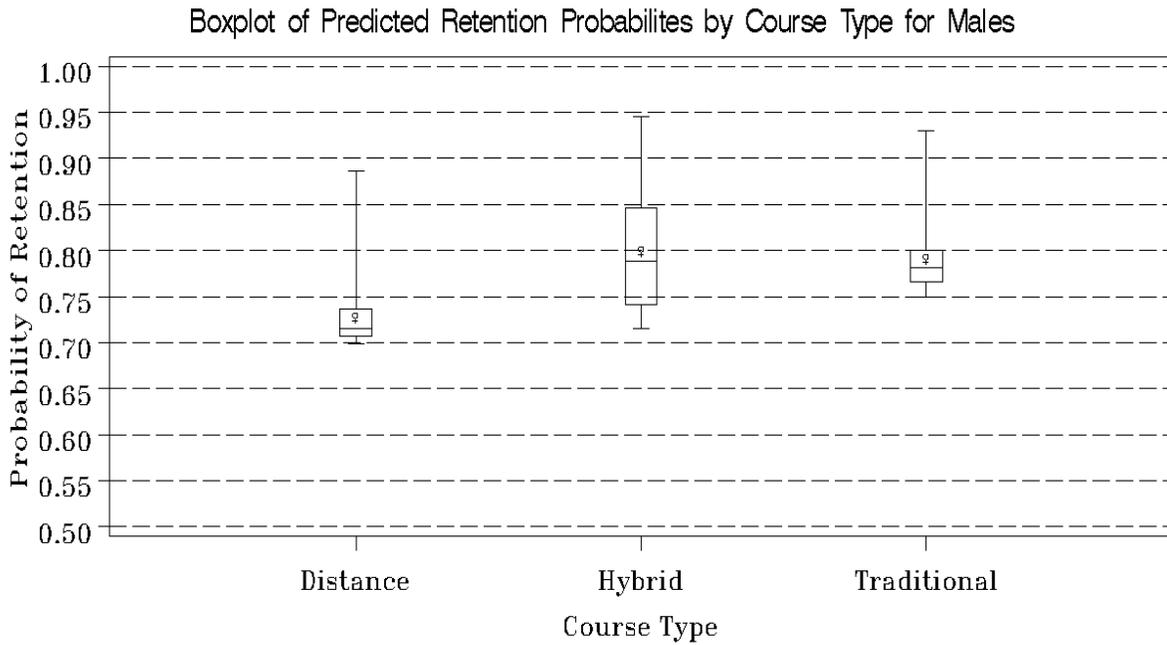
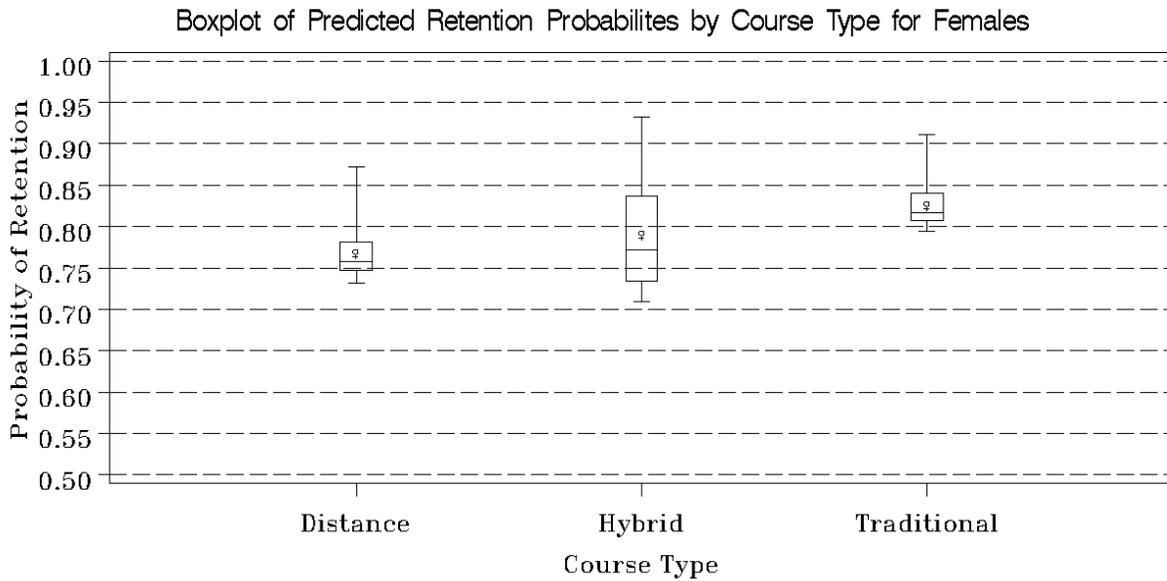


Table 4.7



At first glance, these two box plots seem to reveal comparable results to the combined one previously shown. Notice that the difference in hybrid and distance only courses is larger for males than it is for females. In fact when the hypothesis is formally tested by gender, the results show that there is a slightly significant difference in retention rates for males enrolled in hybrid versus distance only courses. The Chi-Square test statistic for this is 5.15 with a corresponding p-value of 0.0233. The researcher chose a statistical significance level of .05. For females the difference is not significant. The Chi-Square test statistic is 0.02 with corresponding p-value of 0.8873. Notice that the effect is significant for males but not for females, but when aggregated over both genders the effect is nullified. This is an example of a variable lurking in the background and if we fail to take it into account then it results in a different conclusion.

Table 4.8 Retention Comparison by Gender in Distance Only and Hybrid Courses

Retention	Chi-Square	p-value
Hybrid vs. Distance (males)	5.15	0.0233
Hybrid vs. Distance (females)	0.02	0.8873

A second observation is that it is unclear whether there is a difference in retention rates between hybrid and traditional courses for males. A formal testing of this hypothesis reveals a Chi-square test statistic of 1.64 with a p-value = 0.2008. However for females, the Chi-Square test statistic is 13.51 with a p-value = 0.0002. Overall, traditional courses tended to have higher retention rates than the hybrid courses, but when divided between the two genders, it was found

true only for females. There is no significant difference in traditional and hybrid retention rates for males. Again, gender has proven to be a lurking variable.

