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The Influence of Individual Factors on Web-based Developmental Education Course Success in a Two-year Technical College

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The Influence of Individual Factors on Web-based Developmental Education Course Success in a Two-year Technical College

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ABSTRACT

This study was designed to identify and examine certain individual factors that contribute to Louisiana Technical College (LTC) student success in Web-based developmental education (DE) courses among the academically underprepared students. The independent variables (IV) selected for this study included students' prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT). The dependent variable (DV) was students' course success measured by their mid-term scores (MTSCORE).

Research methodologies included correlational statistics using multiple and logistic regression, and t-test for group comparisons. Data were gathered through an online survey using SurveyMonkey.com from the DE students at LTC that use PLATO Web Learning Network using a survey instrument (WBLSS) designed by the researcher for this study.

The study found two predictor variables, IWF and PAP, to be statistically significant and two variables, MOT and CWT, statistically not significant. Based on the IVs' combined identified relationship with the DV, the researcher designed a predictive model of LTC students' course success in Web-based DE courses. The model employed in this study explained 17% of the variance in the MTSCORE. For many academically underprepared students at LTC, college and career success first depend on their success in the DE courses. Therefore, identifying individual characteristics related to course success is the key to building academic success models for underprepared students at two-year colleges like the LTC.

Key Words

Student Success Developmental Education Web-based Learning PLATO

Underprepared Students Workforce Development LTC WBLSS

CHAPTER ONE: INTRODUCTION

Introduction

Open-access to postsecondary education has been the guiding principle and a major policy among American community and technical colleges. Open-access policies have enabled the two-year colleges to be the point of entry to postsecondary education for many disadvantaged students who wouldn't otherwise participate in any higher education experience (Bueschel, 2003). Many of these students are first-generation college goers, often from the low-income, ethnic minority, or recent immigrant groups, yearning to fulfill their American dream (Cohen & Brawer, 2003). Conversely, open-access policies have also brought many underprepared, at-risk students into the two-year colleges who face a variety of social and academic barriers to succeed in the postsecondary educational settings (Cohen & Brawer, 2003; Grubb, 2001).

To address the issue of underprepared students' academic deficiencies and to prepare them for success in regular college-level courses, community colleges began offering remedial education since their inceptions (Boylan & Saxon, 1999). The traditional remedial courses were designed specifically to compensate for deficiencies in prior learning. Once educational experts began to understand the factors behind successful college performance, which included individual factors like self-confidence, ability, and study behaviors that affect grades and retention, personal and academic development skills were included in the remedial classes (Boylan, 1999). Consequently, according to Boylan, the term "developmental" replaced the term "remedial" among educational professionals and practitioners. Moreover, Baily, Jeong, and Cho (2008) posit that most practitioners in this field use the term "developmental" rather than "remedial" education, referring to its broad array of services to students with weak skills.

Bettinger and Long (2005) posited that remediation has been defined as coursework that is retaken, while classes focusing on new material are called developmental. However, most literature, including various government documents, uses the terms remedial and developmental synonymously. The National Association for Developmental Education (NADE, 2008) favors the term "developmental education" in its various publications; therefore, in this study, the term "developmental education" has mainly been used. Although in certain context, the term "remedial education" has also been used synonymously.

Developmental education, despite its relevance as one of the most important educational issues in America (Astin, 1998), is not without controversy. There has been tension between those who would provide college access and developmental education to the students needing assistance and those who argue that it would lower academic standards of certain institutions (Casazza, 1999). Regardless of the issues of proper place for developmental education within higher education and the methodology of instructional delivery, educating underprepared students for academic success is a significant issue facing today's postsecondary institutions. Training and preparing underprepared students to achieve college-level capabilities is essential for both individual and institutional success. In light of the twenty-first century knowledge-driven global economy, Kuh, Kinzie, Schuh, and Whitt (2005) asserted that virtually all forecasters agree that some form of postsecondary education is essential to become economically self-sufficient in today's competitive workforce.

This study was designed to examine the issue of student success in Web-based developmental education courses in a two-year technical college from the perspective of individual student characteristics. This chapter presents an overview of the study which includes the background of the study, the problem statement, purpose of the study, and the significance.

The research questions guiding this study are presented. Explanations of the variables used in this quantitative study and a brief methodology and definitions of certain relevant terms are discussed. The chapter concludes with a brief discussion on the limitations of the study and a summary of the salient points.

Background

Astin (1998) once described postsecondary remediation as the most important educational problem facing America. A decade later, the level and the dimension of the issue of postsecondary remediation is still startling (Bahr, 2007). The educational quality of the American secondary schools has not changed much twenty-five years after the publication of the "*A Nation at Risk"* report by the National Commission on Excellence in Education (US Dept. of Education, 1983), prompting a new national initiative, "*The High School Redesign Project"* (NASBE, 2008). Now, more students are graduating from high schools that are academically unprepared to handle college-level coursework at the postsecondary institutions. Nationally, 42 percent of all freshmen at public two-year colleges enrolled in at least one developmental course in reading, writing, or mathematics in 2000 (NCES, 2004).

The level of remediation in Louisiana is even more staggering with 66% of the students at public two-year colleges in 2001 needing some form of remediation (Education Commission of the States, 2002). With such alarming statistics and an annual cost of over $1 billion (Bettinger & Long, 2005) for supporting DE programs, the problem of remedial education has been at the forefront of the issues facing postsecondary education in America today.

Kuh, Kinzie, Schuh, and Whitt (2005) have emphasized that in today's highly competitive, global economy, some form of postsecondary education is essential for any gainful participation in the workforce. To participate in any mainstream college-level courses, the

academically underprepared students first have to gain the skills necessary to meet the academic rigors associated with such courses. Successfully negotiating the developmental courses is the first step in such endeavors. The failure to pass developmental math courses before progressing to college-level study presents one of the greatest single stumbling blocks to educational persistence and success (Noel-Levitz, 2006) in American higher education.

The Louisiana Technical College (LTC), with its 38 diverse campuses and over 20,000 students across the state, is engaged in a unique postsecondary educational mission of workforce development for the entire state and the communities that each campus serves (LCTCS, 2007). The LTC is comprised of eight autonomous administrative regions. All the regions, except Region 7, use Web-based developmental education curriculum. The instructions are delivered through PLATO Web Learning Network (PWLN). Students enrolled at the LTC join various programs to earn Associate of Applied Science (AAS) degrees or technical diplomas (TD) and to gain technical skills necessary to join the skilled workforce upon completion.

The problem that the LTC encounters is that one in three students enrolled at LTC needs some sort of remediation (LTC Student Records, 2007). Such a large body of underprepared student population creates serious logistical, financial, and academic challenges for any institution, particularly the LTC. Virtually, no single higher education policy issue has raised as many questions and concerns as the problem of academic deficiency among entering college freshmen (Cohen & Brawer, 2003). It has prompted some states, including Louisiana, to have regulations governing developmental education instruction (Master Plan, 2001).

To address the issue of academic unpreparedness among new students, the majority of the states have mandated assessment and placement testing utilizing ACT, COMPASS or other similar tests. Student placement in the developmental courses at the LTC is based on their

COMPASS test scores. It places students in the appropriate college-level or remedial courses (ACT, 2007). COMPASS is a college readiness test developed by the ACT (2007), a part of the American College Testing (ACT) organization.

Most of the states have relegated postsecondary remedial education to the public, two-year colleges (Ignash, 1997). Lawmakers, accreditors, and other stakeholders are complaining that it is not enough for the community colleges to get students in; they must also successfully prepare and graduate more students with a degree or facilitate transfer to a four-year institution (Ashburn, 2007). Similarly, the Louisiana Board of Regents (BOR) and other stakeholders of the LTC have raised questions concerning increased drop-out and low retention rates in some high demand programs at the LTC (BOR, 2007).

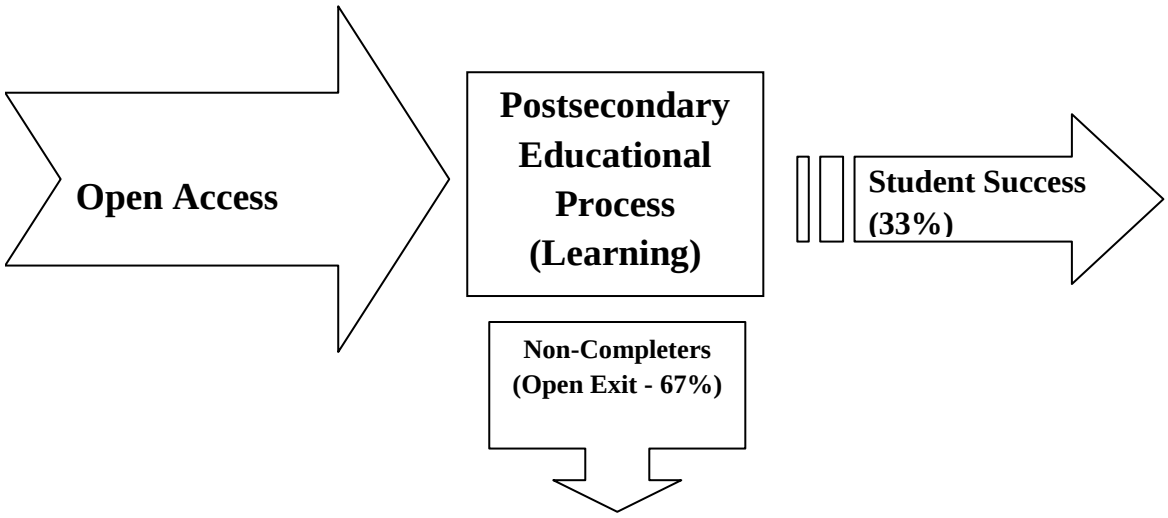


Figure 1.1: The Student Flow Diagram at Two-year Colleges. Data from NCHEMS, 2007

The two-year colleges' policy and philosophy of "open-access and success for all" is somewhat challenging if not impossible to materialize. As the two year colleges admit any student who meets the basic admissions requirements of age and high school diploma or

equivalency, irrespective of their academic abilities to handle college-level courses, the goal of "success for all" is difficult to achieve even though the goal of open-access is met. The two-year college student flow diagram illustrates the issue (Figure 1.1).

The student in-take capacity depicted by the wider pipe on the left hand side of the illustration (Figure 1.1) is much more than the number of students successfully leaving colleges after completion or graduation (33%) as depicted by a narrower pipe on the right hand side of figure 1.1. Another large number of students leave or exit without any credential, a diploma or a certificate (67%), depicted by the pipe pointing downward in the figure. Such exits and "withdrawal of students from a college represents a loss of investment and opportunity to the student, to the institution, and to the state, as there are tangible economic and social costs related to attrition" (Master Plan, 2001, p. 12). According to the Master Plan, the overall graduation rate in public higher education institutions in Louisiana in 1999-2000 was 29%. To remedy such inadequate graduation rates the Master Plan called for its third objective of increasing graduation rates in Louisiana's public higher education institutions to 34% in 2005-2006. A report by the National Center for Higher Education Management Systems (NCHEMS, 2007) puts Louisiana's two-year college graduation rates at 33.7%. Consequently, this puts nearly 67% of the freshmen in two-year colleges as potential non-completers.

To address the issues of open access and help more of their students succeed, community and technical colleges across the United States are embracing new teaching methods and technologies. Most notably, the two-year colleges have turned to the Internet or the Web for viable solutions. Ninety percent of two-year institutions offered some type of distant education courses in the 2000-2001 academic year, and 90% of all institutions offered distant education courses using Internet-based instruction (NCES, 2003).

Following the national model, the LTC has also looked towards the versatile World Wide Web, also called the Web, for effective delivery of its developmental education courses to its ever expanding body of underprepared student population. Accordingly, the LTC implemented a mandatory Web-based developmental education program throughout its 38 campuses in 2004. This mode of self-paced, anytime, anywhere program delivery through the Web is believed to bridge the gap between student access and success. It also promises to serve more underprepared students in the developmental education program with limited classroom resources, thus bringing economic benefits to the college as well. Nearly four years after the start of the Web-based DE curriculum in Fall 2007, Region 7, one of the 8 regions with 5 campuses, decided not to continue its Web-based DE program and opted for traditional classroom-based instructions instead.

The developmental education labs in LTC campuses use the PLATO Web Learning Network (PWLN) programs in developmental math, English, and writing courses for teaching academically challenged students. It also delivers a general science course for the pre-allied health students who are deficient in the required science scores necessary for admissions in the allied health science programs. Additionally, such Web-based instruction is complemented with classroom tutoring for students as needed. LTC's developmental education programs include a demographically diverse student population; the majority of these students are non-traditional, first-generation college students. In this study, non-traditional students may fall into any of these categories: those who are age 25 or older, those who have family responsibilities like dependent children or adults, those who are married, or those who are employed.

Even though research shows how socio-cultural influences create specific developmental needs and interests, and how social factors such as race, class, and gender shape learning (Merriam & Caffarella, 1999), not much research could be attributed to the topic of student

success factors in career and technical education in the two-year college settings. This is specifically true in the context of Web-based learning pedagogy involving developmental education programs in spite of the huge proliferation of online instructions in the two-year community and technical colleges (NCES, 2003).

The identification and examination of the success factors involving career and technical college Web-based developmental courses are of extreme importance to all involved stakeholders. The primary stakeholders are the students and the teachers and the secondary stakeholders are the general public and the state in general. It is especially important when the state is facing overwhelming economic and workforce challenges. Additionally, such a study is even more critical in post-Katrina Louisiana as the state experiences shortages in the skilled workforce in every field. It would also aid in tackling any physical constraints in preparing dislocated students in need of developmental courses in the hurricane ravaged areas. This study was set to identify the success factors in Web-based developmental education courses among the underprepared, at-risk students at Louisiana Technical College. It also put forward a predictive model of course success based on students' individual characteristics.

Statement of the Problem

The problem of educating a growing number of academically underprepared students at the LTC has been of serious concern to all its stakeholders. The issue has taken on a new dimension upon implementation of selective admissions criteria (Master Plan, 2001) in Louisiana's four-year institutions which began in the fall semester of 2005. The BOR mandated selective admissions criteria at Louisiana's four-year public universities has diverted many academically underprepared students to the state two-year colleges, including the LTC.

In an effort to accommodate an ever increasing number of academically deficient students and to streamline the various modes of delivering developmental education courses, contain costs, and standardize the curriculum, Louisiana Technical College (LTC) implemented a Web-based developmental education program in January, 2004, as the only instructional modality for the developmental courses. This approach provided no other options for the academically underprepared, at-risk students at LTC. Despite claims of success (PLATO, 2005) and effectiveness, the success rate is low as evidenced by the depreciative completion and retention rates in the developmental education program (LTC Student Record, 2007) and by the increase in course repeat rates among the students. The lack of any noticeable success in the process of educating the DE students to provide the skills necessary to handle college-level coursework has even led the campuses at Region 7, one of the eight regions of the LTC, to abandon such Web-based DE program, and revert to their traditional classroom-based instructional mode (A Region 7 DE instructor, personal communication, June 10, 2008). On the other hand, the rest of the 33 campuses in seven regions still continue to pursue Web-based DE curriculum using PLATO. Such dichotomous views regarding success in the LTC Web-based developmental education program calls for much needed studies in this important topic of student success in LTC's DE programs.

The low success rates could be the result of student's unfamiliarity with technology associated with the Web-based learning environment or some other student characteristics which play critical roles in their academic success. The examination of the factors and the forces that contribute to student success and subsequent institutional intervention techniques to promote success (Perna & Thomas, 2006) is an area that requires proper study, specifically in the technical college environment. These factors may include individual and institutional

characteristics. Individual characteristics, such as comfort with technology, motivation, prior academic preparation (Hoyt, 1999), goals and commitments, interactions with faculty (Tinto, 1993) are deemed to be significant factors in student success in the traditional learning environment. These individual characteristics may also contribute to the success of the academically underprepared students in the Web-based learning environment at LTC. Therefore, the purpose of this study was to identify and understand the influence of certain individual factors contributing to the prediction of student success in Web-based developmental education courses at Louisiana Technical College.

Purpose of the Study

The purpose of this study was to identify and examine the individual factors that contribute to LTC student success in Web-based developmental education courses. Boylan, Bonham, and Bliss (1997) suggested that grades in developmental courses, among other variables, should be considered when evaluating developmental program outcomes for improvements.

As guided by the review of the literature, the predictor variables to be studied are student's prior academic preparations (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT). The strategy utilized in this study was the Pearson's correlation coefficient statistic to determine the magnitude of the associations between the independent and the dependent variables and to detect the directions of any such relationships that were observed. Additionally, to investigate the differences in course performance (MTSCORE) between groups based on (a) intended program of study, (b) outside employment; the independent sample t tests were conducted.

Another purpose of this study was to validate the researcher-developed instrument, Web-based Learning Student Survey (WBLSS). This instrument was designed to aid in predicting developmental education course success at a two-year technical college based on selected individual student factors.

Research Questions

Based on the review of the literature which mentions individual factors that influence and contribute to student success in general, a primary and two secondary research questions were framed to seek answers regarding the influences in predicting student success in Web-based developmental education courses in career and technical education settings. The primary question guiding this research was: Is there any relationship between the individual factors of students' prior academic preparation, comfort with technology, interaction with faculty, motivation, and students' course performance in the Web-based developmental education courses? The two secondary research questions were:

- Are there any differences in the performance levels among the students in the Web-based developmental education courses based on their intended program of study?
- Are there any differences in the performance levels in the Web-based developmental education courses among the students with employment and no employment?

Significance of the Study

Policymakers, practitioners, and scholars have directed tremendous attention and resources to the goal of improving student success (Perna & Thomas, 2006). Three-fifths of students in public two-year colleges enrolled in at least one developmental coursework (NCES, 2004), and a large number of such students are from the historically underserved populations including first generation, racial and ethnic minorities, and low income families. To prepare

developmental students to succeed in college-level work by creating the necessary environment has profound implications in expanding college access and success.