Table 4.9 Retention Comparison by Gender for Traditional and Hybrid Courses

Retention	Chi-Square	p-value
Hybrid vs. Traditional (males)	1.64	0.2008
Hybrid vs. Traditional (females)	13.51	0.0002

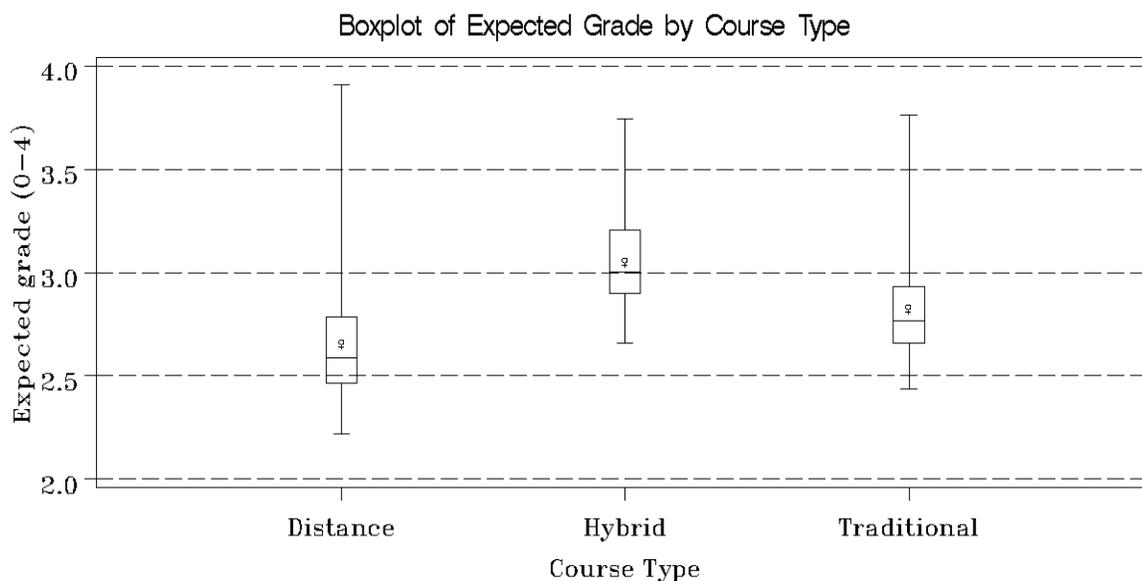
### Grades by Course Type

The next two research questions examine the difference between grades according to course type.

3. Is there a significant difference in the grades of students enrolled in hybrid courses and those enrolled in distance only courses?
4. Is there a significant difference in the grades of students enrolled in hybrid courses and those enrolled in traditional courses?

The following box plot provides a visual of the expected grades by course type.

Table 4.10



It appears that the mean and the median for grades in hybrid courses are greater than those for distance and traditional courses; however, the spread is larger for distance and traditional courses meaning that there is more variability in expected grades for them. When the hypothesis comparing hybrid grades with distance only grades is formally tested, the Chi-Square test statistic is 16.83 with a corresponding p-value  $< 0.0001$ . Therefore, there is a significant difference in grades for students in hybrid courses and those in distance only courses at  $\alpha = 0.05$ . Based on the statistics and box plots, the evidence supports the belief that hybrid courses are associated with higher expected grades than distance courses. When the next hypothesis, comparing hybrid and traditional, was formally tested, the results were a Chi-Square test statistic of 2.29 with a p-value of 0.1299. Therefore the conclusion is that there is no significant difference between the expected grades of students taking hybrid versus traditional courses.

Table 4.11 Grades Comparison by Course Type

Grades	Chi-Square	p-value
Hybrid vs. Distance	16.83	< 0.0001
Hybrid vs. Traditional	2.29	0.1299

Although hybrid looked larger than both distance and traditional courses, there was not enough data, for hybrid, to support the hypothesis. Since there are only just over 1,100 hybrid observations versus over 20,000 for each of the other two groups, it is more difficult to prove significance. When the sample size is smaller, the variation of the estimators is larger. In this case, it was shown that hybrid courses are associated with higher grades than distance courses because the difference was large enough that random variation alone would not explain it. Table 4.12 shows the descriptive statistics for grade point averages by type of course.

Table 4.12 Descriptive Statistics for Grades by Course Type

Course	N Obs*	Mean	Median	Std Dev**
Distance	22010	2.6510047	2.5851022	0.2781827
Hybrid	1440	3.0530877	3.0007510	0.2307992
Traditional	44542	2.8223152	2.7669712	0.2330165

\*Number of observations

\*\*Standard deviation

Before moving onto the next hypothesis, it is of interest (and fairness) to determine if this effect changes by gender, as was the case in the last set of hypotheses. First, consider the box plots in tables 4.13 and 4.14. Gender has been added to the analysis and in this case it is

apparent that for both genders, the hybrid courses have higher expected grades than the distance only courses and traditional courses.

Table 4.13

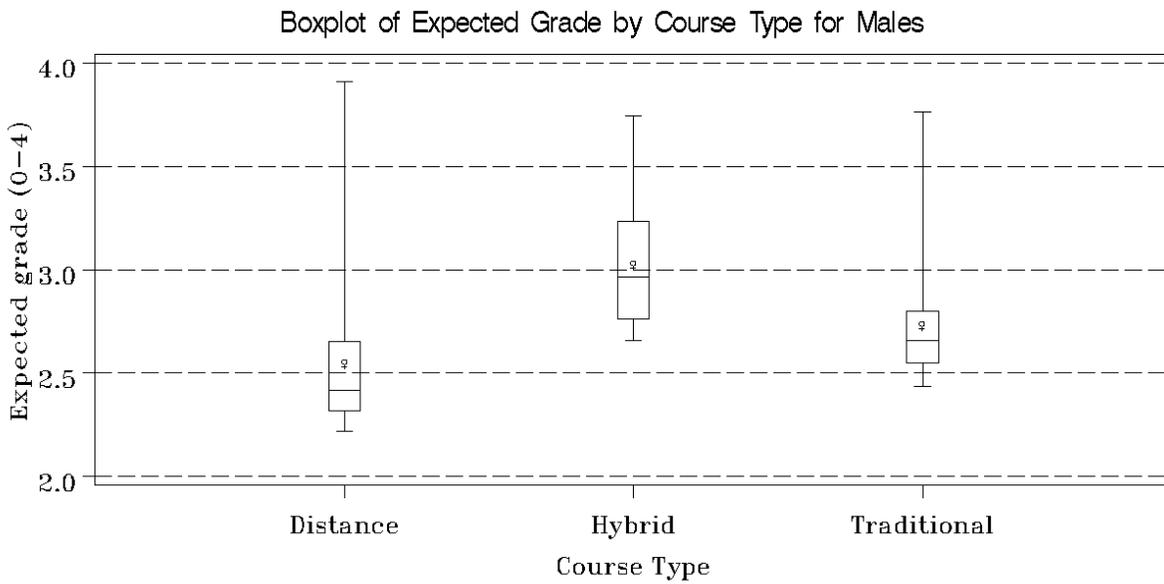
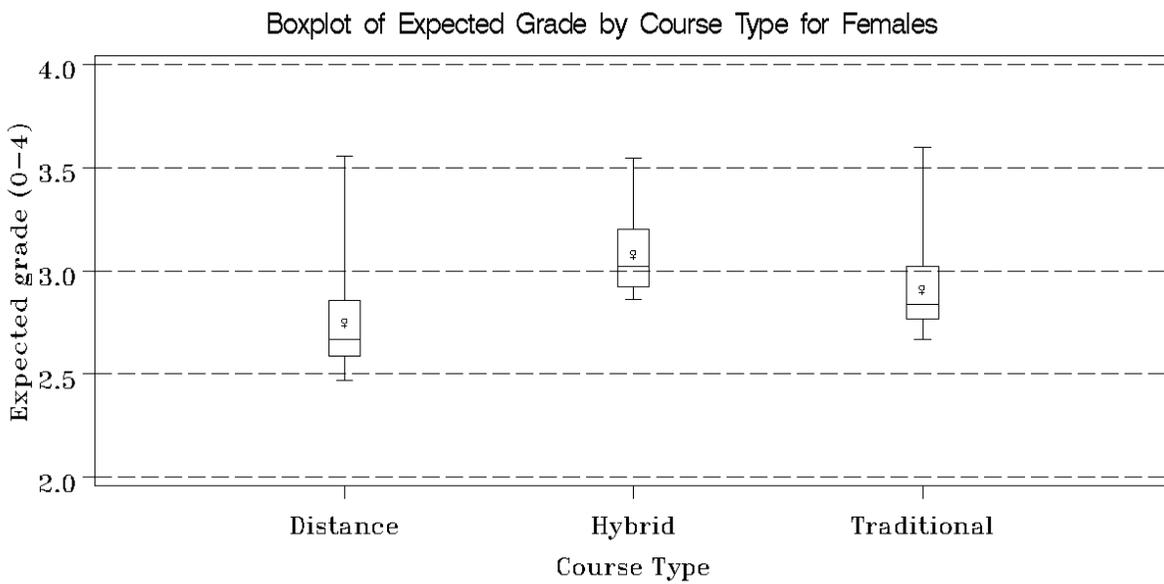


Table 4.14



Since we can visually see that the effects are the same for each gender, it is not necessary to formally test whether the significance changes by gender; however, if we were interested in testing the formal hypothesis then we would find that the Chi-Square test statistic is 0.24 with a p-value = 0.8888. Therefore the previous conclusion that hybrid courses are associated with higher grades than distance courses but not significantly higher than traditional courses is supported for both genders.

Table 4.15 Grades Comparison by Gender

Grades	Chi-Square	p-value
Hybrid males vs. females	0.24	0.8888

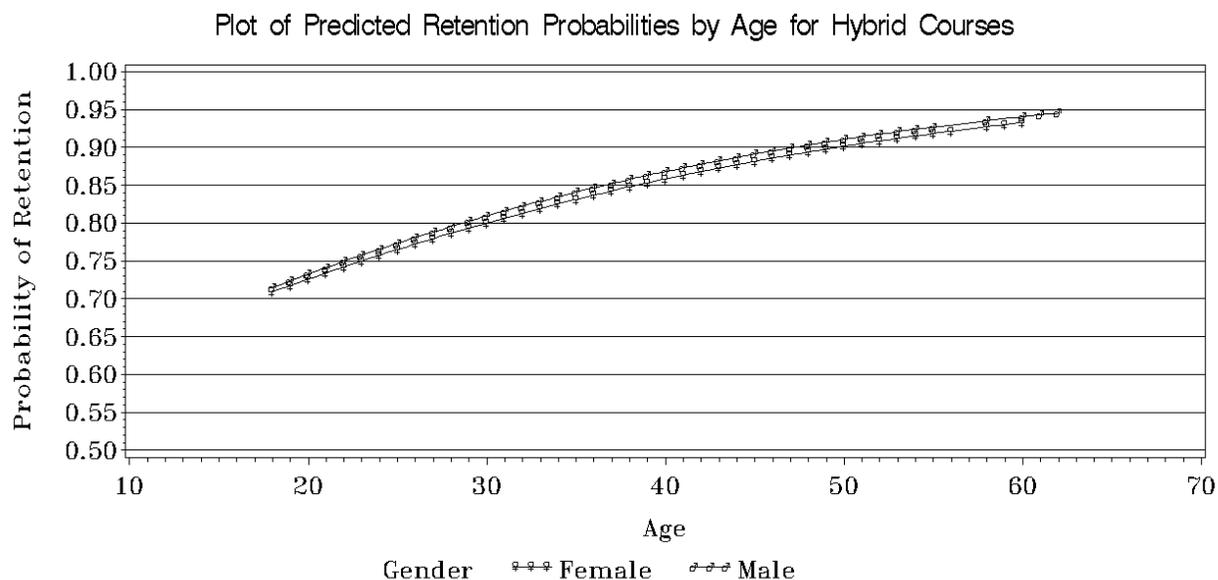
#### Retention by Age and Gender

The next two research questions focus on the relationship between age and retention in hybrid and distance only courses.