Even though policymakers and researchers have increasingly turned their attention to student success, most of the research and attention focused on educational outcomes of baccalaureate students and not on students at community colleges (Bailey, Calcagno, Jenkins, Kienzl, & Leinbach, 2005). This is even truer for technical colleges. More specifically, literature on student success in developmental education (DE) in the Web-based environment involving technical and career education can rarely be traced in spite of the huge proliferations of online learning phenomenon in almost every aspect of higher education.

As the LTC has embraced the Web-based mode to delivering quality, skills education for the working adults, including the delivery of developmental education courses to its underprepared students to equip them with skills required for college-level course success, very little is known regarding the issues facing student success in such endeavors. The shifting workforce in the global economy and consequent changes in the configuration of the labor force, to a large extent, determine where learning takes place, what is offered, and who participates (Merriam & Caffarella, 1999). These dynamics have added to the complexity of the issue of student success. Therefore, this research study was intended to fill the gap that exists at the two-year career and technical education arena and to shed some light on understanding Web-based developmental instructions from the perspective of the students whose success or failure is directly related to the success or failure of the DE program itself.

This study could help in identifying and understanding the major factors playing important roles in student success in the Web-based developmental education environment at the technical college campuses across Louisiana. It could also address the vitality or vulnerability of

such methodologies that have currently been deployed at the LTC's developmental education labs throughout the state. The factors identified as enhancers could help in revamping the existing Web-based learning programs, thereby helping student retention and success rates.

Using this study, a model Web-based learning program could be designed and implemented in the Louisiana technical or community college campuses. This study would also help address the void in technical college Web-based learning literature, specifically in the developmental education area from the perspectives and experiences among the academically challenged student population.

Overview of Methodology

Quantitative research methodologies using descriptive and inferential statistics were employed in this study. More specifically, statistical relationships using simultaneous multiple regression involving scaled variables and logistic regression involving dichotomous dependent variable were utilized to identify the individual characteristics and examine their relationship in influencing student course success in Web-based developmental courses at the Louisiana Technical College campuses. Moreover, independent samples *t* tests were utilized to compare variations in course grade between groups. For this study, student success was defined as student's course success in the developmental education courses. Gilbert (2000) posited that variables and strategies for student success should be considered at the individual course or program levels and contexts.

Most of the technical college developmental education students generally take one or two developmental courses in reading, math or English. Additionally, the pre-allied health students take remedial science through PLATO PWLN. For this study, course success, in turn, was defined as passing an attempted course with a grade of an "A", "B", or "C". On the numerical

scale these scores were 90% or above, 89% - 80%, and 79% - 70% respectively. A score between 69% and 60% was given a letter grade of "D". Any score less than 60% was given a letter grade of "F". Both these scores, D and F, are considered unsuccessful in DE programs throughout the LTC irrespective of their intended program of study. The dependent variable of students' mid-term test score (MTSCORE) was self-reported by the students in the numerical form.

The study examined the statistical relationship between the dependent variable of student mid-term score (MTSCORE) in Web-based developmental education courses and the independent variables of student's prior academic preparations, comfort with technology, interaction with faculty, and motivation, as measured by the Web-based Learning Student Survey (WBLSS) scale. The WBLSS scale was developed by the researcher of this study in the absence of any satisfactory scale for this particular study context. As a part of the WBLSS scale development, exploratory factor analysis (EFA) was conducted to explore any possible underlying factor structure for the measured variables.

The design of the study was inferential in nature (Johnson & Christensen, 2000). The review of the literature including certain dissertation abstracts relating to Web-based and e-learning attrition rate and persistence issues provided guidance in developing this investigation. The study utilized the Pearson correlation coefficient statistic to determine the magnitude of associations between the independent predictor variables and the dependent outcome variable and to detect the direction of any relationship observed. The Pearson correlational coefficient statistic is generally used to test theories when researchers collect data to confirm or disconfirm hypotheses (Creswell, 2002).

During the pre-dissertation pilot test, the researcher observed significant variations in students' course grades based on the intended program of study among the developmental

education students. The issue was discussed with some developmental education instructors at LTC, Lafayette Campus who also asserted this researcher's observation. In particular, it was observed that the students whose intended program of study was practical nursing (PN) or health occupation fared better than the non practical nursing (NPN) students as a group. The reason for such variations could be due to the importance of the utility factor of educational programs among the nontraditional students (Bean & Metzner, 1985).

The practical nursing program is one of the most popular, high demand programs on any technical college campuses in Louisiana. It is very much sought after because of the high level of employment opportunities for its graduates in local healthcare and related industries. Moreover, a large percentage of the technical college students intending to study PN are also nontraditional (LTC Student Records, 2007). Therefore, this study also conducted independent samples t tests between the groups of students intending to study PN and the non-PN students to identify if there were any variations in students' MTSCORE between these two study groups. Additionally, t-tests were also conducted among the groups of students with full-time or part-time employment and no-employment to examine if any variation in the MTSCORE existed among these groups. For this research, data was collected online through SurveyMonkey.com using the researcher designed survey instrument. The data collection involved students in the Web-based DE program in all the campuses of the LTC except in Region 7 that does not use PLATO.

Data Source

For this study, the survey population involved the Louisiana Technical College (LTC) developmental education (DE) students that use PLATO Web Learning Network (PWLN) as part of their Web-based DE curriculum. The targeted sample was DE students in all the 33 technical college campuses of LTC with the exception of the 5 campuses in Region 7 (Northwest

Louisiana) that do not use PWLN. For data collection, a Web-based, self-administered, cross-sectional survey was administered using the SurveyMonkey.com online survey tool. The survey was conducted following the mid-term exam in the Fall 2008 semester with all willing participants in the developmental education programs at LTC with the exception of the Region 7 campuses. Using proper protocol and upon obtaining the necessary permission from the LTC administration, the Web-based Learning Student Survey (WBLSS) questionnaire, a Likert type instrument, was administered through the SurveyMonkey.com online survey tool with a conspicuous link to the survey site placed in the LTC's Web site. Several e-mails were sent to the Web-based DE instructors at the LTC campuses giving detailed instructions along with the password for the survey site (Appendix E) for their students to take the survey after finishing their mid-term tests.

The data representing the independent variables were collected using a self-administered questionnaire designed for this survey. The survey data were self-reported by the students. The dependent or outcome variable of mid-term exam scores (MTSCORE) representing the level of performance for each participant was also obtained from students' self-reported data.

Theoretical Models

In conceptualizing this research study, two major component factors were hypothesized to best address the problem of academic success of the underprepared students. One component was the student's individual characteristics and the other was institutional characteristics. Educational researchers have extensively studied the effect of student and institutional characteristics on educational outcomes, such as student success (Bailey et al., 2005). In this study, the major focus was the influence of student characteristics on course outcomes.

Various literatures have studied the issue of student success through the retention lens (Kuh et al., 2006), specifically using Tinto's (1993) student integration model and Bean's (1985) student attrition model. This study included such lenses. A large percentage of the technical college students being nontraditional, Bean and Metzner's attrition model, which studied nontraditional and working students, was considered with special interest. Chickering and Gamson's (1987) seven principles were also utilized in guiding this study.

Literature on student success has asserted that the student's course performance is related to learning. Web-based learning (WBL) effectiveness, which is a subset of learning in general, affects the student's grade or course success. Each of the independent variables, the student's prior academic preparations, comfort with technology, student interactions with faculty and student motivation, are related to student characteristics. In this study, these factors were hypothesized to affect learning, which in turn, influence course success.

Limitations of the Study

The study was limited to developmental education students on 33 campuses of the Louisiana Technical College in seven geographical regions that used the PLATO curriculum for their DE programs. The Web-based courses were limited to developmental courses, including math, English, reading, and science. Therefore, generalization to other institutions and other Web-based courses is not feasible. The possibility of the students to be less forthcoming in their responses to the survey questionnaire, specifically to their self-reported mid-term test scores, could also limit the study. The study was limited to the two-year technical and career education environment. Therefore, the study and its findings cannot be generalized or duplicated in other sectors of higher education without major considerations or limitations.

In spite of numerous variables noted in a host of literatures, this study was limited to only four variables for the sake of simplicity and manageability. This would certainly limit the study's scope. The reliability and validity of the researcher-developed instrument, WBLSS, could impose limitations on the findings of this study.

Definitions of Selected Terms

Asynchronous e-learning: The process of learning online through the internet where the communications or learning does not occur at the same time among all the participants.

Attrition Rate: Failure to complete a course or unsatisfactory outcome of a course attempted.

Blended e-learning: Combining active learning techniques using face-to-face instructions in the physical classroom and distance learning using the internet.

Constructivism: Learning is a constructivist process in which the learner builds an internal illustration of knowledge, a personal interpretation of experiences.

Developmental education (DE): Programs that focus on the whole learner, with the unique blend of academic and personal strength and weakness that each individual brings to the learning process (Ignash, 1997).

E-learning (online learning): Electronic learning. E-learning is a general term that relates to any training that is delivered with the assistance of a computer using the internet.

Individual characteristics**:** Each person's inherent, unique characteristics and observable behavior responsible for an individual's unique learning style and abilities.

Nontraditional students: Working definition includes any of these characteristics befitting a student- 25 years or older, part-time worker, commuter (Bean & Metzner, 1985), married, a parent, a returning student after being out of school (stop-out) for more than one semester, or a student with family responsibility.

Online learning: (Same as e-learning)

Pedagogy: The general art and science of teaching.

Persistence: The result of a student's decision to continue participating in the learning process.

Plato Web Learning Network (PWLN): Designed and hosted by PLATO, Inc., delivers Web-based instructional contents via the Internet that can be accessed by the institutions and authorized students, anytime, anywhere, on and off-campus (PLATO Website, 2008).

Remedial education: Refers to programs that focus on providing remedies for specific deficiencies in reading, writing, and math (Ignash, 1997).

Retention: Continued student participation in the learning process to the point of completion of a course, program or degree.

SPSS: Statistical Package for the Social Sciences (Statistical software for data analysis)

Student characteristic: Individual, personal characteristics of students in their approach to learning and coping with academic requirements.

Student course success: A student earning a passing course grade of C (2.0) or better on a 4.0 scale. The numerical scale: 100-90 A (4.0), 89-80 B (3.0), 79-70 C (2.0). A score less than 70, is considered as failure in developmental education at LTC.

SurveyMonkey: **A** private company specializing in secured survey data collection process which enables users to create their own Web-based surveys. The site is popular with academic research scholars as well as with many Fortune 500 companies.

Traditional students: Students who matriculate into a higher education program following high school graduation.

Underprepared student: Student who lacks the reading, writing, or mathematical abilities or academic skills required to be successful in college-level courses.

Web-based learning: Delivery of lessons using the distributed World Wide Web multimedia platform, a subset of the Internet.

Summary

This chapter introduced the topic of this study, the study variables, its context and the settings. The issue of educating an ever increasing number of academically underprepared students at Louisiana's two-year colleges has taken on a new dimension upon implementation of the BOR mandated selective admissions criteria at the states' four-year, public, higher education institutions. The issue of student success in developmental education courses is more critical now when the state's two-year colleges are experiencing serious budget constraints and accountability issues. Student success in developmental education (DE) courses has also profound implications in expanding college access and success, the two major goals of the two-year postsecondary educational institutions in America. Therefore, it very important to examine, identify, and understand the factors contributing to student success in Web-based developmental education courses that the students experience at the Louisiana Technical College (LTC).

The research questions guiding this study were mentioned. The data sources and the data collection techniques were briefly discussed along with the survey instrument for data collection. The research methodologies and statistical models used in the study were mentioned. The limitation and scope of the study's findings were briefly mentioned. The study may shed much needed light on the subject of Web-based learning practices specific to developmental education at LTC. It may add to the dearth or almost nonexistent literature and knowledge base on the issue of student success in Web-based developmental education in the two-year technical and career education area in Louisiana.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

The main objective of this study was to develop a predictive model of student success for the academically underprepared students in the developmental education program at the Louisiana Technical College (LTC) using individual characteristics as the independent, predictor variables. The modality of instructions in the developmental education courses at the LTC is Web-based. This chapter reviews the literature related to learning theories, learner characteristics, developmental education, Web-based learning, and student success as they relate to the dependent and independent variables of this study.

The overarching theoretical perspectives that inform this study originate from three different areas in the literature. These three areas are developmental education, Web-based learning, and student success. The specific area of interest, student success in the Web-based developmental education courses, has two principal contributing forces. They are the student characteristics and the institutional characteristics. Therefore, the literature on related learning theories and on student and institutional characteristics contributing to student success will be reviewed as well.

Educational researchers have extensively studied the effect of student and institutional characteristics on educational outcomes, such as student success (Bailey et al., 2005) among four-year college students. But the literature is very sparse in the two-year community and technical college arena. In this study, the major focus will be the influence of student characteristics on course success among two-year college students. Since academic achievement in any program of study or course, in general, is a reflection of teaching and learning; therefore, this section begins with a review of the related learning theories.

Learning Theories

Some form of postsecondary education has become a necessity for a majority of high school graduates (McCabe, 2000) to prepare them to live an economically self-sufficient life in today's increasingly complex and challenging global economy. As a result, the college-going stakes are higher today than at any point in history (Kuh, Kinzie, Schuh, & Whitt, 2005). Simply, access to two or four-year postsecondary institutions of higher education does not necessarily lead to success in postsecondary education. Neither does it guarantee an economically self-sufficient life after college. Nevertheless, obtaining a college education holds the key to achieving the American dream and social mobility (Cohen & Brawer, 2003).

In spite of the significant progress in expanding access to higher education for the underrepresented or underprepared students, many of these students experience differential retention rates and inequities in academic achievement (Bauman, Bustillos, Bensimon, Brown, & Bartee, 2005). To address this issue of "open access and success for all," higher educational institutions, specifically the two-year colleges, have developed programs like developmental education to support underprepared students in their pursuit of course success and academic achievements.

Student success in the developmental programs is critical to overall college success. In order to design effective solutions for the at-risk, under-prepared students' academic success, higher education professionals must understand how students differ and what significance the differences have for educational practice (Roberts, 1994). As we look for any viable solutions, theories in human learning and development can provide educators with suitable foundation and framework for meeting the needs of students in general and the needs for the developmental education students in particular (Chung, 2005).

In the absence of any single, comprehensive, theoretical perspective to account for all the factors that influence student success in college (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006), multiple lenses have been invoked by scholars and researchers of higher education to look into the subject of student success in postsecondary education. The issue of student success in developmental education is even more complex. Casazza and Silverman (1996) put forward four major theoretical perspectives that could serve as an overarching theoretical framework for student success in developmental education. These four perspectives are the behavioral, social cognitive, motivational, and adult learning approaches.

In addition, aspects of cognition and instruction relating to individual differences in learning as well as motivational variables are also considered as important factors relating to student success. For more insight into the topic of student success, we look into the learning theories to shed some light on the topic. Each one of the learning theories is a huge topic in itself. This section provides a brief description of the learning theories relevant to the study.

Behavioral Learning Theories

The behavioral theories of learning were the first among the theories to illuminate on the process of human learning. The major traits of the behavioral theories is not that they deal with behavior, since all theories do that, but rather that "they explain learning in terms of environmental events" (Schunk, 2004, p. 29). Schunk mentions B. F. Skinner's operand conditioning, Thorndike's connectionism, and Pavlov's classical conditioning as some of the best known behavioral theories to be most cited in the literature. The behavioral theorists dominated the field of psychology of learning during the first half of the twentieth century. These theories explained learning in terms of environmental events.

The behavioral theorists contend that mental or cognitive processes are not necessary to explain the acquisition, maintenance, and generalization of behavior. These theories, in general, view learning as a process of forming associations between stimuli and responses (Schunk, 2004). The programmed instruction of teaching materials was developed in accordance with behavioral principles of learning. Skinner was a pioneer in developing a teaching machine and programmed instruction. Schunk also stated that the reinforcement perspective of the behavioral theory involves self-regulation, which has three constituents: self-monitoring, self-instruction, and self-reinforcement.

Another famous behavioral theorist was Thorndike. Thorndike's basic ideas about learning include the laws of exercise and effect. The law of effect which emphasizes consequences of behavior is central to Thorndike's theory. Thorndike's law of effect states that responses to a situation that are followed by satisfaction are strengthened and responses that are followed by discomfort are weakened. One of Thorndike's principles of teaching, which is very relevant to technical education, deals with cautioning against teaching content that is removed from its application (Schunk, 2004). According to Schunk, the behavioral theorists' generality of operant conditioning principles has been challenged by the cognitive theorists. The cognitive theorists contend that the explanations of the process of human learning are incomplete without considering thinking or the cognitive side. Bargh & Ferguson (2000) posit that such phenomenon as language, memory, reasoning, and problem solving cannot be addressed adequately without considering thinking or cognitive faculty associations.

Bandura's Social Cognitive Learning Theory

The social cognitive theory stresses the idea that human learning occurs in social environment (Schunk, 2004). Generally, people acquire knowledge and skills by observing

others performing the observed tasks. In putting forward a comprehensive theory of observational learning, Bandura (1986) posited that people could learn new actions merely by observing others perform such actions. Schunk mentions that according to Bandura, human functioning and learning is explained in terms of reciprocal interactions among three entities: behaviors, environmental variables, and personal factors such as cognitions. Bandura called it "the triadic reciprocity model of causality," where these three events operate interactively in the process. The following example illustrates Bandura's triadic reciprocity model.

An example of triadic interactions among behavior, personal factors, and environmental variables can be found in involving students in the developmental education programs. Factors like self-efficacy and motivation are considered to be personal factors. Research shows that positive behaviors such as persistence and time on tasks influence these personal factors. When a student puts forth the required time and effort to persist, he or she gains higher self-efficacy. This leads to more motivation for academic achievement. On the other hand, self-efficacy and motivation, in turn, re-instill and influence positive behaviors such as higher standards and expectations on the part of the student. Personal factors like self-efficacy and motivation are also influenced by environmental variables like mentoring. When an instructor interacts and gives positive feedback to a student, it helps to improve the student's self-worth, motivation, and self-efficacy. These characteristics of self-worth, motivation, and self-efficacy, influence students' behavior and encourage them in putting forth the efforts and time on tasks to achieve their goals.