5. Is there a relationship between age and retention in hybrid courses?

In the following plot represented in Table 4.16, the relationship between age and retention rates is broken up into gender. The two curves do not look different, but clearly there is a positive relationship between age and retention in hybrid courses. This effect tapers as the students' age increases because the probability is getting really close to 1 but cannot exceed it.

Table 4.16



Visually, there does not appear to be a significant difference between genders because the curves are close but do not cross one another. To be certain of the outcome, both hypotheses were tested. The first hypothesis of interest was to test whether age has a significant effect on retention rates, in general for hybrid courses. The Chi-Square test statistic for this hypothesis is 14.71 with a p-value = 0.0001. As seen in the plot, there is a significant increase in retention probability as age increases. The next step is to determine if this effect is different for males and females. Clearly it is increasing for both, but is it stronger for one gender than another? The Chi-Square test statistic for this hypothesis is 0.03 with a p-value = 0.8734. This indicates that indeed the effect of age is not significantly different for males and females taking hybrid courses.

Table 4.17 Retention Comparison by Age and Gender

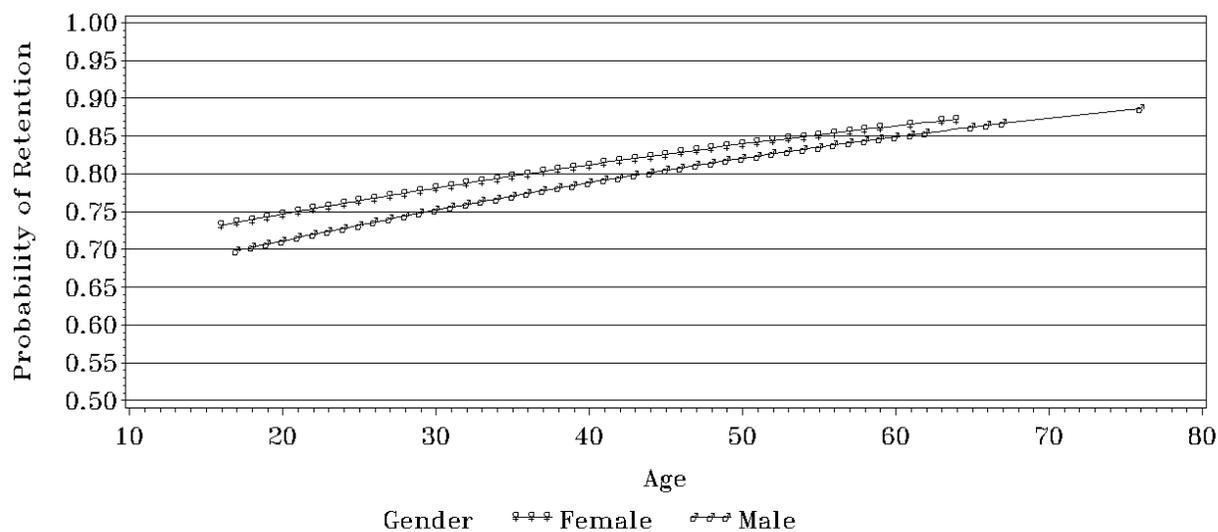
Retention	Chi-Square	p-value
Hybrid courses (By age)	14.71	<0.0001
Hybrid courses (By age and gender)	0.03	0.8734

6. Is there a relationship between age and retention in distance only courses?

The plot in table 4.18 represents the relationship between age and probable retention rates, divided by gender. Again, it is obvious that there was a positive relationship between age and retention probability, but it is less clear if gender affects the outcome. To be certain of the results, these hypotheses were tested formally.

Table 4.18

Plot of Predicted Retention Probabilities by Age for Distance Courses



The plot clearly shows that as age increased, probability of retention increased; however, the rate of increase is larger for males than for females. Also, the effect seems to taper off more for females than males as age increases. The first hypothesis of interest is to test whether age has a significant effect on retention rates in general for distance courses. The Chi-Square test statistic for this hypothesis is 39.24 with a p-value  $< 0.0001$ . As seen in the plot, there was a significant increase in retention probability as age increased. The next step is to see if this effect is different for males and females. The plot indicates that for distance courses, the effect of age seems to change by gender, but is it significant? The Chi-Square test statistic for this hypothesis is 0.13 with a p-value = 0.7199. This indicates that the effect of age is not significantly different for males and females.

Table 4.19 Retention Comparison by Age and Gender

Retention	Chi-Square	p-value
Distance (By age)	39.24	$<0.0001$
Distance (By age and gender)	0.13	0.7199

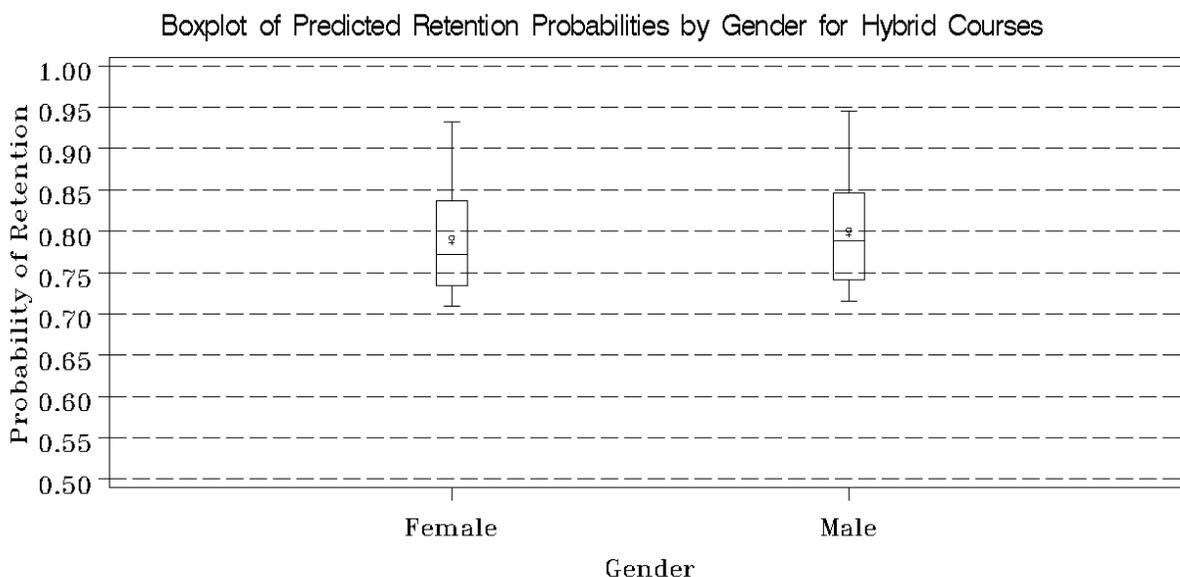
#### Retention and Gender by Course Type

The final four research questions will provide a closer look at the differences between genders when examining retention rates and grades within hybrid and distance only courses.