One of the important constructs in Bandura's theory is perceived self-efficacy (Schunk, 2004), which is a personal characteristic of one's beliefs concerning one's capability to learn or perform actions at designated levels. For example, academically deficient students placed in the developmental education courses are assumed to perform at a different level in academic courses

than students not needing developmental education. The students' scores in assessment tests like the ACT or COMPASS are used to designate their levels of competency in related courses. On the other hand, students also seem to base their skills and proficiency levels on their scores in assessment tests and GPAs. These levels of proficiency, in turn, affect and contribute to their self-efficacy and self-worth, leading students to set their own goals and levels of performance.

Many researchers have tested Bandura's social cognitive theory in a variety of contexts involving cognitive, social, instructional, and self-regulatory skills. According to Schunk, the key processes in the area of self-regulation are self-observation, self-judgment, and self-reaction. Students' motivation to achieve their academic goals is based on the self-efficacy and self-regulation concepts put forward by Bandura. Since motivation is a key factor in accomplishing academic goals and persisting in educational endeavors leading to student success, student motivation is an important construct in this study.

Gagne's Conditions of Learning

The role of technology in the field of educational instructions has grown tremendously in recent time. In higher education, we cannot imagine teaching and learning without the use of technology in general and the internet in particular. It is being increasingly infused into the instructional delivery process. As a result, certain factors or areas are very crucial to examine in investigating the phenomenon of successful learning using technology. Some of these areas include interactions among instructors and learners, learning environment, and learners' perceptions of the learning process. The most well-known theory that addresses these issues is Robert Gagne's conditions of learning. Gagne (1985) contended that learning is complex and learners acquire capabilities which manifest themselves in different outcomes. According to Gagne, the five types of learning outcomes are intellectual skills, verbal information, cognitive

strategies, motor skills, and attitudes. According to Schunk (2004), Gagne's theory incorporates the five important principles of learning and instructional delivery. These elements are learning occurs in phases; skills to be learned are acquired sequentially in small steps; practice, feedback, and review are integral components of learning systems; social modeling is employed during instructional phases; motivation is a function of learner's attitude.

These five elements are very important in designing, implementing, and delivering instructions in Web-based developmental education courses catering to the academically underprepared students at two-year technical colleges. The students in the PLATO Web-based learning lab used by the LTC in the developmental education program are given instruction in phases, in small steps, according to a student's individual pace. A student is not allowed to progress to the next level without mastering the previous levels. Skills development through practice and frequent feedback on tasks by the PLATO program and by the instructor are integral parts of the program. The students' personal characteristics of performing those course-related tasks, coping with technological difficulties and motivation and attitude toward learning play important roles in this study.

Carroll's Model

Another theorist studying student success factors was Carroll. Carroll (1989) formulated a model of learning that posits that students successfully learn according to the amount of time they spend on academic engagements. Academic engagements include the extent of time that the students need to learn a topic. According to Carroll, the degree of learning depends on several individual factors including, the students' aptitude for learning, ability to understand instruction, and time spent on learning. Carroll's models can be adapted to student learning in the Web-based developmental education environment as well. Student achievement and the degree of learning in

Web-based developmental education courses may also depend on the learner's individual characteristics like aptitude, ability, and time devoted to learning course materials as mentioned in Carroll's model of success.

Constructivism

Constructivism is a learning model that has its roots in psychology. Different views can be found in the literature describing the term 'constructivism.' In general, constructivists share the beliefs that learning is an active process of constructing rather than acquiring knowledge. They also believe that instruction is a process of supporting that knowledge-construction rather than communicating knowledge (Duffy & Cunningham, 1996). Constructivism is widely recognized by practitioners of higher education as a teaching and learning process where learners construct their own meaning. According to Duffy and Cunningham, constructivism in education is not new. Various sources suggest that the theory of constructivism in education has been greatly influenced by the works of Bartlett, Piaget, Dewey, Vygotsky, and Bruner.

John Dewey argued against educational frameworks based on memorization of facts and figures and their simple recitation. His new ideas and methods to meet the changing needs of the newly emerging industrial society of the early twentieth century brought the theory of constructivism in education into the limelight (Lefoe, 1998). John Dewey advised that "education is life itself, not just a way to prepare for life." The development of constructivist theories has been strongly influenced by the principles of cognitive psychology. Constructivism attracted more attention by separating itself from the outcomes-based behaviorist theory and it provided a greater degree of autonomy and self-initiative to the learner (Lefoe, 1998).

Constructivism focuses on the experience of the real world. It implies that the meaning of things and events in the world are the interpretations of the individuals rather than their existence

in the world independently (Duffy & Jonassen, 1992). The symbolic meaning of any idea or object is a person's interpretation. The same object or symbol may be interpreted by different groups very differently based on their educational level, knowledge, cultural or national affiliation. Knowledge is related to its interpretation and its associations, just like the adage, "beauty is in the eye of the beholder." Constructivists believe knowledge and understanding must be constructed by the learners.

Further, the constructivists believe that knowledge is constructed subjectively by people based on their earlier learning experiences. The way people reflect and organize their thoughts indicates that knowledge takes different forms (Lefoe, 1998). Accordingly, if the learner acquires the strategies that meet the objectives of learning, then it can be said that learning has occurred. Lefoe also stressed that a rich learning environment is a major goal in constructivism. Major stress is placed on the unique interests, styles, motivations, and capabilities of the individual learners so that learning environments can be customized to suit the individual learners. The customizations of learning suiting individual needs and style have found fertile ground in the World Wide Web with its multimedia rich applications and ease of delivery.

Schunk (2004) suggested that constructivism has found increased applications in socially and culturally situated context of cognition and in technology based education. One such example is the ever expansion in the uses of the Web-based learning environments. Constructivism is the dominant theory supporting the design of student centered virtual and distant learning environments that are increasingly taking on problem-based approach to learning. The problem-based approach to learning involves learner's own interpretation of understanding the problem and designing appropriate solutions to such problems. Web-based learning generally involves active learning which encourages students to find solutions to various

problems. Such solutions may involve the use of search engines like “Google” or “yahoo,” or utilizing other Web-based utilities and resources like the wikis, the blogs, online dictionary, or portals like YouTube. Even at the developmental level, underprepared students use many of these Web-based utilities in their remediation courses.

Duffy and Jonassen (1992) identified three common elements in the constructivist learning process. These elements are the learning context, collaboration, and construction. According to the authors, these factors are crucial to the constructivist learning process. It was further posited that learning should occur in the context to which it is relevant. Knowing how to know is the ultimate human accomplishment (Duffy & Jonassen).

Another major theorist and practitioner of constructivist theories in education was Bruner. Bruner’s (1966) constructivist theory is a general framework for instruction based on the study of cognition. According to Bruner, an individual’s motive and interest for the subject to be learned are the best stimulus to learning rather than any external factors.

Distance Learning Model

The rapid proliferation of the multi-media rich Web-based learning, online, or e-learning phenomenon began in earnest in the later part of the 1990s. Although the concept and practice of distant education or distant learning in itself is not new, learning through the Internet or the Web is relatively a new phenomenon in higher education. Moore and Kearsley (1996) describe distance education as a complex system of institutional, social, technical, and individual components. Therefore, online learning must be understood from the points of views of each of these individual components. Pedagogical principles modified to fit Web-based learning can play crucial roles in effective instruction similar to the traditional classroom environments. The emergence of such pedagogical phenomenon is evident from the proliferation of the virtual

colleges and universities including Louisiana Community and Technical College's own virtual college (LCTCSOnline, 2008).

Many faculty members in higher education institutions including two-year technical and community colleges have incorporated the Web into their classroom teaching in various degrees through learning management systems like Blackboard or WebCT. The pedagogical contents and quality of such courses may vary or in some cases may be insufficient. Bonk and Dennen (2003) posited that to develop critical thinking and effective learning skills among students, instructors need to tap into the new pedagogical frameworks that incorporate the rich constructivist learning environment by utilizing the power of the internet. Simply rushing to put the course contents onto Web sites without regards to any pedagogical changes is not productive or conducive to any form of learning.

Learner Characteristics

Many learning theories and models consider learner characteristics to be very important elements as they affect instruction and student learning (Schunk, 2004). Some of the learner characteristics documented in many learning models include learner aptitude, cognitive styles, personality variables, study skills (Pearson & Royse, 2001) and demographic factors such as age, gender, ethnic background, as well as employment status for nontraditional students.

Aptitude-treatment interaction is a concept that reflects the principle of customizing instruction to important student characteristics (Snow, Corno, & Jackson, 1996). Aptitudes are student characteristics that include abilities, attitudes, and interests. Also included are personality and demographic variables such as ethnic background, socioeconomic status, age, sex, and employment status. Treatments are instructions targeting specific outcomes acknowledging

individual differences in learning styles and other personal characteristics. Aptitude-treatment interactions involve tasks that yield differential results depending on student characteristics.

Cognitive style or individual learning styles have been explored by many researchers. Kolb's theory of experiential learning suggests that students tend to have preferences for one or two of four learning stages: concrete experience, reflective observation, abstract conceptualization, or active experimentation (Pearson & Royse, 2001). A number of learner characteristics and learning styles have been identified in the literature as part of the cognitive style constructs that affect learning and academic performance. According to Schunk (2004), field dependence-field independence is another major style in the cognitive area. The following section describes the concept and implication of this style in learning and student performance.

Field Dependence-Independence

The importance of learners' cognitive styles and the role of field dependence-independence in learning have been investigated by many researchers. Field dependence refers to a learner dependency on external help and field independence refers to learner's autonomy in the learning process or task. Herman Witkin's research on human perceptions in the 1940s first explored the idea of field independence and field dependence based on human perception of the upright (Witkin, Moore, Goodenough, & Cox, 1977). Witkin, et al. identified field dependence-independence to be widely applicable to educational research in describing learner characteristics and their cognitive styles. A number of learner characteristics and attitudes have been established in the literature as part of the cognitive style construct affecting learning and academic performance. In educational research, cognitive styles involving field dependence-field independence has been widely used relating to student characteristics. Other widely mentioned personal factors affecting learning and academic performance are self-efficacy and motivation.

Self-efficacy and Motivation

Self-efficacy and motivation are two important and related factors that affect academic performance and goal achievement among students. Self-efficacy is especially germane to school learning and achievements (Schunk, 2004). Extending his theory of social cognitive learning to include self-efficacy, Bandura (1977) suggested that people seek control over important events of their lives through self-regulation of their thoughts and action. Bandura refers to self-efficacy as one's beliefs in his/her capabilities to organize the courses of action and execute the necessary actions that help in achieving one's desired goals.

The basic processes involving self-efficacy and exercise of control that is associated with it, as posited by Bandura, are setting goals, judging anticipated outcomes for actions taken, evaluating progress in achieving goals, and self-regulating thoughts and actions. These basic processes are also the major characteristics of student motivation. Schunk (2004) asserts that students' perceptions of their progress substantiate their self-efficacy for learning, which in turn sustains student motivation and learning. This validates Bandura's triadic interaction model discussed previously.

Demographic Characteristics

The demographic characteristics of students in terms of age and learning styles has been well documented by Malcolm Knowles (1970) in his illustration of andragogy, the pedagogy of adult learning. The concept of andragogy, introduced from Europe by Knowles, focuses on the adult learner and his or her life situation (Merriam & Caffarella, 1999). According to Knowles, andragogy is based on five assumptions about the adult learner. These assumptions are as follows: With age and maturity, a person moves from dependent personality to a self-directing, independent human being; an adult accumulates a growing reservoir of experience which is a

rich resource for learning; an adult's readiness to learn is in response to his/her social role; adults view the importance of the immediacy of application; adults are motivated to learn by internal factors rather than external ones (Knowles, 1970).

Any instructional design involving delivery of instruction to an adult student population should reflect these assumptions of andragogy. According to a study by Allen & Seaman (2007, p. 2), online or Web-based students "tend to be older and often hold additional employment and family responsibilities, as compared to the more traditional student." This is also the case at Louisiana Technical College where a large proportion of students are of nontraditional age (25 years or older) and work part-time or full-time.

Generally, educational institutions characterize underprepared students as lacking academic skills necessary to carry out any college-level courses successfully. These students are not in control of their academic success. They lack the aptitude and the skills necessary to be successfully engaged in college-level courses. Underprepared students lack self-efficacy and confidence as they are unsure about their abilities to succeed academically. They seem to accept their underachievement as a reality. Darby (2004) asserts that many of these underprepared students adopt a passive rather than active learning style. Darby also states that students who exhibit an active learning style are also self-motivated. They are responsible for their own success or failure.

Developmental Education

Developmental education (DE) is designed to provide students entering colleges with weak academic skills the opportunity to reinforce those skills to prepare them for college-level course work (Bailey, Jeong, & Cho, 2008). The National Center for Educational Statistics (NCES) has defined developmental education as courses in reading, writing, or mathematics for

college students lacking those skills necessary to perform college-level work at the level required by the postsecondary institutions (U.S. Department of Education, 1996). Weissman, Silk, & Bulakowski (1997) also affirm that developmental education programs are designed so that students can gain the skills necessary to complete college-level courses successfully. It includes, among other things, placement, courses, and academic support for remediation and retention of skill-deficient students.

The National Association of Developmental Education (NADE) defines developmental education as "A field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners, at all levels of the learning continuum. Developmental education is sensitive and responsive to individual differences and special needs among learners" (NADE, 2008). Developmental education programs or the presence of underprepared students who do not have the skills necessary to successfully conduct college-level courses is not a new phenomenon (Boylan, 1999). Programs designed to assist underprepared college students have been offered at the post secondary level for over a century. Brier (1984) posited that in 1849, the University of Wisconsin established a college preparatory department for helping students who lacked the basic skills necessary to be successful in the university curriculum. In spite of its long history, the issues regarding the effectiveness and delivery methodologies of DE are a source of contention and public debate.

Roueche and Roueche (1993) described developmental education as college courses that are designed to bring students up to the academic levels necessary to succeed in taking college-level courses. Boylan (1999) posited that traditionally, academically underprepared students were enrolled in what were called remedial education courses to compensate for deficiencies in

prior learning in certain areas like math or English. Boylan further stated that as educational researchers and professionals began to understand the factors behind successful college performance, they recognized that students fail to do well in college for a variety of reasons. The lack of "academic preparedness" is only one of several such factors.

Other factors, such as personal autonomy, self-confidence, ability, study behaviors, or social competence have a great influence on students' grades, retention, and successful course completion (Astin, 1977; Boylan, 1999). Recognition of these factors, Boylan stresses, led to integrating personal development and academic development into remedial coursework which subsequently became known as developmental education. Boylan also points out that there are some institutions where remediation in the traditional sense is still practiced. Such institutions offer only remedial courses. In the case of Louisiana Technical College (LTC), students are encouraged to take personal and academic developmental courses like freshmen orientation (ORNT 1000) or computer literacy (CPTR 1000). Such curricular offerings make its remediation courses truly developmental in nature.

The developmental education (DE) program at LTC is a statewide response to the needs of the academically deficient students who lack the preparations or skills needed to enroll in regular college-level course work. It is one of the largest programs in the state technical college system with nearly one out of every three new students taking some sort of developmental or remedial education courses (LTC Web site). The courses are facilitated through the PLATO Web-based learning network (PWLN) using the asynchronous learning model delivered through the World Wide Web or the Internet, also called the Web.

The developmental education courses at LTC are self-paced. Students are placed in these courses at different academic levels in English, reading, and mathematics, based on their scores

in the placement exams (LTC Web site) which assess students' readiness for college-level work. Additionally, the pre-allied health students who are deficient in science take science as a remedial course to be admitted into the nursing or health occupational programs. LTC conducts and uses the COMPASS test for course placement. Additionally, it also accepts and uses ACT scores for placement. The COMPASS is a comprehensive computer adaptive testing system that is used to place students in appropriate courses (ACT, 2007). The ACT is a college entrance exam which assesses high school students' general educational development and their ability to complete college-level work.

The required minimum ACT test score in math, reading, and English is 18 in each of these subject areas for the Associate of Applied Science (AAS) degree in various programs. The same scores are also applicable for the diploma program in the Allied Health (AH) courses at LTC. The required minimum COMPASS scores for direct college-level course placement are: Math, 48; Reading, 80; and English, 68 (LTC Placement Policy, 2007). These scores are the benchmark for enrolling in the AAS degree level courses. Students need to perform at this or a better level in the entrance tests in order to enroll in the Louisiana Board of Regents transferrable courses (BOR, 2008). Nationally, 42% students in the two-year public postsecondary institution enroll in some form of developmental or remedial education courses (NCES, 2004). In a recent national study, Bailey, Jeong, and Cho (2008) found 59% of the sample enrolled in at least one developmental course. The developmental education enrollment landscape at LTC Lafayette Campus follows a similar, national trend as evidenced from the college enrollment data. Additionally, the issue of developmental education in technical or vocational colleges is more serious as Bailey et al. (2008) claim that students in vocational programs are less likely to progress through their remedial classes than other peer community college students.

Shifts in Developmental Program Settings

The growth of open-access community colleges and the expansion of postsecondary education as a result of the 1965 Higher Education Act opened the doors of higher education to many nontraditional students (Cross, 1976). These institutions have provided many opportunities for various disadvantaged students to pursue higher education where none existed before (Grubb, 2001). Many of these postsecondary students are academically underprepared and belong to ethnic minority, low-income, or first generation college-going population (Cohen & Brawer, 2003). The two-year community and technical colleges began offering developmental education courses since their inception to prepare many of its underprepared students for the skills needed to successfully carry out college-level course work (Boylan, 1999).

In an effort to address the problems of academic unpreparedness among the college-entering students, a majority of states have mandated assessment and placement tests. Many states have relegated postsecondary remedial education to the public two-year colleges (Ignash, 1997). The states and communities across the country are also asking community and technical colleges to take a greater share of developmental instruction (ECS, 2002). More than a dozen states, including Louisiana, prevent or at least discourage public four-year institutions from offering remedial education (ECS, 2002; Master Plan, 2001).