7. Is there a significant difference between male and female retention in hybrid courses?

The box plot in table 4.20 reveals similar data for expected male and female retention rates in hybrid courses. To determine if a significant difference existed, a formal test was conducted.

Table 4.20



Overall males and females tend to stay in hybrid courses at the same rate and this was confirmed by the formal test of this hypothesis, which yielded a Chi-Square test statistic of 0.12 with a p-value = 0.7299. This does not mean that gender is unimportant in the prediction of retention rates. In hypotheses one and two, we saw that the difference between hybrid and distance only courses or hybrid and traditional courses depended upon the gender of interest. Overall the effects said one thing, but when gender came into play, our results became clearer. Therefore, although males and females do not differ significantly in terms of their overall retention probabilities, gender is still playing an important role when comparing course types. Basically, gender is interacting with course type in such a way that the results change based on which gender is of interest.

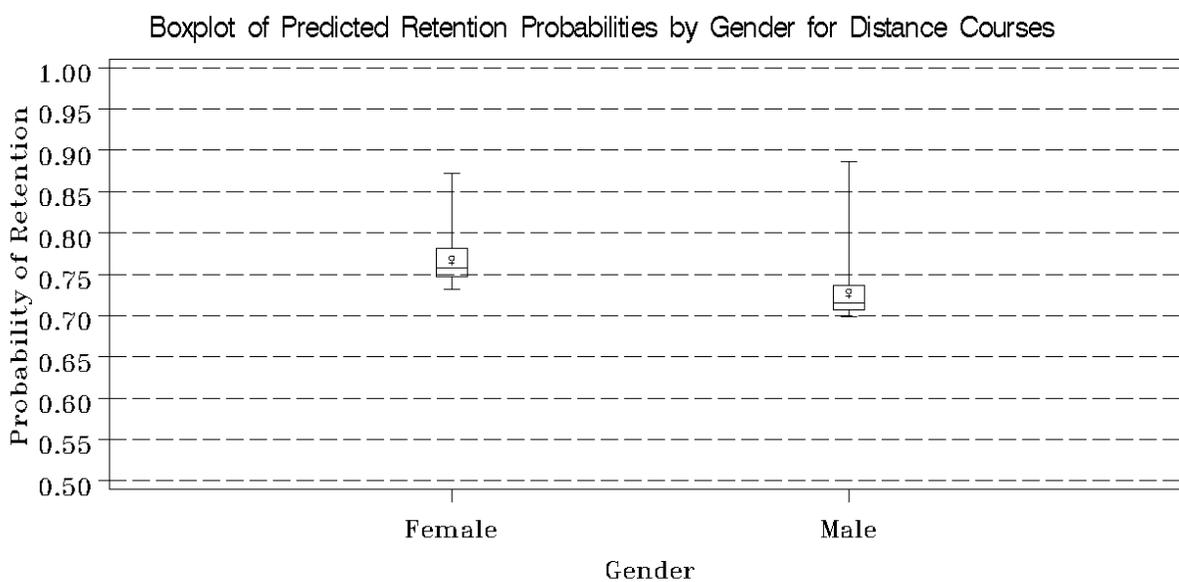
Table 4.21 Retention Comparison by Gender in Hybrid Courses

Retention	Chi-Square	p-value
Hybrid (Males vs. Females)	0.12	0.7299

8. Is there a significant difference between male and female retention in distance only courses?

In table 4.22, it appears that the probability of retention in distance only courses is higher for females than males.

Table 4.22



A formal test reveals a Chi-Square test statistic of 28.88 with a p-value  $< 0.0001$ .

Therefore, we can conclude that there is a significant difference in retention rates for males and

females. As previously mentioned, the box plot indicates that females tend to have a higher probability of staying in a distance only course than males, and the statistical test supports it. This confirms the conclusion in the first research question.

Table 4.23 Retention Comparison by Gender in Distance Only Courses

Retention	Chi-Square	p-value
Distance (Males vs. Females)	28.88	< 0.0001

#### Grades and Gender by Course Type

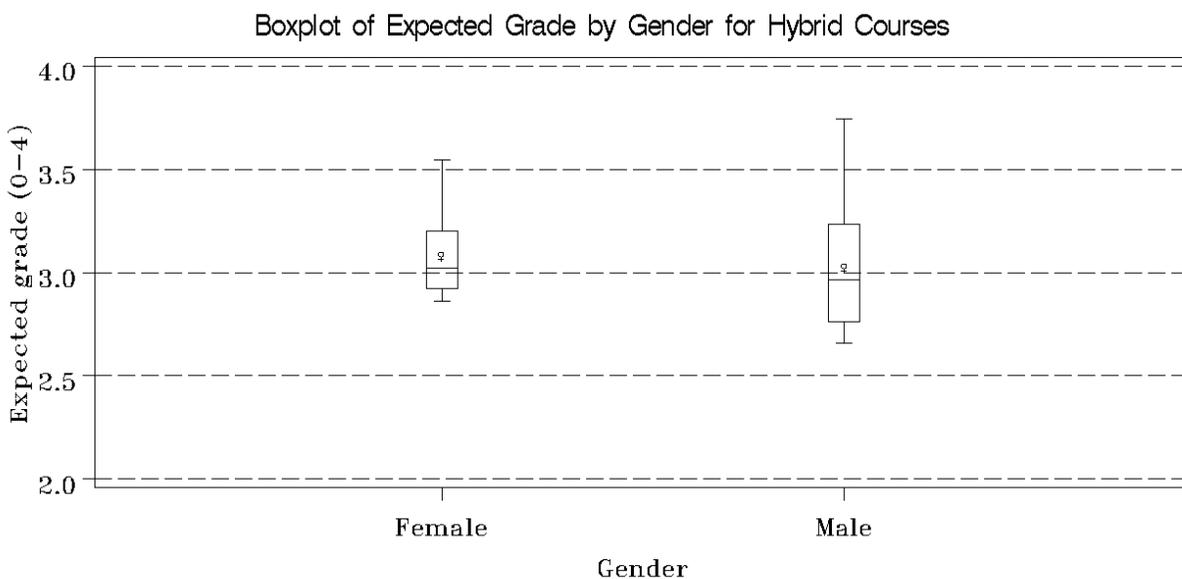
9. Is there a significant difference between male and female grades in hybrid courses?