Recent developments in policy changes suggest that more states are moving towards the model of concentrating remediation in the community or technical colleges (Bettinger & Long, 2003). In Louisiana, the issue has taken on a new dimension upon implementation of the selective admissions criteria (Master Plan, 2001) in its four-year institutions beginning the fall semester of 2005. The BOR mandated selective admissions criteria has relocated developmental education from the four-year institutions to the two-year colleges. The shift has placed additional

responsibilities and constraints on the two-year colleges. As a result, the balance between quality and access to higher education has become an issue.

Need for Developmental Education

Astin (1998) described postsecondary remediation as the most important educational problem facing America at the turn of the twentieth century. A decade later, the level and dimension of the issue of postsecondary remediation is still baffling (Bahr, 2007). According to the National Center for Educational Statistics (NCES), 42% of all freshmen at public two-year colleges in the United States were enrolled in at least one remedial course in reading, writing, or mathematics in 2000 (NCES, 2004). Roueche and Roueche (1999) reported that nearly 50% of all first-time community college students test as underprepared for the academic rigors of college-level courses. In a recent study of "achieving the dream project," Bailey, Jeong, and Cho (2008) found 59% of the sample enrolled in at least one developmental course. This figure did not change much during the past twenty years when a National Education Longitudinal Study of 1988 (NCES, 2003) reported 58% of community college students take at least one remedial course. Accordingly, these students are directed to enroll in one or more developmental courses. With such a large number of students needing remediation, developmental education is a serious issue in today's postsecondary education.

Kuh, Kinzie, Schuh, and Whitt (2005) argued that some form of postsecondary education is essential for any gainful participation in the workforce in today's highly competitive, knowledge-driven economy. To participate in any mainstream college-level courses, underprepared students first have to gain the skills necessary to meet the academic rigors associated with such courses. This is particularly true for Louisiana Technical College (LTC) where over one in three new students lack such academic skills.

The LTC's primary goal is workforce development. For its students to remain competitive in a changing global economy and to meet the competencies needed in today's knowledge-driven workplace, students must develop higher-order critical thinking and problem solving skills. For many of its students to be successful in acquiring the technological skills that requires college-level reading and math competencies, the demand for developmental education is very high. This is evident from the ever-growing rosters in the developmental education courses. The need for developmental education is expanding as more and more underprepared and working adults participate in postsecondary education necessitated by the prevailing, complex economic, demographic and social forces (McCabe & Day, 1998).

Related Studies in Developmental Education

Although the concept and practice of remediation has been there over a century, it is only since the years following World War II that a body of research has been developed on the topics of developmental and remedial education (Boylan, Bonham, & White, 1999). Nationally, nearly one-third of the students entering college take developmental courses to improve their academic skills and bring them up to a level to adequately perform in the college-level courses (Bettinger & Long, 2005). Two major studies involving developmental education were conducted by the National Center for Education Statistics (NCES) in the fall of 1995 and 2000. Between the two reports, no differences were detected in the overall proportion of institutions that offered at least one college-level developmental course (NCES, 2004). Among the participants in fall 2000, proportionally more students enrolled in developmental mathematics than any other course. The NCES report also stated that compared to public and private four-year institutions, public two-year colleges were more likely to offer developmental courses through distance education with

25% vs. 8 and 4%, respectively. Additionally, the two-year colleges were more likely to report use of computers as tools for on-campus developmental courses.

The fall 2000 NCES study did not mention any personal characteristics of the participants such as ethnicity, gender, or age. An earlier study from the National Study of Developmental Education (Boylan, Bonham, & Bliss, 1994) reported that about two-third of students in developmental courses were white and one-third were minority, with African American and Hispanic being the two largest minority groups engaged in such endeavors. Boylan et al. also reported that women and men were equally represented in both community college and four-year developmental education programs. The majority of the developmental education students are reported to be adults and nontraditional students. Also, the majority of developmental students, particularly those at the two-year colleges, have part-time jobs. They also often have other adult responsibilities. These factors add barriers to underprepared students' course and college success (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006).

Research regarding the effects of developmental courses in community colleges, which deliver a disproportionate share of developmental courses nationally, is somewhat mixed (Kuh, et al., 2006). Several researchers found students taking developmental courses to positively associate with student retention. Developmental students were more likely to persist in college in comparison to students with similar test scores and background who were not required to take developmental courses (Hoyt, 1999; Bettinger & Long, 2005). The Pell Institute (2004) reported that developmental education courses played an important role in student success at institutions with high graduation rates. Bettinger and Long asserted that remediation appears to discourage students seeking two-year degrees but not students attempting four-year degrees. This finding may reveal why retention rates at two-year colleges' developmental programs are low.

The literature also refers to a number of positive effects of developmental education by various studies on the underprepared and at-risk students. The positive effects of developmental education on student persistence, GPA, and the average grade in the first college-level courses have been asserted (Boylan & Bonham 1992; Gerlaugh, Thompson, Boylan, & Davis, 2007).

Boylan, Bonham, and Bliss (1997) conducted a national study to examine the relationship between various developmental program components and first-term GPA, cumulative GPA, retention and performance in developmental courses. All these program components were found to have some relationship to the success measure being studied. According to Boylan et al. (1997), the program components identified in the study to be associated with student success included the presence of centralized program structure, mandatory student assessment, mandatory placement of student, availability of tutor training, and presence of program evaluation. The data regarding student performance involving retention, first-semester GPA, and success in developmental courses were obtained from individual student transcripts.

Although the study by Boylan et al. (1997) found all program components to have some relationship to the success measure being investigated, the study conducted in 1997 did not look at the effectiveness of the program delivery methodology or its relationship to student success. The program delivery methodology is an important issue for studying program success as more and more colleges offer their programs through the Web. The National Center for Education Statistics (2004) has reported widespread use of online delivery of developmental education courses, particularly in two-year colleges. Some form of studies involving delivery methodologies and their effectiveness in terms of student success is very important. It is particularly important in the two-year technical college domain where there is an urgent need for workforce development to meet the challenges posed by the changing economy.

Starks (1994) argued for research focusing on development of metacognitive skills by learning to monitor comprehension of the developmental students. Since the developmental education students are believed to have not learned or mastered the basic skills in the past with traditional learning methodologies, application of new learning strategies to improve comprehension is particularly important for such students. Starks asserted that programs emphasizing metacognitive skills are more effective for the students who are underprepared.

Cross (1971) cautioned that remediation is a "high risk high stake enterprise." She outlined a solution to reorient students to learning through programs that clearly specified what and how to learn in organized, comprehensive sequences. In dealing with underprepared students, providing ample practices, support, and encouragement are important aspects of learning in the developmental courses. Additionally, Cross stressed the importance of prompt feedback in improving student performance and student-faculty interactions. She also refined her recommendations for supporting developmental learners.

In another comprehensive examination of developmental programs conducted at the University of Texas at Austin, Roueche and Roueche (1999) highlighted the many successful programs that offered multiple learning systems and varied instructional methods. These programs implemented systems to monitor student progress. Such monitoring of student progress also offered chances for timely and needed interventions. These multiple learning systems like CBT and PLATO have been extended to include the World Wide Web. The PLATO Web-based developmental curriculum at the LTC was designed to deliver such functionality.

In a study examining the relationships between student engagement, college GPA, and persistence for 11,000 students attending 18 baccalaureate-granting institutions, Kuh, Cruce, Shoup, Kinzie, & Gonyea (2007) found student engagement in educationally purposeful

activities is positively related to academic outcomes as represented by student grades and persistence. Kuh et al. also found student engagement to have a compensatory effect on first-year grades and persistence, especially for those "who start college with two or more risk factors - being academically underprepared or first in their families to go to college or from low income backgrounds" (p. 23).

Despite the growing debate on remediation and on the issue of an ever-increasing number of underprepared students entering the nation's postsecondary institutions each year, little is known about the effects of remediation on student outcomes (Bettinger & Long, 2003). Bettinger and Long also reported a study by the Ohio Board of Regents, which found that almost 40% of remedial math students never take an additional math course and are less likely to succeed in subsequent math courses. Bettinger and Long further contended that the lack of any analysis on the effect of remediation is likely due to the absences of proper student-level datasets that would shed light on the issue.

An ideal student dataset for a successful developmental program should contain extensive information on a student's background, prior academic preparation and performance, and their experiences with remediation (Bettinger & Long, 2003). This scenario is very typical to the developmental program at the Louisiana Technical College. The author of this study believes that an extensive dataset on a student's background and individual characteristics along with an insight into the student's experiences in the program would shed much needed light on what needs to be addressed to make success for all a real possibility.

Use of Technology in Developmental Education

Although the use of instructional technology in the delivery of developmental education is not new, the use of the Web as the primary mode of developmental education course delivery

is a relatively new phenomenon. According to an NCES (2003) survey, between 1995 and 2000, 25% of two-year public colleges offered some developmental courses through distant learning. It included simultaneous real time or synchronous delivery and a non-simultaneous or asynchronous (store and retrieve) method of course delivery mainly through the internet or compressed video. The most recent NCES study on distant education found that in the 2000-2001 academic year, 64% of the Title IV, two-year and four-year institutions offered some remedial education courses through the internet (NCES, 2003).

Web-based instruction provides a new educational opportunity, offering greater accessibility and availability. Such courses are helpful to students with jobs and family commitments (Fogg, 2007). They are best for students who are self-motivated, independent learners, willing to pursue knowledge actively. It seems to be an appropriate fit technology for the community and technical colleges as they have a large number of nontraditional students. Additionally, this technology accommodates the large population of underprepared students who need developmental education.

Boylan, Bonham, and Bliss (1994) reported that most developmental students fall in the 18-24 year old or traditional-age bracket. The report had slightly more female than male students enrolled in developmental education classes. Boylan et al. suggested several variables should be considered when evaluating developmental program outcomes including course completion rates, grades in developmental courses, and grades in follow-up curriculum courses to improve such programs. But, these studies were mainly based on four-year colleges. The composition of DE student demographics in a community or technical college will be much different than that in four-year colleges as usually seen in most past research studies.

While many underprepared students lack the necessary basic literacy as well as higher order thinking skills, today's workplaces often demand high levels of both skills sets. Economic, organizational, and technological forces have changed the nature of most workplaces which demand employees to have basic problem solving skill that involves manipulation or operation on previous knowledge and skills. Developmental education course offerings and methodologies should impart problem solving skills to all students.

The PLATO Web Learning Network (PWLN) has been adopted as the standard curriculum for delivering developmental education courses at the Louisiana Technical College (LTC) campuses since the fall semester of 2003 (PLATO, 2005). PLATO instructional technology software has been used extensively in remedial education in many higher education institutions over the past forty years "to ensure the success of all learners throughout their lifetimes" (Plato Web Learning Network, n.d.). PWLN is a Web based portal that uses the internet as its primary developmental instruction delivery mode. It is used widely on many community college campuses including Miami-Dade College (MDC), Miami, Florida, one of the largest and most diverse community colleges in the country serving more than 163,000 students each year in both credit and noncredit courses (Quinn, 2003). Quinn reported that at MDC, use of PWLN showed a positive relation to the score gained on the Computerized Placement Test (CPT) retake for developmental math, elementary algebra, and reading courses. At the LTC and a few other LCTCS campuses, PWLN is mainly used as the primary skill development system in the developmental education program.

In spite of reported greater positive effects of computer-based instruction with college-aged and adult learners, regardless of their achievement levels, such claims are not clear when it comes to Web-based instruction. Clark (1983) contended that there was no simple answer to the

question whether Web-based instructions improved learning in developmental education courses. The lack of any study on Web-based developmental education at the technical college level adds to much confusions regarding student success in such environments.

There is a dearth in the amount of research that has been done involving developmental education at the Louisiana community and technical colleges, especially in the area of Web-based delivery mode of developmental education. The current implementation of PWLN was initially done in 2003 in a majority of the LTC campuses without any known, published study or survey. Currently, there is no alternative to the PWLN in its developmental course delivery in 33 campuses of the LTC. The five campuses in Region 7 opted for traditional instruction after four years of experience with Web-based PWLN. There is no proper comparative study or data available in terms of student retention and successes involving the traditional instructor led developmental education courses and the newly adopted Web-based developmental education courses. Because the Web-based developmental instructions are relatively new, very little research could be located regarding its pedagogical values or student success issues in this learning environment except on the technical papers on the PLATO learning support Website. That information also is inadequate.

Web-based Learning

The rapid proliferation of the Internet and the increased everyday use of the Web by ordinary people worldwide have transformed the way people live, learn, and communicate. Among many of the Web's uses, education has become a major player enabling learners to receive and interact with educational ideas, materials, and resources. Exploring the factors influencing students' success in Web-based courses, Chen and Lin (2002) asserted that student background, learning strategies, academic self-concept, study habits, attitude, and devotion to

studies are associated with academic achievement. Web-based learning can be defined as the use of the multimedia rich Web in communicating and delivering instructions to an intended learner. The terms “online education,” “electronic learning,” or “e-learning” all refer to the act of teaching and learning through the use of the internet (Online dictionary, n.d.). In the context of online education, the traditional classroom instruction is generally referred to as on-ground education.

Various concerns about Web-based learning have been noted. One of the concerns facing Web-based education is student attrition, which is evidenced by the concerns of several postsecondary educational institutions (Carr, 2000). Compared to traditional classroom courses, Carr reported higher attrition rates in distance education courses in many American colleges and universities, including the University of Central Florida, the Dallas County Community College, and Tyler Junior College. Another issue with Web-based learning involving academically underprepared students is the lack of comprehension. Students who lack reading comprehension skills in the traditional classroom instruction may find it harder to understand the instructions and the contents in the Web-based environment in the absence of proper direction and personal instruction from a classroom instructor.

Perez and Foshay (2002) posited that developmental studies, by any definition, involve students who have not succeeded in conventional campus classroom activities. Therefore, Perez and Foshay suggested that it is possible that these academically challenged students may be able to learn and successfully pursue their higher education or career goals if they could be brought into the academic mainstream through the use of new media or format of education that meets these learners’ needs using the ubiquitous Internet or the Web. Some researchers contend that as the higher education institutions look towards online course delivery to cover a larger student

body including the non-traditional and the academically underprepared students as a solution to the increasing financial and logistical constraints, the quality of instructions, student retention and success may be compromised in the process.

Unlike pure online learning, the LTC's Web-based learning students generally have optional added benefits of tutorial help from their instructors or facilitators. Receiving instructional material is not confined to classroom computers. In essence, the Web-based learners have the added benefit of learning anytime, anywhere. Garrison, Kanuka, & Hawes (2002) asserted that the methods of instructional delivery through the Web or the Internet in higher education result in the reduction of seat-time, which in turn, help serve more students with less physical facilities. Globalization and infusion of new technologies are changing the higher education landscapes in America. The changing structure and practice of higher education and the transformations in delivery of instructions is blurring the distinctions between traditional education and distance education (Burbules & Callister, 2000) resulting in changing faculty roles and student-faculty relations.

The effect of online learning or e-learning on student success is a phenomenon that is not fully understood. Limited resources and studies have been employed to examine the impact of online education on students (Ury & Ury, 2005). Significant differences between online and face-to-face learning were observed at the University of Paisley in Scotland, with online students outscoring face-to-face students (Stansfield, McLellan, & Connolly, 2004). On the other hand, a study at Michigan State University, where researchers compared student performance in classroom and online courses in "Principles of Microeconomics," found online students to fare significantly worse on most complex material (Brown & Liedholm, 2002). Another study conducted over a period of five-semesters at Indiana State University involving undergraduate

students in a business statistics course found no significant difference in performance among students who completed the course online or through traditional classroom instructions (McLaren, 2004). These findings from four-year institutions discussed here send conflicting claims and messages regarding the effectiveness and learning outcomes of various online instructional modalities.

One major area of difficulties involving online learning is noticed in complicated technical projects involving students who need one-on-one assistance in performing specialized tasks (Ury & Ury, 2005). These types of one-on-one help are usually necessary for the underprepared developmental education students. Similar help is also necessary for project-oriented, skills-based technical education that Louisiana Technical College delivers for workforce preparation. For example, at times, developmental education students find themselves stalled in certain difficult areas of math or science while studying online. Without proper intervention and guidance in such situations, students may get frustrated. Such repeated problems may frustrate students to the point of quitting. Timely intervention and instructional help usually alleviate such issues. Healthy interactions between instructors and students create a positive environment where students do not hesitate to ask for help in difficult situations. This also helps enhance student motivation.

Wojciechowski and Palmer (2005) conducted a study of online community college business students examining the relationship between community college students' success in online courses and their demographics and learner characteristics. The authors found positive, significant correlations between student grades, attendance in orientation sessions, placement test scores, and previous online course taking and course success. Wojciechowski and Palmer asserted that learner characteristics are helpful in predicting online course success.

Student Success

Defining student success is one of the most difficult tasks in higher education as it can present a multifaceted perspective. Given the strong demand from various stakeholders to demonstrate evidence of student success in postsecondary education, multiple definitions of the term "student success" have been constructed (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006). According to Kuh et al., although many consider degree attainment to be a definitive measure of student success, other quantifiable attainment indicators, such as enrollment in postsecondary education, grades, persistence to next levels and obtaining certification are also commonly used as measures of student success.

Students attending two-year colleges pursue a range of goals including, transfer to four-year colleges, obtaining industry certifications, earning an associate degree, or obtaining job-related skills to be gainfully employed. Therefore, student success at two-year colleges may differ than at four-year colleges. Kuh et al. assert that student success can also be defined using traditional measures of academic achievement like test scores in standardized assessment tests, college grades, and credits earned, or post college employment and income. For this study, student success in developmental education courses was related to passing grades, a grade of C or better in the traditional grading scale in the mid-term exam. In terms of numerical score, students achieving a score of 70% or more in the mid-term exam (MTSCORE) were considered successful. In a study by Gilbert (2000), it was argued that variables and strategies for student success should be considered at the individual, course, or program levels and contexts. Successful outcomes in developmental education programs are dependent on individual and institutional characters (Bailey, et al., 2008). The following section discusses some of the theoretical models related to this study.

Theoretical Models

Student success is a complex subject which requires multiple lenses to study. Berge and Huang (2004) stated that no one simple explanation or model exists, which completely explains student success in terms of course or degree completion. Success in developmental education courses in the traditional and Web-based learning environment can be drawn and adapted from often cited theories pertaining to student success. Most of these success theories are based on the retention or persistence models, or on achievement motivation models. As Pascarella and Terenzini (2005) asserted, the best predictors of whether a student will graduate or not are academic preparation and motivation. Among these well known theories, Tinto's (1993) model, Bean and Metzner model (1985), and Weiner's attribution theory, can be adapted to study the issue of student success in Web-based developmental education. Additionally, Chickering and Gamson's *seven principles of good practice in undergraduate education* are the most useful and cited principles in student success. These models and theories were guided this study.

Tinto's Model

Tinto's (1975, 1993) model of student departure is one of the most widely recognized and cited models on student persistence. Tinto's model illustrates that effective student persistence is dependent on strong institutional commitment to quality education and on students' social and academic integration with the campus community. Tinto posits that students go through various stages of change as they enter college. First, they must separate themselves from prior pre-college group, undergo a period of transition, integrate into the new college environment, and adopt the normative values and behaviors of the new collegial group (Kuh et al., 2006). Students, who leave college early, voluntarily or involuntarily, are unable to effectively negotiate such changes or go through such transformations.

Tinto's pre-entry student attributes which include family background and prior academic skills and abilities can be adapted to the conceptual model for this study as they relate to student characteristics variables of prior academic preparation and certain demographic variables. Certain elements from Tinto's model, like student's intention and goal commitment, as well as institutional experiences like academic integration through student-faculty interaction can be adopted into the conceptual framework of this study. These elements are goal commitment, a motivation construct, and student-teacher interaction attributes contributing to student characteristics. According to Tinto, all these variables play important roles in student persistence, which is a measure of student success (Kuh et al., 2006, p.5).

Although Tinto's model is generally applied to traditional students in four-year colleges, Tinto (1993) addressed the added difficulties of the students "whose prior academic training has not adequately prepared them for college-level work" (p. 163) while discussing the transitional issues of the first year students. Developmental education is a serious transitional issue (Tinto, Kuh et al.). Tinto's model thus incorporated the developmental students' academic and social integrations as well. However, Tinto's model of academic and social integration may not be equally applicable to all students in its entirety, specifically for the nontraditional community college students. Still, certain aspects of the model, like student-faculty interactions, are applicable in part.

Bean and Metzner Model

The issue of the nontraditional student persistence was studied by Bean and Metzner (1985). Bean and Metzner' model recognized that the nontraditional students are more affected by the external environment than by the social integration variables affecting traditional student attrition. Their attrition model was based on non-traditional aged students and part-time or full-

time working students. This model fits well with the two-year community and technical college students since non-traditional students are particularly likely to choose two-year institutions (NCES, 2002).

Bean and Metzner's model posits that non-traditional students are less influenced by social integration and they place more importance on the utility of education. Therefore, the academic performance or achievement levels are more dependent on such students' perceptions of the utility value of the education or training being received. This is particularly important in case of the technical college students where many nontraditional students come for obtaining the skills and training they perceive important in their future employment.

Bean and Metzner's (1985) model also plays a significant role in the realm of distance education as "moderately or highly nontraditional students are more likely than other students to participate in distance education" (NCES, p. 10, 2002). Bean and Metzner's modifications of Tinto's theory make very good sense since nontraditional students are more likely to pursue postsecondary education to train for new jobs or gain skills for professional advancement (Meyer, Bruwelheide, & Poulin, 2006). Such students are more focused on achieving their goals.

Grosset's (1991) study involving community college students found that study skills are essential for the academic success of older, non-traditional students. According to Grosset, study skills are the most important predictor of attrition for older students. Goal commitment is important for persistence for all students. In Bean and Metzner's conceptual model of student persistence, academic variables such as grade point average, utility of learning materials, and environmental variables such as employment and finance play important roles among the non-traditional students. The following section briefly looks into the motivational aspects of student success as found in the literature.

Motivational Aspects

Motivation is essential for learning. Educators and psychologists have long considered the important role motivation plays in student achievement and learning. The role that motivation plays in student success in a self-directed, Web-based learning environment is even more crucial. Chang (2005) concurs that motivation is the factor that arouses, directs, and sustains increased performance. Learners with high motivation, self-confidence, a good self-image, and a low level of anxiety are better equipped for success. Chang further argued that low motivation, low self-esteem, and debilitating anxiety, on the other hand, can combine to raise a learner's affective filter and form a mental block to impede knowledge acquisition.

Linnenbrink and Pintrich (2002) pointed to several research studies focusing on how motivational and cognitive factors interact and influence student learning and achievement. Linnenbrink and Pintrich also stated that students need both the cognitive skills and the motivational will to do well in school. The many assumptions and aspects of student motivation as an academic enabler include self-efficacy, attributions, intrinsic motivation, and goals. Additionally, motivation is not a stable trait of an individual, but is more situated, contextual, and domain specific. It means that student motivation is inherently changeable and sensitive to the context and the learning environment. According to Linnenbrink and Pintrich, this aspect further suggests that instructional efforts and design can make a difference in motivating students for academic achievement and success.

The attribution theory, which focuses on understanding why events occur, is an important field of research on achievement motivation (Graham & Weiner, 1996). Attribution theory suggests that when a failure or success occurs, individual will analyze the situation to determine the perceived causes for the failure or success (Weiner, 1974). These causes may be

environmental factors or personal factors. The personal factors include lack of knowledge, ability, or skill. According to the attribution theory, it is the individual's focus on why success or failure occurred that explains specific psychological outcomes such as future expectancies and self-efficacy. According to Weiner, psychological outcomes have been further linked to behavioral outcomes such as engagement and achievement.

The concept of intrinsic and extrinsic motivation is quite prevalent in psychology and education. Intrinsic motivation is a motivation to engage in activity for its own sake, whereas extrinsic motivation refers to motivation to engage in an activity as a means to an end (Pintrich & Schunk, 2002). Intrinsically motivated behavior is associated with interest, curiosity, and spontaneity. Extrinsically motivated behaviors are associated with attaining to accomplish goals without inner-driven, self-interest.

The distinction between intrinsic and extrinsic motivation provided the basis for Deci and Ryan's (1994) development of self-determination theory. According to Deci and Ryan, intrinsically motivated and interested learners are more content in their learning process, acquire knowledge in more coherent ways, show long-term retention of knowledge, apply knowledge more often than others, and cope better with course and educational demands. They also show higher academic achievement and perceive themselves as more competent.

Chang (2005) referred to the use of technology to improve learners' motivations, citing several researchers including Chung, Guthrie, and Richardson. These studies linking motivation and technology to student learning and achievement makes online and Web-based learning a viable option for student engagement and their academic achievements. Alderman (1990) developed a model called "Links to success," for the at-risk students based on student motivation for learning. This model relates persistence and success factors for remedial education.

According to Alderman, some students persist and work on their own for their guided by their intrinsic interest, while others work extrinsically because they are required to do so. In self-regulated Web-based learning environment, such attributes of motivation can have a major impact on underprepared students' achievement and academic success.

Chickering and Gamson's Seven Principles

Enhanced student learning through effective teaching practices is a key to student success in any environment. Among the various well-researched scholarly publications providing clear, consistent, and comprehensive descriptions of instructional strategies to promote student learning, Chickering and Gamson's "Seven Principles of Good Practice in Undergraduate Education" is the single best known work (Eison, 2002). The well-documented seven principles of good practices in higher education (Chickering & Gamson, 1987), based on decades of research on the undergraduate experience in the traditional setting, is very much relevant in the online, Web-based instructional setting as well. The State University of New York (SUNY) has successfully utilized Chickering and Gamson's principles as a framework in a survey research relating student satisfaction and reported learning in the online environment to the principles of good practices in the "offline" environment (Shea, Fredericksen, & Pickett, 2001).

Four of the seven principles put forth by Chickering and Gamson are most relevant for this study. The first principle, good practice encourages contacts between students and faculty, suggesting frequent student-faculty interactions in and out of classrooms to be very important in student motivation, involvement, and academic success. Interaction with faculty is one of the independent variables for this study. The second principle, good practice develops reciprocity and cooperation among fellow students encouraging collaborative and social learning. In

essence, this principle is also incorporated into the independent variable of interaction with faculty (IWF) in this study.

The third principle of good practice, as noted by Chickering and Gamson (1987), suggests that good practice encourages active learning technique. The criterion of active learning has been incorporated into the study variables and in the related survey questionnaire designed by the researcher. The fourth principle, good practice gives prompt feedback is mentioned extensively in the literature as a factor in effective teaching and learning. This principle was incorporated into the independent variable, interaction with faculty (IWF), in this study's survey questionnaire.

The fifth principle of good practice by Chickering and Gamson, good practice emphasizes time on task, referring to students' efforts and dedication to learning to be a measure of their motivation. This principle is incorporated into the survey questionnaire in an effort to measuring student motivation construct. The sixth principle of high expectations is also incorporated into the survey questions measuring the motivation construct. Finally, the seventh principle refers to diverse talents and ways of learning. Diversity justifies the concept of "new-age" teaching and learning methodologies. The ever expanding Internet with its many ways of instructional program delivery and learning empowers such methodologies.

Chickering and Gamson's seven principles of good practice in undergraduate education were further enhanced by incorporating technology as a lever (Chickering & Ehrmann 1995). It describes some of the most cost-effective and appropriate ways to use computers, video, and telecommunications technologies to advance the seven principles. Shea, et al. (2001) reported using these principles in SUNY's online education satisfaction and effectiveness survey in measuring student outcomes for individual course rather than for a total academic program.

Kuh et al. Framework for Student Success

Kuh, Kinzie, Buckley, Bridges, & Hayek (2006) developed a guiding framework for postsecondary student success using a structural map rather than the familiar "pipeline" analogy. The authors called this model "What matters to student success." The two major elements of Kuh et al. framework are precollege and college experiences of the student. According to this model, the precollege experiences that affect students' college success include prior academic preparation in high school, family background, enrollment choices, motivation to learn, and aptitude and college readiness. Kuh et al. argue that student success indicators must be broadened to include elements pertaining to different types of students, such as adult learners, special and lifelong learners. The underprepared students in developmental education can also be viewed as special learners.

In the Kuh et al. (2006) framework for student success, between the precollege and college experience, there is a "mediating" condition which the authors calls "transitions." Students must successfully navigate these "rapids" to continue their education. Such transitions include developmental education courses for the academically underprepared students. Developmental courses usually do not count toward graduation credits but they do count for institutional credits. They are necessary for raising academic skills of the underprepared students. Other elements which influence this area are financial aid policies and the students' need to work. Kuh et al. emphasize that all these factors may prohibit students from fully engaging in the college experience, and they could hinder success if not properly and proactively addressed.

The second element of the framework is the college experience itself. The college experience element has two central features. The first one is students' behavior and the second feature is institutional conditions. Student behaviors include aspects such as time and effort put

into studies and interactions with the faculty and peers. Institutional conditions include resources, educational policies, and programs and practices in place for student support. In the Kuh et al. (2006) framework, at the intersection of student behavior and institutional conditions there is an important element of student success called student engagement. This area is identified by student-faculty interaction, active and collaborative learning, and high expectations and motivation. All these elements are related to student satisfaction, persistence, and educational attainment leading to student success.

A part of the framework for success developed by Kuh et al. was modified to fit in this research for studying student success in developmental education courses at the LTC. In this case, the mediating transitions work like a bridge between students' precollege academic deficiencies and college-level skills attainment that is necessary for success in postsecondary courses. Some of the elements of this framework along with certain elements from the learning models were utilized in studying this complex issue of student success in developmental education in the Web-based learning environment as practiced in the LTC.

Conceptual Framework

Student success is a complicated concept that has multiple definitions and contexts. The most often cited theories define student success in college as persistence and educational attainment, or achieving the desired degree or credential (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006). Kuh et al. depicted a framework for student success in their study which they called: *What matters to student success.* Their conceptual framework for student success constitutes a complex array of interrelated elements and factors that include various phases, from pre-college experience to post-college outcomes. A simple and modified version of the framework limited to students' pre-college and college experience was adapted for this study.

Also the broader scope of student success under the Kuh et al. model was limited to course level success in the developmental education area in the LTC Web-based learning environment.

The overarching conceptual idea for this study is rooted in the two-year colleges' policy and principle of "open access and success for all." The open-access policies and the "success for all" philosophy of the two-year colleges create a basic dilemma of educating anyone who walks into the college irrespective of their college-level academic preparations. The two-year colleges' biggest challenge is educating academically underprepared students and providing these individuals with the skills necessary to be successful in college-level coursework. The Kuh et al. (2006) framework for student success recognizes developmental courses for the academically underprepared students as the "mediating" condition and is represented as transitions between students' precollege and college experiences that students must successfully navigate to continue their education in order to accomplish their desired goals.

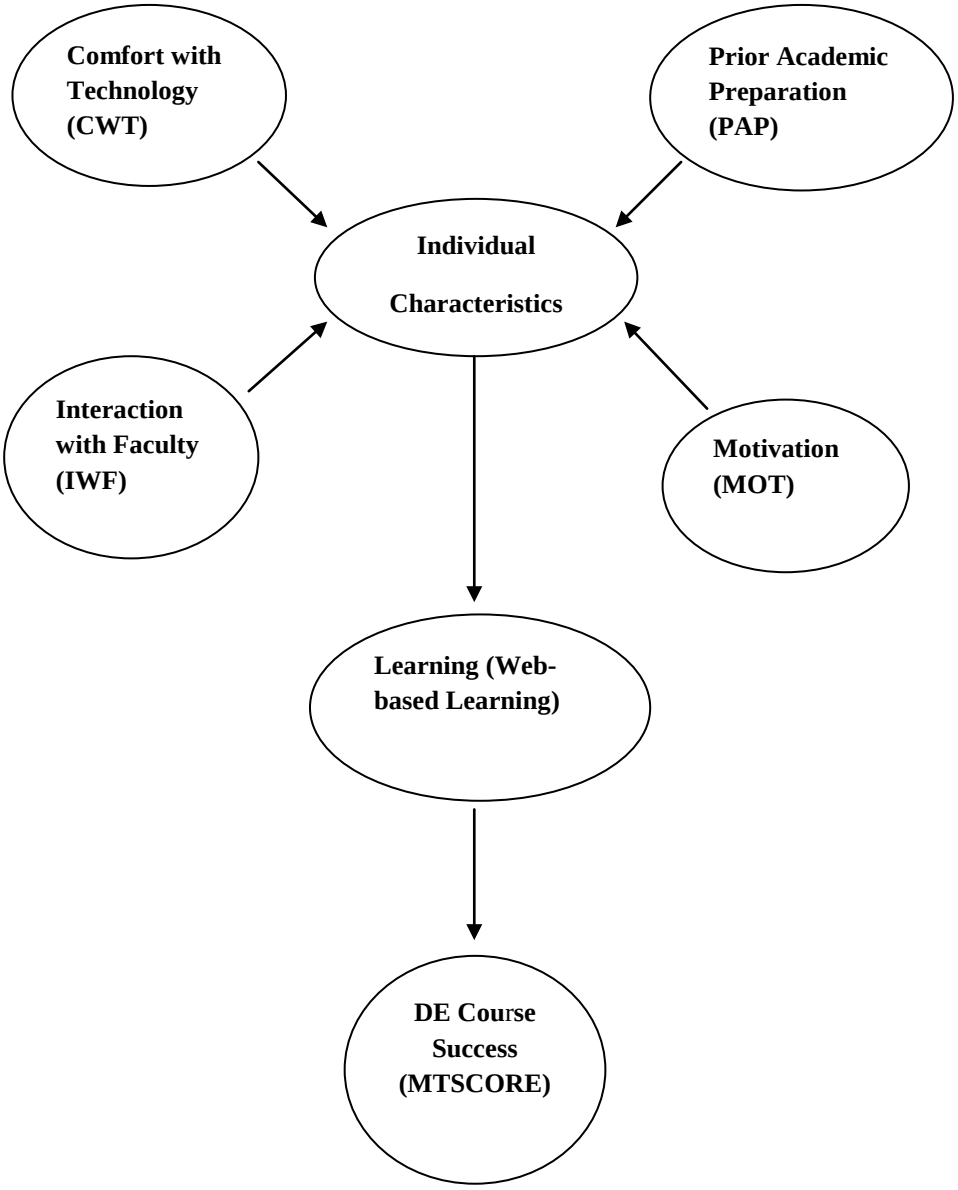


Figure 2.1: Conceptual Framework: Individual Factors Affecting Course Success

The conceptual framework relating to students' course success in this study focuses on one of the two major aspects affecting student learning, this is the student's individual characteristics. The other aspect, institutional characteristics, is not the focus of this study. The Kuh et al. model refers to student's individual characteristics as student behavior. These two

aspects are regarded by many literatures as the primary agents influencing student success. The conceptual framework depicted in Figure 2.1 shows the relationships between the independent variables of prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), motivation (MOT), and the dependent variable of mid-term score (MTSCORE). As depicted in the figure, course success (MTSCORE), which is considered to represent student success, is dependent on individual learning, indicated by the direction of the arrow. Web-based learning effectiveness, which is a subset of learning in general, affects student grades or course success. Each of the variables depicted in the oval shapes are the independent variables of the study. These variables are related to student attributes or individual characteristics which were assumed to affect learning and course performance in developmental education in the Web-based learning environment.

The circle at the bottom of figure 2.1 representing course success (MTSCORE) is the dependent variable. Individual course successes accumulated over time represent student's academic achievement or college success. The mid-term test score is assumed to be affected by learning, which, in turn, is affected by the independent variables of PAP, CWT, IWF, and MOT, representing one's individual attributes or characteristics.