In the following box plot, it appears that in hybrid courses, females had slightly better expected grades than males, but this could be due to random variation. A formal test of the hypothesis yields a Chi-Square test statistic of 3.89 with a corresponding p-value = 0.0484.

Table 4.24 Grades Comparison by Gender in Hybrid Courses

Grades	Chi-Square	p-value
Hybrid grades (Males vs. Females)	3.89	0.0484

Table 4.25

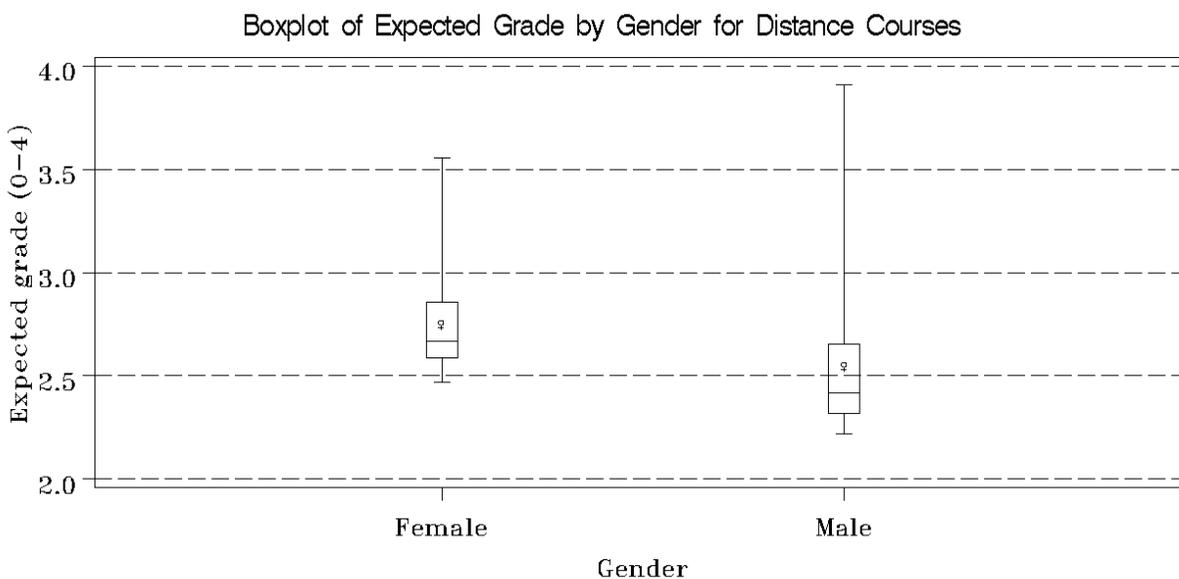


At the  $\alpha = 0.05$  significance level, the null hypothesis is rejected. Based on the box plot in Table 4.25, it seems that the females tended to do better in general, but not by much.

10. Is there a significant difference between male and female grades in distance only courses?

The box plot in Table 4.26 clearly shows that female students earn higher grades in distance only courses than their male counterparts.

Table 4.26



A formal test of the hypothesis reveals Chi-Square test statistic of 83.45 with corresponding p-value  $< 0.0001$ . Therefore, at the  $\alpha = 0.05$  significance level, the null hypothesis is rejected. There is a difference in expected grades of females versus males in distance only courses.

Table 4.27 Grades Comparison by Gender in Distance Only Courses

Grades	Chi-Square	p-value
Distance grades (Males vs. Females)	83.45	$< 0.0001$

Table 4.28 provides descriptive statistics for grades in distance course and hybrid courses by gender.

Table 4.28 Descriptive Statistics for Grades by Gender

Course	Gender	N Obs*	Mean	Median	Std Dev**
Distance	Female	11560	2.7470503	2.6686372	0.2128819
	Male	10450	2.5447570	2.4156089	0.3022767
Hybrid	Female	758	3.0786527	3.0197177	0.1727330
	Male	682	3.0246737	2.9951905	0.2790288
Traditional	Female	23074	2.9080508	2.8392228	0.1888180
	Male	21468	2.7301658	2.6581686	0.2407192

\*Number of observations

\*\*Standard deviation

### Summary of Results

The following table provides a summary of the null hypotheses and respective results discussed in this chapter.