In the Kuh et al. student success model, students' pre-college experiences include motivation (MOT) to learn, academic preparation (PAP), aptitude and college readiness, peer support and interaction with faculty (IWF), and certain demographic characteristics such as race, gender, and socioeconomic status. Students' motivation to learn, academic preparations, and peer support are important variables that inform the conceptual framework of this study. The other major factors within student behavior that informs the conceptual framework of this study are students' interaction with faculty (IWF) and motivation (MOT). The two other independent,

secondary variables that the researcher of this study assumes to affect student success include student employment and intended program of study. The Kuh et al. model also considers these variables to influence student learning, which in turn affects students' course success in general. This dissertation study is focused on individual characteristics that influence student success in DE courses in a Web-based learning environment at the LTC.

Summary

This chapter reviewed selected literature related to student success in the developmental education courses in the Web-based learning environment. Academic success is the result of individual efforts, commitment, persistence, and learning; therefore, literature on learning theories, individual characteristics, and student persistence was reviewed. Literature highlighting issues with developmental education and Web-based learning were reviewed. Instructional technology including Internet technologies used in the DE programs as practiced at the LTC was reviewed.

The theoretical framework of this study and the related literature reviewed helped the researcher in identifying the individual factors, PAP, CWT, IWF, and MOT. These components and certain factors related to student background are important variables that contribute to effective learning and student success in Web-based developmental education courses.

In dealing with the important issue of underprepared students' success in developmental education, it is very important to understand individual student characteristics since it is a basic force that drives student success. Teaching and learning can be adapted to individual characteristics to maximize success. The knowledge and insights gained from this study may offer a blueprint for designing customized programs for success in developmental education in technical and community colleges in the Web-based learning environment.

CHAPTER THREE: METHODOLOGY

Introduction

This study examined the relationship between certain individual characteristics and course performance in Web-based developmental education courses among the students in a two-year technical college. Several variables depicting students' individual characteristics were gathered for the study through an extensive review of the literature. Based on the independent variables' identified relationship with the outcome variable, the researcher developed a predictive model of course success related to individual learner characteristics. In order to achieve this study's major goal of examining the relationship between the independent and the dependent variables and to answer the research questions, selected quantitative research methodologies and statistical methods were applied. The purpose of this chapter is to describe the research design, the rationale for the methodologies employed, the population and sample selection technique, instrumentation, data collection, data analysis and interpretation techniques, its limitations, and other issues that are relevant to this study. In this study, the terms "individual characteristic" and "student characteristic" has often been used interchangeably.

To identify the factors predicting student success in Web-based developmental education courses, the researcher examined the statistical relationship between the dependent variable of students' mid-term exam scores (MTSCORE) and the selected independent variables based on the constructs representing various aspects of individual characteristics. The independent variables, which were drawn from and suggested by the literature to have impact on student's academic performance included prior academic preparation (PAP), comfort with technology (CWT), student interaction with faculty (IWF), and motivation (MOT).

The researcher gathered data using SurveyMonkey.com, an online survey application, and deploying a survey instrument, the Web-based Learning Student Survey (WBLSS), which was designed and developed by the researcher for this study. The selected research setting was the Louisiana Technical College (LTC), a public, two-year career-technical college with 38 campuses across Louisiana. The study population included the developmental education students at the various LTC campuses that utilized PLATO Web Learning Network (PWLN). The LTC is comprised of eight autonomous administrative regions with 38 individual campuses. All the regions with the exception of Region 7, use Web-based curriculum (PWLN) as the only mode of instruction in the delivery of developmental education (DE) courses. Region 7, which has five campuses, uses traditional classroom instruction for such courses. Therefore, the sample population consisted of the Developmental Education (DE) program students in 33 campuses of the 38 campuses of the LTC.

Study Variables and Conceptual Framework

The main idea driving this study and the basis for the development of the WBLSS survey instrument were essentially guided by the conceptual framework for individual characteristics and course success, which is depicted in Figure 2.1, in Chapter 2. In the postsecondary educational context, student success, in general, is viewed as a product of a student's learning experience. It is often measured by success indicators such as student graduation rates and test scores (Hearn, 2006). A successful course grade or test score is an acknowledgement or outcome of one's learning. It represents an accomplished transfer of knowledge and skills from a teacher to a student. The grading systems and the grading scales in higher education institutions are believed to be a measure of a student's academic performance and learning outcomes. Notwithstanding the arguments in the literature that inconsistencies on grading practices and

grade inflation exist at institutions (McCabe & Powell, 2004), grades are found to be one of the most consistent predictors of academic performance in both large, nationally representative, and small, single institutional studies (Pascarella & Terenzini, 2005).

As illustrated in the conceptual framework diagram (Figure 2.1), course success (MTSCORE) is dependent on individual learning. Individual effectiveness in Web-based learning as well as in developmental learning, a subset of learning in general, influences student grade or their course outcomes (success). Each of the independent variables depicted in the conceptual framework diagram, student's prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and student motivation (MOT), are constructs that are found in the literature to be associated with the characteristics of an individual learner. These constructs related to individual student characteristics were assumed in this study to affect learning and by extension to affect students' course success (MTSCORE). Therefore, by identifying and examining the proper relationship among these variables, both in magnitude and direction, a prediction regarding the outcome variable of MTSCORE can be made based on the predictor variables of this study, PAP, CWT, IWF, and MOT.

Assessing Data for Skewness and Kurtosis

Most of the common inferential statistics including *t* test and regression analysis assume that the dependent variable is normally distributed. Such normality assumes that the data representing the dependent variable forms a normal, unimodal, symmetric curve, and the mean, median, and the mode are equal. The frequency distributions of many of the variables used in the behavioral sciences are distributed approximately as a normal curve (Leech, et al., 2005). But, in practice, not all statistical data collected through surveys are ideally normal. If one tail of a frequency distribution is longer than the other, and if the mean and the median are different, then

the curve is skewed. It is possible that the survey data, representing the dependent variable of mid-term test score (MTSCORE) follow only a moderately normal curve or it is skewed. In such cases, it is important to test the data for skewness and Kurtosis and to take necessary actions to minimize their effect on data analysis and on the results of the study.

Multivariate statistical testing, specifically inferential testing, has three general assumptions. These assumptions are normality, linearity, and homoscedasticity. One important condition for applying multiple regression is that the dependent variable should be an interval or scale variable that is normally distributed in the population from which it was drawn (Leech, Barrett, & Morgan, 2008). Most common inferential statistics like t test, multiple regression, etc. assume that the dependent variable is normally distributed. Therefore, it is important to examine if the dependent variable of this study, MTSCORE is highly skewed.

Kurtosis is peakedness of the frequency distribution curve. If the frequency distribution is more peaked than the normal curve, it is said to have positive kurtosis. If the distribution is relatively flat in the middle with heavy tails then it has negative kurtosis. Kurtosis does not seem to affect the results of most statistical analyses (Morgan, et al., 2005) as skewness does. It can easily be tested in SPSS for any variable using an option in the frequency command. When a distribution is normal, the values for skewness and kurtosis are both equal to zero (Mertler & Vannatta, 2005). In this study, an examination of normality of the dependent variable, MTSCORE was conducted using SPSS analyze menu.

Morgan, et al. (2005) contended that parametric statistics including t test, ANOVA, multiple and logistic regressions assume certain variables to be distributed approximately normally. In this study, the central tendency, variability, range of scores, shape of the distribution for the scaled variables, skewness statistic and the standard error of the skewness were checked

by performing proper descriptive analysis tests using SPSS. According to Morgan et al., if the skewness is less than plus or minus 1.0, the study variable is considered at least approximately normal. Moreover, 2-tailed t test and ANOVA are quite robust to violations of normality, so even a skewness of more than +/-1 may not change the results much (Leech et al., 2005).

Research Design

In this study, the researcher employed selected quantitative research methodologies utilizing the prediction correlational design (Creswell, 2002) to facilitate a comprehensive examination and identification of the factors that predict student success. Among the major theoretical frameworks of research paradigms, positivism, interpretivism, and critical theory or post modernism, this study was conducted under the ontology of positivism. The goal of the positivism framework is to uncover the truth and facts in quantitatively specified relations among variables (Gephart, 1999). In the physical, objective world, knowledge can be realized or predicted with privileged knowledge in line with the positivist philosophy (Zhou, 2006). Accordingly, to reach this goal of predicting student success, several quantitative research methodologies were employed to examine the relationships among student characteristics and student success indicator, the mid-term test score (MTSCORE). In all the statistical models employed in this study, the related significant level of $p < .05$, which is the pre-set value for the SPSS software package, was employed.

Creswell (2002) posited that correlational research design using sophisticated applications and procedures such as regression analysis helps to explain the association between two or more variables or to predict an outcome. Additionally, Creswell stated that the purpose of a predictor research design is to identify variables, called predictor variables that will positively predict an outcome or criterion. In many prediction researches, investigators often use more than

one predictor variables which are typically measured at one point in time and the criterion variable at a later point in time. However, in this study these variables were measured at the same time using the online survey participants' self-reported data.

Multiple Regression Model

A multiple regression model was utilized to answer the primary research question of this study. Multiple regression is a statistical procedure which is used to examine the combined relationship of two or more independent variables with a single dependent outcome variable. Johnson and Christensen (2004) mentioned that after determining the correlation between independent and dependent variables in a correlational research, the researcher generally conducts a statistical test to determine whether the correlation is statistically significant. According to Johnson and Christensen, correlational coefficients that are larger than .5 are usually statistically significant. Leech et al. (2005) posited that if a researcher has no prior ideas about which scaled variables will create the best prediction equation, then simultaneous regression is the best method to use as long as it has a reasonably small set of predictors. The predictor variables of the model designed for this study were PAP, CWT, IWF, and MOT. The outcome variable was MTSCORE.

The Pearson correlational coefficient statistic is used to test theories when researchers collect data to confirm or disconfirm hypotheses (Creswell, 2002). The study utilized this statistic to determine the magnitude of association between the independent predictor variable and the dependent outcome variable. The Pearson correlation coefficient also detected the direction of any relationship that was observed. The multiple regression model is a special case of the general linear model that the researcher use to determine how well the multiple variables predict results when used in combination, simultaneously (Johnson & Christensen, 2004). There

are several conditions, issues, and assumptions that must be met prior to using the multiple regression model. These issues include multicollinearity of variables, normal distribution of data, and assumptions of linearity (Leech, et al., 2008).

Logistic Regression Model

This study included students taking different courses that involved various levels of course mastery within the developmental education and pre-Allied health curriculum. To address the issue of varying preparations and pass/fail scoring criteria among potential nursing and non-nursing students within course levels, logistic regression analyses were conducted using the independent scale variables of PAP, CWT, IWF, and MOT and the dependent categorical or dichotomous variable of pass or fail based on the mid-term exam scores (MTSCORE) reported in the categorical format based on the survey questionnaire item 29. Leech et al. (2005) suggested logistic regression to be useful when a researcher wants to predict an outcome variable that is categorical or dichotomous while the predictor variables are categorical or scaled. The logistic regression model can provide with the odds ratios for each independent variable with respect to the dependent variable of the model.

The reason for using the pass or fail criterion in the mid-term test was to simulate the final pass or fail grades that the students would receive in the final exam irrespective of their course levels or actual numerical score. The DE courses at LTC do not count for credits toward graduation or degree. However, if a student does not receive a passing grade of C or better (70% or more) then he or she cannot progress to the next level within the coursework until the lessons assigned for the mid-term are mastered first.

The course pass/fail criterion is a categorical or dichotomous variable. Logistic regression and discriminant analysis are appropriate models when the dependent variable is categorical or

dichotomous (Leech, Barrett, & Morgan, 2005). The original research question of student course success based on the categorical dependent variable of course pass or fail (PassCourse) and the independent variables of PAP, CWT, IWF, and MOT can be addressed by using logistic regression model. Logistic regression (LR) is useful because it does not rely on some of the assumptions on which multiple regression is based (Leech, Barrett, & Morgan, 2005). Moreover, because of its very few assumptions, it has become popular in research methodology. Logistic regression models normally need a minimum of 20 cases per predictor variable. Like multiple regression, logistic regression requires addressing the issue of multicollinearity among the independent variables. In this study, the logistic regression procedures were performed using the variable PassCourseR (PassCourse Recode) as the dichotomous dependent variable, reflecting whether a respondent passed or failed in the mid-term exam in the attempted DE course. The independent variables were prior academic preparation, comfort with technology, interaction with faculty, and motivation.

t Test

While gathering data for the pilot test during the pre-dissertation period, the researcher observed some variations in students' course grades based on the intended program of study among the developmental education students. The issue was discussed with some developmental education instructors at LTC Lafayette Campus who also agreed with this researcher's observation. In particular, it was observed that the students whose intended program of study was practical nursing (PN) fared better than the non practical nursing (NPN) students as a group. The reason for such variations could be due to the importance of the utility of programs or education among the nontraditional students (Bean & Metzner, 1985) or might be students were motivated due to ample job opportunities in the program field.

The PN program is one of the most popular and high demand programs in any technical college campus in Louisiana due to the high level employment opportunities and huge demands of its graduates in the local healthcare industry. A large percentage of the students intending to study PN are also nontraditional. Therefore, this study also conducted t tests to examine the differences of the mid-term exam scores (MTSCORE) between the groups: students intending to study practical nursing (PN) and those entering other non-practical nursing (NPN) programs. The t test statistical model was utilized since Mertler and Vannatta (2005) suggested that the t test was the most basic statistical test to measure any significant group differences between two group means.

A large percentage of the career-seeking students at the LTC have outside employment, part-time or full-time. Various studies find different effects of employment on student grades or exam scores. To see if any such significant effect existed in this study, t tests were conducted between the groups of students with employment, full-time or part-time, and no employment. Morgan, Leech, Gloeckner, and Barrett (2005) posited that when investigating the differences between two or more independent groups on an approximately normal dependent variable, t test is the most basic and informative.

As part of the research design, various statistical tests were conducted; corrective measures were employed to screen data for missing values, outliers, and to test for non-response bias. Additionally, necessary statistical procedures were employed in order to check for the basic assumptions and whether the pre-conditions of the statistical models utilized in the study were met. These tests included assessment of normality of the important quantitative variables and testing data for skewness and kurtosis. The next section discuses the population and the sample for this study and the technique involved with the data collection process for this dissertation.

Population and Sample

The population for this study consisted of the students in the developmental education (DE) program at the Louisiana Technical College (LTC) that use Web-based instructional methodology for course delivery. The Louisiana Community and Technical College System (LCTCS) was created in 1998 as two-year, public, postsecondary educational system combining 40 erstwhile technical institutes that were spread out across the state of Louisiana and 7 relatively new community colleges under Governor Mike Foster (Manning, 2006). The conglomeration of the 40 technical institutes in 1999 was called the Louisiana Technical College (LTC). The oldest among these institutes was established in Bogalusa in November of 1930 (LTC Web site, 2008). Currently, LTC comprises of 38 diverse campuses located throughout the state which are grouped into 8 geographical regions. LTC offers 38 diverse programs under 13 major occupational areas leading to associate degree, technical diploma, or certificates in skills-intensive career education.

The Fall 2008, 14th day student enrollment at LTC was 21,260 (LTC Student Record, 2008). The 2007 fall enrollment was 17, 516. According to LTC Student Record Office, about 50 percent of the students attend college part-time. According to the Louisiana Board of Regents (2008) statewide student profile system, the demographics of LTC students were: 52% White, 41% Black, less than 1% Asian, under 1% American Indian, 2% Hispanic, and 3% others. According to the Fall 2007 semester records, 44% LTC students were female and 56% were male. Forty two percent students were 25 years or older belonging to the nontraditional group. The average ACT score of LTC's entering, first-time freshmen students for the academic year 2005-2006 was 17.3 (LCTCS Web site, 2008). This is less than the average ACT composite score of freshmen in Louisiana's postsecondary institutions of 20.2. The national average ACT

composite score in comparison was 22.1 during the same time period (BOR Web site, 2008). About 35% of the new, first time, LTC students were in the developmental education program, enrolled in at least one remedial course.

Thirty-three LTC campuses use PLATO Web Learning Network (PWLN) in its developmental education curriculum. Only 5 campuses in Region 7 in the Northwestern part of the state do not use PWLN. The Fall 2008 enrollment in the DE program at the 33 LTC campuses that use Web-based learning using PLATO was 2053(LCTCS Office of Institutional Research, 2008). This number excluded the 346 students in the DE program in Region 7 which did not use PWLN. This made the initial sample population target for the online survey to be approximately 2000.

To be consistent in the sampling process representing participants with similar course experience, only the students who were taking any particular DE courses for the first time were asked to participate in the survey, thus eliminating the students who were repeating any DE course. This would keep the sample consistent in terms of course preparation for mid-term test. This further narrowed the targeted population for this study. All the 33 campuses within the LTC that use PWLN Web-based courseware for DE program instruction were the part of the setting for online data collection for this study.

A conservative formula to determine the appropriate sample size N is based on the amount of error one is willing to tolerate (SPSS, 2004). According to SPSS, if an error of 5% is acceptable, then $N = 1/.05^2 = 1/.0025 = 400$. Therefore, an approximate sample size of 400 should be adequate for this study. To be safe, a target sample population of 500 participants was considered in designing and delivering the survey questionnaire for this study. Creswell (2002) recommended a minimum of 30 participants for any correlational study. The initial pilot study

during the pre-dissertation was carried out only in three campuses in LTC Region 4. To represent a larger sample selection involving the majority of the LTC Web-based DE program students, the target population for this current study was expanded to include all the DE students involving 33 LTC campuses that use Web-based PLATO PWLN curriculum including the pre-Allied health students for a total N of 2053 (LCTCS IR Office, 2008).

A student participating in the online survey could be taking any of the developmental courses which included Developmental English (DVEN), Developmental Math (DVMA), Developmental Reading (DVRE), Allied Health English (AHEN), Allied Health Math (AHMA), Allied Health Reading (AHRE), and Allied Health Science (AHSC) in the Fall semester of 2008. All these courses were delivered through the Web using PLATO's PWLN courseware. This particular population and the setting represented certain characteristics that the investigator was seeking to study (Creswell, 2002) for this dissertation project. To accomplish the goals of this study a non-probabilistic, convenience sampling procedure targeting any eligible DE student at the LTC was adopted using an online survey application facilitated by SurveyMonkey.com.