Table 4.29 Summary of Results

Hypothesis	Chi-Square	p-value	Conclusion
1. $H_0$ : There is no significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in distance only courses.	3.08	0.0794	Fail to Reject $H_0$
1a. $H_0$ : There is no significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in distance only courses for males	5.15	0.0233	Reject $H_0$
1b. $H_0$ : There is no significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in distance only courses for females.	0.02	0.8873	Fail to Reject $H_0$

Table 4.29 Summary of Results (continued)

Hypothesis	Chi-Square	p-value	Conclusion
2. $H_0$ : There is no significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in traditional courses.	11.87	0.0006	Reject $H_0$
2a. $H_0$ : There is no significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in traditional courses for males.	1.64	0.2008	Fail to Reject $H_0$
2b. $H_0$ : There is no significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in traditional courses for females.	13.51	0.0002	Reject $H_0$
3a. $H_0$ : There is no significant difference in the grades for students enrolled in hybrid courses and those enrolled in distance only courses.	16.83	<0.0001	Reject $H_0$
4a. $H_0$ : There is no significant difference in the grades for students enrolled in hybrid courses and those enrolled in traditional courses.	2.29	0.1299	Fail to Reject $H_0$
3&4b. $H_0$ : The conclusions from hypotheses 3 and 4 are unaffected by gender.	0.24	0.8888	Fail to Reject $H_0$
5. $H_0$ : There is no relationship between age and retention in hybrid courses.	14.71	<0.0001	Reject $H_0$
5b. $H_0$ : The relationship between age and retention in hybrid courses differs by gender.	0.03	0.8734	Fail to Reject $H_0$
6. $H_0$ : There is no relationship between age and retention in distance only courses.	39.24	<0.0001	Reject $H_0$
6b. $H_0$ : The relationship between age and retention in distance only courses differs by gender.	0.13	0.7199	Fail to Reject $H_0$

Table 4.29 Summary of Results (continued)

Hypothesis	Chi-Square	p-value	Conclusion
7. $H_0$ : There is no significant difference between male and female retention in hybrid courses.	0.12	0.7299	Fail to Reject $H_0$
8. $H_0$ : There is no significant difference between male and female retention in distance only courses.	28.88	<0.0001	Reject $H_0$
9. $H_0$ : There is no significant difference between male and female grades in hybrid courses.	3.89	0.0484	Reject $H_0$
10. $H_0$ : There is no significant difference between male and female grades in distance only courses.	83.45	<0.0001	Reject $H_0$

## Chapter V

### Analysis

#### Overview

The purpose of this study was to determine if the outcomes of hybrid courses were better than distance only courses and at least equal to traditional classroom courses. There has been extensive research on distance learning and increasingly courses are being developed for this method of instruction. The most obvious advantages of distance instruction include flexibility and convenience for both students and faculty.

Where distance education falls short of expectations is in the number of dropouts. In higher education, retention rates are a concern for all types of institutions and with all types of instructional methods, but research has consistently documented that attrition in distance learning is especially high (Berge & Huang, 2004; Carr, 2000; Levy, 2007; Merisotis & Phipps, 1999; Stumpf et al., 2005). The best of both worlds would combine the flexibility of distance learning with the higher retention rates of traditional classroom instruction. This is the idea behind hybrid courses, sometimes referred to as blended courses. Tinto's theory (1975) on student retention explains that academic and social integration are key to student persistence. Do courses have better retention rates when students have the opportunity to interact with faculty and other students in a classroom on campus?

This question was expanded to ten research questions examined in this study. Using secondary data from four community colleges in the North Carolina Community College System, grades and retention rates were measured as outcomes in three types of courses: hybrid, online (distance only), and traditional. Gender and age were also analyzed for potential effect. The questions are as follows:

1. Is there a significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in distance only courses?
2. Is there a significant difference in the retention rates for students enrolled in hybrid courses and those enrolled in traditional courses?
3. Is there a significant difference in the grades of students enrolled in hybrid courses and those enrolled in distance only courses?
4. Is there a significant difference in the grades of students enrolled in hybrid courses and those enrolled in traditional courses?
5. Is there a relationship between age and retention in hybrid courses?
6. Is there a relationship between age and retention in distance only courses?
7. Is there a significant difference between male and female retention in hybrid courses?
8. Is there a significant difference between male and female retention in distance only courses?
9. Is there a significant difference between male and female grades in hybrid courses?
10. Is there a significant difference between male and female grades in distance only courses?

### Conclusions

The conclusions drawn from this study are grouped according the measured outcome.

#### **Retention**

The first and most important question in this study, comparing retention rates between hybrid courses and distance only courses, was answered with a familiar phrase, “no significant difference.” Russell (1999), who wrote the definitive book, and others (Benson et al., 2005;

Hackman & Walker, 1994; Miller & Webster, 1997; Ryan, 2002; Searcy, 1993; Tucker, 2001; Wyatt, 2005; Yaw & Gilman, 1999) have reached the same conclusion many times over when comparing the outcomes of distance and traditional methods of instruction. An alpha level of .05 was used to determine significance for the statistical tests in this study. It should be noted that a p-value of .0794 resulted when comparing retention in hybrid and distance only courses, thus indicating the difference between the two was approaching significance. This could have been the result of a random chance or there could have been a real significant difference in the retention rates, but not large enough to detect with the limited data. Notwithstanding this speculation, the conclusion is that there is no significant difference in the retention rates between the hybrid and distance only courses examined in this study. When compared to traditional courses, the results changed. The fact that traditional courses had higher retention rates than hybrid suggests that blended instruction has yet to bridge the remaining significant difference between instruction in the classroom and instruction online.

When gender was accounted for, male students were found to have greater retention rates in hybrid courses when compared to distance only. Gougeon (1999) provides a possible explanation for this by explaining that men have a fundamental need to acquire and maintain status with others. In a face-to-face environment, men do this by using animation, interrupting, and speaking louder, none of which are available in the online environment (Gougeon, 1999). Hybrid courses may provide enough of the face-to-face environment to appeal to male students. As for the female students in this study, traditional courses were found to have greater retention rates than hybrid. Sullivan's (1999) research on gender differences in online courses could explain why female students had greater retention numbers in traditional courses when compared to hybrid. He suggested that female college students miss the student-teacher interaction of the

classroom more than male students (Sullivan, 2001). Kramarae (2001) observed that women prefer traditional courses, but often their situation makes it difficult or impossible to attend class. For women, hybrid courses may provide the best of both worlds.

In this study, there were slightly more women enrolled in the hybrid and distance only courses. Two research questions specifically addressed gender differences in these courses separately without using the traditional courses as a benchmark. For hybrid courses, there were no significant differences in male and female retention, but for distance only courses, female retention rates were higher. The latter is supported by research that reports an upward trend in female enrollment in distance learning courses (Carswell, Thomas, Petre, Price, & Richards, 2000). A possible explanation for the seemingly contradictory results of this study is that the option of hybrid courses is not widely available.