The decision to use an online electronic survey instead of a paper and pencil survey questionnaire was based on economic and logistical reasons. This method can also be deployed and delivered faster to multiple campuses at the same time with little cost or travel time for the researcher. Once the survey is over, online data can be collected and processed immediately. SurveyMonkey.com hosted survey application is sophisticated, secured, and convenient.

Creswell (2002) recommended a minimum of 30 participants for any correlational study. This study intended to have about 500 participants (n = 500) to compensate for any validity or reliability issues that might arise. Gay and Airasian (2003) asserted that if the validity and reliability were low, a larger sample size was recommended. Gay and Airasian further posited

that a larger sample size compensates for error measurements which otherwise could mask the true relationships among the variables.

Non-response Bias and Missing Data

Response rate has been used to indicate the percentage of sample subjects who send their completed survey forms back to the researcher (Huck, 2004). An ideal response rate for surveys, specifically for a Web-based survey is a debatable issue. Many factors affect survey response rates. These factors include subject matter, method of administration, perceived rewards or usefulness by the participants, interest (Olson, 2007), and level of education (Israel, 1992). Whether a non-response bias exists is always an issue with any survey questionnaire, paper-based or online. Huck suggested several ways to check for the existence of any non-response bias in a survey. He argued that late survey respondents resemble more closely to the non-respondents. As a result, if a response bias exists then late respondents would differ from early respondents. Accordingly, Huck suggested grouping respondents by arrival date and comparing the dependent variables using one-way analysis of variance. Another acceptable practice is to see if and how responders and non-responders differ on important covariates by using t tests.

For this study, the early responders were grouped as EarlyResponders and the late responders were grouped as LateResponders. In the SurveyMonkey data collection methodology, each survey response is given a respondent ID called RespondentID. It is based on date and time of response. Accordingly, the RespondentID list is arranged in a time-sensitive numerical order with the latest response having a greater number than an early response which is given a smaller numeric label. Therefore, the survey response list is ordered with late response at the top of the list and the early response at the bottom of the list (SurveyMonkey, 2009). For this study, the

researcher used the top forty responders, who responded in the last week of data collection after repeated requests, as late responders and the rest of the respondents as early responders.

The first step to take to minimize the non-response rate and reduce the chance of missing data is to design a clear, concise, and easy to understand questionnaire (Huck, 2004) that gives valid and reliable information. It is important to avoid "double-barreled" questions that may confuse a survey participant in answering such questions or may even avoid responding to such questions. Fortunately, using proper logic in SurveyMonkey.com online survey application, the survey questionnaire was designed in such a manner that it required the participant to answer each question before proceeding to the next section or to the next page.

Other means of dealing with missing values or non-response data is to assign missing values using imputation technique or by running a series of cross tabulations before doing any analysis. Imputation or multiple imputations can be used to substitute some probable values for the missing data from similar records. However, missing data are usually excluded when calculating percentages (SPSS, 2004). Cross tabulation can solve the problem of empty or sparse cells on tables, thus aiding in completion of certain missing data. The SPSS program uses listwise deletion by default if the percent of missing value is less than 5%. Another technique of dealing with missing or non-response data is running statistical analysis separately with the imputed data and without the missing data and to observe and discuss the differences.

Mertler and Vannatta (2005) mentioned that if the researchers realize that missing data are important then there are several options to handle these data. These options include deleting the cases or variables that have created the problems, estimating the missing values by using prior knowledge, by calculating the means, or by well-educated guess, and by using a regression approach in estimating the missing value.

In this study, certain precautions were taken to reduce the chances of missing data representing any study variable. For example, the variable relating to course grade or mid-term exam scores was informed by two questionnaire items, item 29 and 32. Item 29 used the score ranges or levels and item 32 asked for the numerical value of the test score. During the pre-dissertation pilot study it was observed that some students did not remember their COMPASS placement test scores which they took before their admissions and therefore could not answer the question. To increase the chances of obtaining a response, some items had been modified to a nominal category.

Test for Non-response Bias

In order to test any non-response bias in this study, Huck's (2004) methodology of grouping responders in terms of early and late responders, based on their response date were followed. In the SurveyMonkey data collection methodology, each survey response is given a respondent ID based on date and time of response. Accordingly, the Respondent ID list is arranged in a time-sensitive numerical order with the latest response having a higher value than an early response which is given a lower numeric value. Therefore, by default, the survey response list in this study was ordered with later responses at the top of the list and the earlier responses at the bottom of the list (SurveyMonkey, 2009). For this study, the researcher used the top forty responders, who responded in the last week of data collection after repeated requests, as late responders and the rest of the respondents as early responders following Huck's model. An independent sample t test between these two groups was conducted using SPSS version 17.0 to verify any non-response bias in the study.

Data Collection

The context and the scope of this study was the developmental education (DE) program at the Louisiana Technical College (LTC). The targeted participants were the DE students at the 33 campuses of the LTC within the seven autonomous, administrative regions spread over multiple parishes around the state, that use PLATO PWLN courseware for its DE program. The common criteria of choosing the 33 campuses was that all these campuses used the PLATO, PWLN Web-based instructional program for delivering developmental education courses to its academically underprepared students.

An online cross-sectional survey using the well-known *SurveyMonkey.com* survey application and portal was employed to collect data from the participants anonymously. Participation in the survey was voluntary and the participants were approached for their individual consent through a consent statement at the beginning of the survey before completing any survey questionnaire items (Appendix A & C).

Proper permission was obtained from the office of the Vice-President of Career and Technical Education (VP-CTE), Louisiana Community and Technical College System (LCTCS) in Baton Rouge (Appendix D). Also, the regional directors and campus administrators were approached for local permissions to facilitate in conducting the online survey at their campuses (Appendix E). The DE instructors and coordinators were initially informed of the survey through email communications in July 2008.

The survey questionnaire titled "LTC Web-based learning student survey" (WBLSS) was created by the researcher and posted at the http://www.surveymonkey.com Web site on September 18, 2008. The site was originally planned to open for data collection in the official mid-term week of October 20, 2008. But, as the researcher started communicating with the DE

instructors through e-mails regarding the survey, few instructors at LTC Region 4 informed the researcher that some students had already started taking their mid-term tests because of their fast pace in the self-paced environment (Appendix E). As a result, I opened the survey on October 1, 2008 for any PWLN DE students who had completed their mid-term exams. A link to the survey site was placed in the http://www.myltc.edu Web site in a very conspicuous manner. The site entry was password protected. Earlier, a pilot test named, LTC DVED-PreNursing Student Survey (Pilot Test), using the same questionnaire was created on August 12, 2008. The pilot test was conducted for a week beginning August 12, 2008. The main objective of the pilot test was to test the online survey delivery, access by participants, data gathering and data retrieval processes. The researcher asked for feedback from the advisory panel regarding this online pilot study. Twelve people participated in this online pilot survey. The feedback was very helpful in the creation and online delivery of the survey questionnaire for this dissertation.

After the initial email contacts with the LTC DE faculty members in July 2008 regarding the survey and its goal, a detailed email describing the survey site, the step-by-step directions on how to guide eligible students to the survey site, and the password for the site was sent at the end of September 2008 to all instructors. A copy of the online survey questionnaire that included the consent letter (Appendix A) was made available to the DE instructors and the subject matter experts. Since the researcher did not have direct contact with the survey participants through email or telephone, and since the SurveyMonkey.com Web site for this particular survey was very long and cryptic, the researcher asked and received permission from LTC Regional administrator to place a link to the survey site at LTC's www.myltc.edu Web site. Once the link was posted, it became very easy for any DE student to go to the myltc.edu Web site to participate

in the survey, provided they had the password from their instructors. Only the instructors had the common password to enter the survey site.

The researcher was aware that the DE instructors had to login to the survey site for each eligible student once the student had completed the mid-term exam. Since the Web based DE program was self-paced, the mid-term exam was taken by the students at different campuses at different times that spread over more than a month period. When the researcher decided to close the survey site at the end of October 2008, some DE instructors wrote to the researcher requesting an extension of the survey since Hurricanes Gustav and Ike delayed some students in their coursework reaching the mid-term point (Appendix E). Therefore, the survey site was kept open until November 14, 2008 to accommodate the remaining students.

The data for this study was collected through the Web Based Learning Student Survey (WBLSS) survey instrument (Appendix A). Complete confidentiality of the survey participants were maintained regarding their responses and other privacy matters. No Internet Protocol (IP) address or computer identity tracking process was used in this survey. The information regarding the Web site and the simple steps along with the required password to guide the DE students were emailed to the LTC developmental education instructors that use PLATO to encourage their students to participate in the survey. Several letters and reminders were sent to the DE instructors at different intervals containing the proper script to guide the survey participants.

In addition to the data informing the dependent and the independent variables, other demographic data was collected through the survey instrument that included student's age, enrollment status, employment status, and intended program of study. Also, toward the end of the survey questionnaire, an area for additional open-ended comments was provided. This area also solicited voluntary contact information for four gift cards, each $25 value, to be given away

to four eligible participants. The survey responses and the email or telephone numbers of the drawing volunteers are not compared. The email or telephone numbers are kept separately to ensure anonymity of responses.

Contact Process

In order to reach the participants of this survey that were scattered throughout the state of Louisiana, first, proper permission was obtained from the Office of the Vice-President of Career and Technical Education (VP-CTE), Louisiana Community and Technical College System (LCTCS). To obtain such permission, a letter was sent through e-mail as attachment to the VP-CTE, explaining my dissertation project and my research goals (Appendix D). I compiled three lists of email addresses that included various LCTCS faculty and administrators using various sources, like the LTC Web site, LTC email services, and personal contacts and telephone conversations. One email list was comprised of the regional directors and administrators, a second email list included the DE subject matter experts and DE coordinators, and the third and the most effective email list included all the DE instructors and facilitators at LTC campuses that used PLATO PWLN courseware in their DE courses.

Once the email addresses of the DE instructors were compiled, I started communicating with the DE instructors, making an initial contact and explaining my dissertation project and its goals in early July 2008. After the initial email contacts with the members of each of the previously mentioned groups of administrators and instructors in July 2008, a detailed email describing the survey site, the step by step directions on how to guide the eligible students to the survey site, and the required password for the site was sent to all the PLATO DE instructors of LTC at the end of September 2008 after getting approval (Appendix B) for my research from the University of New Orleans (UNO) Institutional Review Board (IRB).

Through several emails, the developmental education instructors were instructed to guide their students including the pre-Allied health course students to the survey site using the common password after they had completed their Fall 2008 mid-term exams. The survey being anonymous, the DE instructors' cooperation was very essential for maximum student participation. Also, several follow-up emails were sent to all the targeted DE instructors immediately following the mid-term week of the Fall 2008 semester reminding them about the survey once the students completed their mid-term exams and received their scores (Appendix E). Each of these common email letters sent to all the DE instructors in the LTC's 33 campuses that use PWLN included a script to guide their students describing the steps and the Web site address (URL) to make the process easy and comfortable.

In early November 2008, another email reminder was sent to all the DE instructors urging them to encourage their students to participate in the survey. The importance and the objectives of the survey were re-emphasized in the letter. Several telephone calls were also made toward this endeavor. The regional directors and campus deans were also requested to ask their respective DE instructors to encourage their students to participate in the survey by emphasizing the survey goals. I had some very encouraging responses from the regional administrators in this matter.

The online data collection time period was extended at the request of several LTC campus instructors citing course delays due to hurricanes Gustav and Ike (Appendix E). The online data collection was done throughout the month of October and the first two weeks of November, 2008. Several repeated email remainders were sent to the DE program instructors and coordinators to ensure maximum response from the students. The survey site was closed on November 14, 2008. The researcher sent a thank you note to all the DE instructors, DE subject

matter experts, the LCTCS VP-CTE, the regional directors and the campus administrators for their support in the survey data collection process.

Survey Design

To achieve the stated goals, an electronic survey using the well-known online survey application Web site, *SurveyMonkey.com* (SurveyMonkey, 2008) was employed to deliver the questionnaire and collect data for this study. A link to the survey instrument (WBLSS), a Likert-type questionnaire, was posted at the myltc.edu Web site for the convenience of the LTC DE students. The online survey was cross-sectional and self-administered. The participation in the survey was voluntary, anonymous, and the data was kept confidential. Any research data reported would not identify any individual student. Neither did it identify a campus with the survey data collected. To keep the survey anonymous, the respondent's IP address was not stored in the survey results. Students who were repeating any DE course were not to participate in the survey. There was a questionnaire item, Item 33, to identify any student repeating a course so that such a student could be removed from the survey data collected for this study.

The survey data informing the study variables were self-reported by the participating students. The students were informed in the first page of the survey questionnaire that their participation was voluntary and they could discontinue or exit the survey at any time and their responses would not be reported if they aborted the survey process. The responses were only collected by the survey application if the students clicked the submit button at the end of the questionnaire. The dependent variable of mid-term test score (MTSCORE) would come from their responses to the survey questionnaire item 32. There was also another item (Item 29) that represented the level of performance for each participant in a categorical format.

In a pilot study during the pre-dissertation phase a significant variation in students' course grade was observed. The college grading scale follows the standard 4.0 point scale which correlates the following letter grades: A = 4.0; B = 3.0; C = 2.0; D = 1.0 and F = 0. However, for this study, the dependent variable of MTSCORE was set to accept the actual score in the numerical format to include any score in the 0 to 100 range instead of a categorical range. Such a measure would offer more variability in the criterion variable used in this study to observe any correlations with the independent variables of PAP, CWT, IWF, and MOT.

Students receiving letter grades of C or better, which is equivalent to 2.00 or more in a 4.00 point scale were considered as passing the course. A score of 70% or higher in the test was considered passing or successful in the course (LTC DevEd Policy, 2007). Students receiving a score less than 70% or a letter grade of D or F in the mid-term were given unsatisfactory progress. Similarly, if a student received a score of less than 70% in the final exam then he/she was required to repeat the course. This is true for all the departments, including practical nursing program throughout LTC as far as DE or pre-Allied health classes are concerned.

The participant's numeric score was used to depict the dependent variable (MTSCORE) representing course performance. This self-reported course performance was compared with the self-reported levels of prior academic preparation (PAP), students' comfort with technology (CWT), interaction with faculty (IWF), and student motivation (MOT) utilizing correlations and multiple regression model built into the SPSS software package for conducting this study.

The Survey Instrument

The Web-based Learning Student Survey (WBLSS) instrument was designed by the researcher for this study (Appendix A). The instrument had been modified since the pilot study (Appendix A1) based on the knowledge gained from the pilot study. The reason a survey

instrument was developed for this research was because no other instruments reasonably took into account the unique situation of the underprepared, nontraditional, skills-oriented, two-year technical college students' academic experience and achievements. The experience and concerns of the two-year technical college students in Web-based developmental education programs have largely been ignored or neglected lacking any proper survey instrument. Therefore, the instrument was designed and developed based on the review of the literature, including certain doctoral dissertations related to this particular study.

Originally, the survey instrument used in the pilot study had 16 items representing 4 clusters or groups. A cluster consisted of four items. Each cluster represented an independent variable. The revised survey instrument for this study consisted of 33 questionnaire items. The first 12 items were demographic in nature that gathered information regarding a participant's background, certain typical personal information and course information. The next 16 items, item 13 through 28 consisted of Likert type questions. These 16 items represented the four clusters with 4 items in each cluster representing the study variables. Item 32 represented the dependent variable of mid-term exam score (MTSCORE) in the numerical format. In contrast, the data for the dependent variable, student score, during the pre-dissertation pilot study was obtained from the regional student record office of the LTC at the end of the semester. However, in this current state-wide study, the test scores were reported by the students themselves which helped in keeping this otherwise complex task of gathering personal data more convenient. It also kept the process in accordance with the Family Educational Rights and Privacy Act (FERPA) regulations. Survey questionnaire item 29 represented grade levels in a categorical format. This item collected data for the pass fail variable to be used in the logistic regression

model of this study. Item 30, 31, and 33 represented certain general questions that gathered student information regarding course settings and participants' learning preferences.

Each item representing the study's independent variables, items 13 to 28, had five answer choices in the Likert scale format with choices ranging from strongly disagree to strongly agree or in a similar scale. The well-tested Likert scale is based on equal intervals among responses providing continuous response options to questions with assumed equal distance between options (Creswell, 2002). The point distribution for the five-point Likert-scaled items was as following: Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5.

Researchers use questionnaires in order to obtain information about the thoughts, attitudes, perceptions, personality, and behavioral intentions of research participants. Johnson and Christensen (2004) posited that questionnaires can be used to collect data for multiple research methods including correlational studies. Correlational research involves collecting data to determine whether and to what degree a relationship exists between two or more quantifiable variables (Gay & Airasian, 2003). In designing and developing the WBLSS survey instrument, Johnson and Christenson's (2004) fifteen principles of constructing a questionnaire were carefully considered. Specifically, the first principle, to make sure the questionnaire items match the research objectives, and the last principle, to always pilot test the questionnaire, was followed carefully by this researcher in developing the questionnaire for this dissertation study.

The data collected for the four independent variables, PAP, CWT, IWF), and MOT, was based on student responses to the questions in the WBLSS survey instrument that was delivered online through SurveyMonkey.com Web site. Multiple variables were used since Gay and Airasian (2003, p. 477) asserted, "A combination of variables usually results in a more accurate prediction than any single variable."

The items in the survey questionnaire were drawn and grouped into a cluster based on the reviewed literature. Additionally, exploratory factor analysis conducted during the study guided in grouping of items into proper cluster. Johnson and Christensen (2004) suggested the use of multiple items to measure abstract constructs to increase the reliability and validity of the measure. The authors also stressed the use of summated rating scale of multiple items as they provide more reliable composite scores and variability which helps researcher to make finer distinctions among the respondents. Johnson and Christensen further posited that in order to measure a complex construct such as self-efficacy or motivation, the use of a multiple-item scale like the Likert scale was "pretty much a necessity."