Student age was also examined to determine its relationship with retention. For hybrid and distance only courses, this study found an increase in the probability of retention as age increases. Foote's (1999) research supported this finding. He concluded, "with respect to age, students between 20 and 24 had the lowest success rates, whereas those between 60 and 64 had the highest" (p. 621). As cited by Levy (2007), Fredericksen et. al. (2000) indicated that "older students appeared to report a higher level of satisfaction from e-learning courses than younger students" (p. 189). Other research has shown just the opposite. Some authors have indicated a decline in retention for non-traditional students (Allen, 1993; Fjortoft, 1995; Levy, 2007; Menager-Beeley, 2001; Weiss, 1999; Xenos, Pierrakeas, & Pintelas, 2002). The reasons range from additional responsibilities to lower levels of satisfaction. There is also literature that suggests age does not impact distance learning outcomes (Tinto, 1993; Tucker, 2001; Zhai & Monzon, 2001). The fact that studies have reached different conclusions on whether age is

positively associated with retention may indicate a need for an intermediate solution such as hybrid instruction. Interaction in the classroom may improve levels of satisfaction while fewer meetings minimize the impact on family, job, and community responsibilities.

### Grades

If students persist, the next measure of success is the course grade. This study showed a significant difference in the grades of students enrolled in hybrid courses and those in distance only courses. Overall, students performed better in hybrid courses than in distance only courses and this lends support to previous research that concluded hybrid instruction methods result in better outcomes (Dziuban et al., 2004; Kiser, 2002; Martyn, 2003). At the core of Tinto's (1975) theory on retention, is Spady's (1971) assertion that interaction with faculty enhances grade performance. Welker and Berardino (2006) reported faculty feedback from teaching hybrid courses. The faculty indicated that they had more in-depth discussions with students and assignments were better organized.

Comparison research on hybrid instruction is relatively new and may never achieve the volume of distance learning comparative research. Russell's (1999) *No Significant Difference Phenomenon* provided an enormous amount of empirical evidence that distance education is comparable to traditional classroom instruction. There are also numerous studies that found distance learning resulted in better grades and higher satisfaction (Hogan, 1997; MacFarland, 1998b; Searcy, 1993; Tucker, 2001).

This study also measured grades by gender in hybrid and distance only courses. Female students had slightly higher grades than male students in hybrid courses. When compared in distance only courses, female students earned significantly higher grades. Spady (1971) attributed female persistence to a greater interest in intellectual development, which would

explain greater levels of achievement. Xenos et. al. (2002) observed that female students were more committed to their course work and therefore less likely to drop out. The same sense of commitment likely contributes to higher grades for women in distance learning.

### Implications for Practice

“It’s a mistake to let the disciplines of instructor led training and e-learning parallel each other when there can be huge gains from integration” (p.57) (Zenger & Uehlein, 2001). This statement rings true for the purpose of this study. Hybrid courses offer the best of both worlds, the flexibility of distance learning and the academic integration of the classroom. The results of this study have not shown a significant difference in retention rates, but hybrid courses did show higher grades and that is a start. The following recommendations for practice might help educators incorporate the best of both worlds in their instructional strategies:

For distance educators:

1. Interact. Educators must find ways to engage distance learners. Wonacott (2002) believes this can be done with the appropriate design and use of information and communication technology. To increase academic integration in distance only courses and the online portion of blended courses, Lim (2002) makes the following recommendations: 1) provide immediate feedback and timely technical support; 2) ask short questions frequently to assess understanding of key content; 3) motivate students and encourage achievement by providing progress reports on a regular basis; and 4) use humor to refresh the learning environment and engage students (Lim, Morris, & Kupritz, 2006).

For the classroom educators:

2. Be flexible. Research shows that community college students who drop out are older than traditional students, attend school part-time and are employed full-time (Weiss, 1999). This study showed a positive relationship between age and retention that could be attributed to the flexibility of online and hybrid course formats. Welker (2006) summarized the advantages of blended learning as perceived by students and found flexibility to be a popular response. The students appreciated being able to work at their own pace and accommodate family demands, work schedule, and distance from campus.
3. Incorporate technology. Dziuban (2004) stated “One of the least mentioned benefits of student participation in web based courses, whether fully online or blended, is the resulting increase in student (and probably instructor) information literacy providing students with new abilities that benefit them throughout their academic and employment career” (p. 3).

For higher education administrators:

4. Develop more hybrid courses. As evidenced in this study, the number of hybrid courses is still small compared to traditional and distance only courses. Greater availability must precede increased enrollment.

#### Recommendations for Research

“A certain anxiety attends the struggle of community-college leaders to respond to a perceived public expectation of expansion and growth. That anxiety is intensified by the fact that online courses show a completion rate which consistently falls below that of traditional classroom courses” (p. 365) (Stumpf et al., 2005). What gets measured gets better. As long as

higher education administrators are faced with retention challenges, there will be a need to research and demonstrate possible solutions. Online courses are here to stay, but because of consistently high attrition rates, they may not reach their full potential in meeting the needs of adult learners.

While the amount of retention research seems endless, it remains a hot topic and a worrisome issue in higher education. As for research on hybrid or blended instruction, we have only just begun to analyze outcomes. Definitions related to this type of instruction are likely to change as advances in communications technology influence the concept of academic integration. Regardless of how it is categorized, hybrid instruction will continue to grow and evolve providing greater opportunities for empirical research. This study highlighted the dilemma of having a small sample of hybrid enrollments compared to larger distance only and traditional enrollments. With greater numbers, the results of comparison research may strengthen the case for hybrid instruction. This research should be both quantitative and qualitative and should include measures of persistence, achievement, and satisfaction.

Quantitative research is essential to higher education administration because often funding is based on what is measurable; however, while numbers may get you money, they will not solve the problem. Xenos et. al. (2002) concluded that a qualitative survey was the best method for identifying and analyzing perceived reasons for dropping out. Qualitative research including interviews with recent dropouts and students enrolled in distance only, hybrid, and traditional classes can bring greater understanding of why certain course types see greater completion rates. Ultimately, the future of hybrid instruction rests on the satisfaction of the students and the degree to which these courses truly represent the best of both worlds.

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