Each item in the questionnaire developed for the WBLSS survey instrument was based on the literature highlighting the constructs of the four independent variables. These constructs are discussed in the following sections. The survey instrument had two sections. The first section was designed to collect certain demographic data about courses, intended program of study, gender, previous degrees or diploma achieved, age, enrollment status, employment, financial aid, family obligations and preferred instructional delivery modes. These data would help in understanding the surveyed students' individual background to a certain extent.

Financial aid plays an important role in student persistence, specifically among the socioeconomically disadvantaged or low-income students at two-year community and technical colleges. According to Tinto (1993), the primary goal of financial aid is to remove finances as a cause of attrition. In this study, some of the major financial aid sources for the students at LTC included Pell grant, Tuition Opportunity Program for Students (TOPS), Workforce Investment Act (WIA) program, Veteran's Educational Benefits (GI Bill), Louisiana Rehabilitation Services, Leveraging Educational Assistance Partnership (LEAP), KYTE, CBDG, and STEP (LTC Region

4 Website, n.d.). In the survey questionnaire, only few of these major sources were mentioned to keep the items brief. Other sources not mentioned were grouped as others.

Family obligation is another variable which may include different issues and situations. Family obligation can be a major issue for nontraditional students. Kuh et al. (p. 27, 2006) model considers “caring for children at home” and “being a single parent” as two risk factors that threaten persistence and graduation from college. To keep the scope limited and simple, for this study, family obligation was considered as having the primary responsibilities for the dependent children or dependent adults including the elderly, while actively pursuing academic goals.

The second part of the survey instrument consisted of twenty items in the form of a questionnaire. Each item had five answer choices ranging from strongly disagree to strongly agree in the Likert scale format. The students surveyed were asked to answer or check only one choice per item. The questions, item number 13 through 28, were designed to gather data for the independent variables of the study. Item 32 was the dependent variable of the study, mid-term test score or MTSCORE. This item asked the students to enter their mid-term score in the numerical form. It was also used as a validity check for question number 29 that asked students to report their level of performance in a categorical format. Few of the items, like item 30 and 33, were supplemental and general in nature. They were designed to inform this study regarding the quality of instruction and the students’ preferred mode of instructional delivery.

Theoretical Foundation

The theoretical foundation of this researcher designed survey instrument (WBLSS) was primarily based on the reviewed literature that included educational theories and practices. It also included certain existing instruments used in studying learning effectiveness and student

engagement in two-year colleges (CCSSE, 2007) as well as professional experiences shared by few select technical and career education faculty members at the LTC.

Even though all the relevant items in the survey questionnaire were the original creation of this researcher, the ideas behind these questions had roots in various literatures. One such major source in developing the survey instrument was the well known "Seven principles of good practice in undergraduate education," (Chickering & Gamson, 1987). The other major sources of theoretical foundation included Tinto (1987), Bean and Metzner (1985), and Kuh et al. (2006).

Gay and Airasian (2003) posited that the first step in conducting studies involving multiple regression was to identify the variables that best predict the criterion. Since past performance or prior achievement is generally the best predictor of future performance, as asserted by Gay and Airasian, students' prior academic preparation (PAP) would probably be the best predictor of course success. Accordingly, the first four items on the WBLSS survey instrument were designed to measure a degree of PAP. Tinto (1993) asserted that the skills students bring with them to college shape their persistence and academic success.

Bean and Metzner (1985) model considered high school performance, a parameter of the prior academic preparation construct, to be an important construct influencing nontraditional student's academic outcomes. These items helped elicit information regarding the independent variable, PAP, which is an important factor in the first research question: Is there any relationship between the individual factors of students' prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT), and students' course performance (MTSCORE) in the Web-based developmental education courses? Table 3.1 depicts the theoretical foundations of the WBLSS survey instrument.

Table 3.1

Theoretical Foundations for the WBLSS Survey Scale

Survey Item No. (IV)	*Theoretical Foundation*
Item 13 - HS GPA (PAP)	Kuh et al., Bean & Metzner; Perna, Thomas
Item 14 – Prior skills (PAP)	Hearn,Gay & Airasian; Tinto; Kuh et al.
Item 15 – Study skills (PAP)	Kuh et al.; Pascarella, Terenzini
Item 16 – COMPASS, Academic prep (PAP)	ACT; Roueche,Roueche; Wojciechwski,Palmer
Item 17 – Familiarity w computer (CWT)	Gagne, Miltiadou & Yu, OTSES
Item 18 – Internet skills (CWT)	OTSES, Chickering & Ehrmann; Moore
Item 19 – Course navigation (CWT)	Braxton, Sullivan, Johnson; LTC ESS survey
Item 20 – Email use (CWT)	Miltiadou & Yu; Wojciechwski,Palmer;
Item 21 – Contact with instructor (IWF)	Tinto, Chickering & Gamson; Kuh et al.;Astin
Item 22 – Seeking instructor's help (IWF)	Boylan; Kuh et al.; Tinto; LTC ESS survey
Item 23 – Instructor support & guidance (IWF)	Astin; Pascarella & Terenzini; Cross, CCSSE
Item 24 – Interaction opportunities (IWF)	Tinto; Kuh et al.; Cross
Item 25 – Course/career goals (MOT)	Bean, Metzner; Motivation, Attribution theory
Item 26 – Freedom of study time (MOT)	Pintrich, De Groot(MSQL);Carroll; Schunk
Item 27 – Self-directed nature (MOT)	Bandura; Schunk;Constructivism, Motivation;
Item 28 – Total hours devoted (MOT)	Carroll, Chickering & Gamson; Weiner

According to Kuh et al.'s framework for student success (2006), students' precollege experiences and prior academic preparations play vital roles in the foundation of student success in postsecondary education. The model suggests, "The quality of the academic experience and the intensity of the high school curriculum affect almost every dimension of success in postsecondary education." (Kuh, et al., p.19, 2006). High school grades and scores in national standardized tests have been strong predictors of first-year college grades and course success.

In the pre-dissertation pilot study the original independent study variables included prior academic preparation (PAP), quality of instruction (QI), interaction with faculty (IWF), and student motivation (MOT). Based on students' responses, the pilot study did not indicate QI as a significant factor in Web-based learning at the LTC. From the students' comments on open-ended questionnaires and from personal comments, it was clear that comfort with technology (CWT) and technological issues were more relevant for this study. Therefore, the independent variable of QI was replaced with the independent variable of CWT in this full study. Accordingly, few items in the questionnaire (Appendix A) were modified from the pre-dissertation questionnaire (Appendix A1). The following narrative explains such changes in the study. Additionally, few double-barreled item issues were corrected in this survey questionnaire.

A snap shot of the four items in the questionnaire, item 13, 14, 15, and 16 are shown in the following segment with their respective five-point Likert-scale answer choices varying from strongly disagree, disagree, neutral, agree, to strongly agree category. These four items represent the first independent variable of the study, prior academic preparation (PAP). The very first item, "My Grade Point Average (GPA) in high school was…" has been added since the pre-dissertation pilot study. The first question of the pre-dissertation pilot study, "I am familiar with

computer and the Internet basics before I started with this class" has been moved to the next segment representing the independent variable of comfort with technology (CWT).

13. My Grade Point Average (GPA) in high school was -
14. The skills I had gained previously helped me to be on task in this course with less anxiety.
15. The study skills that I learned in high school helped me to prepare well for this class.
16. My placement score (COMPASS) prior to enrolling in this class was very close to meeting the cut-off score for this class.

The questionnaire item 16 relating to students' COMPASS score was modified because the pilot test found that many students failed to remember their COMPASS placement test scores which the students take before admission. Those scores had to be obtained by the researcher from the student record office during the pre-dissertation pilot study. The full dissertation study did not have such data gathering options since all data were self-reported by the students through the online survey. Therefore, the previous pilot study item 4 had been modified using a similar question in a different, categorical format.

The second independent variable of comfort with technology (CWT), as experienced by the respondents, was measured by the questions 17, 18, 19, and 20 in the survey instrument. The students' comfort with technology (CWT) is generally related to their self-efficacy in technology usage. Such self-efficacy is an important aspect of course performance in Web-based learning. Miltiadou and Yu (2000) developed an instrument to measure academic self-efficacy specific to online environment. Miltiadou and Yu's Online Technologies Self-Efficacy Scale (OTSES) instrument is widely used and cited in online learning environment literatures.

Various studies points out that integrating technology can remove the physical classroom barriers giving students access to interactive curriculum anywhere, anytime, where lifelong learning skills are developed and managed by the instructor, ultimately enhancing student success (Northern Alberta Institute of Technology, n.d.). The following four items, 17 through 20, were framed by the researcher to draw information on students' comfort with technology.

17. I was familiar with computers before I started this Web-based class.
18. I use the Internet on a regular basis to be more productive in my study.
19. I find it easy to navigate around the course materials related to this class.
20. I feel confident communicating with people through e-mail.

Since students at LTC attend and use classroom resources in the Web-based developmental courses in a unique manner, some of the items measuring CWT in the WBLSS instrument were adapted from OTSES and customized to fit this study environment. The OTSES instrument is basically an online technologies self-efficacy scale which measures self-efficacy for online computer-mediated communication (CMC) system and course content. The DE students at LTC do not use WebCT or Blackboard. Instead, they use PLATO Web Learning Network (PWLN) portal and its course contents. Therefore, the items in the questionnaires had to be created catering to the generic Web-based environment that the students at LTC developmental education program generally encounter. These questions were designed to address the second independent variable of comfort with technology (CWT).

The third independent variable, interaction with faculty (IWF), was measured by the items 21 through 24 in the WBLSS questionnaire. Chickering and Gamson's (1987) *Seven Principles of Good Practice in Undergraduate Education* places contact between student and faculty as its first principle of good practice in undergraduate teaching and learning. The

principle asserts that student motivation and involvement is influenced by student-faculty interactions. Kuh et al. (2006) framework for student success considers "purposeful student-faculty contact," as expressed in this study's independent variable of IWF, to be a very significant factor in student's academic achievement. Tinto (1993) reported in his student departure model, whether a student succeeds in academic endeavors or leaves a college campus, is a function of how a student integrates into the academic and social life of the campus. This integration refers to faculty student contacts and interactions. At the two-year technical colleges where imparting skills is the main objective, student-teacher interactions play a major role in successful transfer of knowledge and skills between the trainer and the trainee.

Drawing from Tinto's theory of student departure, Braxton, Sullivan, & Johnson (1997) reported that the critical issues in student success and retention in online courses are related to a student's sense of belonging. This sense of belonging, in essence, is interacting and bonding with faculty and fellow students. The questions measuring faculty-student interaction in the WBLSS survey instrument were guided by such literature reviewed for the study. They were designed to draw data for the third independent variable, interaction with faculty (IWF). The following questions, framed by the researcher, are based on studies mentioned in this section. Similar questions and ideas are scattered in various surveys evaluating online or traditional instructional effectiveness and student success, including LTC's online surveys (LTC Website, 2008a).

21. Throughout this course, I have been in touch with my instructor on a regular basis.

22. When needed, I felt comfortable asking my instructor for help.

23. The support and guidance provided by the instructor in this class has been:

24. The course setting provided ample opportunities for appropriate interactions with the instructor.

The fourth independent variable in this study, student motivation (MOT), was measured by the items 25 through 28. By adopting attribution theory to explore student motivation for academic success, Yan and Gaier (1994) observed that students attributed their academic success to their efforts and to their ability. Creswell (2002) cited Anderson and Keith's correlational model studying the factors that explained academic success of at-risk students using eight independent variables that included motivation and ability, and one outcome variable, academic achievement. In Kuh et al. (2006) framework for student success, "motivation to learn" is regarded as a crucial factor in student engagement and academic success.

The expectancy value theory of achievement motivation developed by Atkinson postulates that achievement behaviors represent a conflict between approach and avoidance, that is, a conflict between hope for success and fear of failure (Schunk, 2004). Schunk further asserted the implications of Atkinson's theory in teaching, learning, and student success. The theory postulates that the need for achievement is a general motive leading individuals to perform their best in achievement contexts.

Motivation is intimately linked with self-regulation (Schunk, 2004). Students motivated to attain their goals engage in self-regulatory activities they believe will help them achieve their goals. One such factor is the amount of time devoted for the task and time management. Carroll's (1989) model of learning emphasized that students successfully learn according to the amount of time they spend on academic engagements. The extent of time that the students spend to learn a topic determines their performance level or degree of success. Accordingly, question number 28 has been modified to reflect the amount of time students spend on achieving course success. Weiner et al. (1971) postulated that students attribute their academic successes and failures largely to ability, effort, task-difficulty, and luck. Chickering and Gamson's (1987) *seven*

principles emphasized the time on task criterion. Time devoted on task, ability, efforts, and self-regulation are important characteristics of motivation.

The questions measuring student motivation in the WBLSS survey instrument, item 25 through 28, were guided by some of these theories and the reviewed literature for the purpose of eliciting answers to the fourth independent variable, student motivation (MOT). One major source of literature in shaping the motivational items for the WBLSS survey instrument was Pintrich and De Groot's (1990) Motivated Strategies Learning Questionnaire (MSLQ). This researcher has adapted some of the ideas from the MSLQ questionnaire in framing the WBLSS instrument. The following questions were framed by the researcher to draw information for the motivation construct.

25. I believe this course will help me in achieving my career goals.

26. The freedom to work anytime during the day or night at my own pace was very motivating.

27. The self-directed nature of this course helped me to stay focused.

28. On an average, the total number of hours I spend per week studying for this course is:

Self-efficacy is a major aspect of Bandura's social cognitive learning theory. According to Bandura (1986), self-efficacy is one's confidence in individual ability of controlling thoughts and actions, and therefore, by extension, influencing the outcomes of such actions. Various researchers have demonstrated that self-efficacy is a significant motivator and a predictor of academic performance and course satisfaction in traditional classroom learning (Lee, 2001). Motivation and self-efficacy are especially germane to school learning and academic achievements (Schunk, 2004). The perception of utility and course demands, academic self-worth (Wylie, 2004) are factors that contribute to students' motivational constructs.

The dependent or outcome variable, test score (MTSCORE), is generally accepted by educational institutions as a measure of course performance. Accordingly, the performance levels representing letter grade "A" is given 4 points, grade "B" is given 3 points, grade "C" is given 2 points, letter grade "D" is given 1 point and the letter grade "F" is given 0 point. In this study successful performance level was defined as student receiving a passing grade of "C" or 2 points in a 4 point scale, or better. In terms of the raw percentage scores of mid-term exam, MTSCORE, the minimum passing score was 70%. In this study, the variable MTSCORE was utilized to represent the outcome variable for course grade. The developmental education program at LTC recognizes a grade of "C" or better (70% score or better) as a passing or satisfactory grade for all the DE students regardless of their intended program of study. A grade of "D" or "F" (score of 69% or less) is considered to be an unsatisfactory or failing grade. The testing and grading of students is generally aimed at pronouncing a judgment on the success or failure of a particular participant in the educational process (Wright, 1997).

The data for students' course performance in developmental education courses were obtained from the DE students' self-reported mid-term exam scores (MTSCORE) as part of their responses to the WBLSS questionnaire item 32 of the survey instrument. This item asked students to enter the numerical scores they received in the mid-term test. This item was not in the Likert-type format. It was designed to be answered in the numerical format to represent the actual variations of student scores. Additionally, a similar question was asked in item number 29, where the students were asked to enter their mid-term scores in a categorical format. Items 30, 31, and 33 asked certain related questions that would help to understand students' overall perceptions regarding the Web-based DE program at the LTC. A snapshot of these questions is presented in the next section.

29. My score in the mid-term exam for this course was:

☐ Below 60% ☐ 60-69% ☐ 70-79% ☐ 80-89% ☐ 90% or above

30. I would recommend this course to anyone needing remediation.

31. At times, problems with technology at the campus impeded my progress in this course.

32. My mid-term exam score in this course is (Please enter your numerical score):____

Student performance was based on online testing through PLATO's Web-based "edutest" test engine. The scores were based on online tests covering the course materials up to the midpoint in the syllabus in their respective DE courses. The scores, based on 100-point scale, and score ranges equivalent to letter grades were reported by the students themselves. These mid-term exam scores (MTSCORE) were used to represent student performance in the respective DE courses. For each item in the survey questionnaire that represented the independent variable, students were asked to choose one box corresponding to the question item indicating their attitude from the Likert-type scale ranging from "strongly disagree" in one extreme to "strongly agree" in the other extreme. The "neutral" state was the mid-point of the scale.

In addition to the independent and dependent variables, certain demographic data were also collected through the survey questionnaire. Demographic data collected included student's age, enrollment status, employment status, family obligations in terms of dependent care or care for the elderly, intended program of study, financial aid and types of aid, and certain other factors representing student background. Some of these variables helped informing the study directly or indirectly. This researcher had assumed that a student's intended program of study or major had some correlation with student motivation and course success. Accordingly, like motivation, it is believed that the intended program of study affects student's course grade and academic achievement. This study was designed to verify such relationship.

The conceptual model of nontraditional student attrition (Bean & Metzner, 1985) considered academic variables like major certainty, study habits, educational goals, high school performance and demographic/background variables like age and enrollment status as major factors contributing to academic outcomes, such as GPA. This could be inferred through t tests or the ANOVA testing and comparing groups such as students intending to study Practical Nursing (PN) and the Non-PN. Other demographic variables like age, family responsibilities, employment, etc. could also play critical roles in the Web-based developmental education course performances. Therefore, such demographic data obtained through the survey questionnaires were utilized to address the following two secondary research questions based on student groups.

1. Are there any differences in the performance levels among the students in the Web-based developmental education courses based on their intended program of study?
2. Are there any differences in the performance levels in the Web-based developmental education courses among the students with employment and no employment?

The pre-dissertation pilot study did not have these two secondary questions regarding group differences. While going through the pre-dissertation data analysis that included some open ended questions and upon reviewing some of the student and instructor comments these two secondary questions were added. These questions were important to answer the issues of student attrition and retention which are affected by the program of study and industry's demand for potential employees. This full study is designed to answer these questions.

Reliability and Validity of Instrument

Reliability of survey instrument is defined by Fraenkel and Wallen (2003) as the degree with which the scores obtained through an instrument are consistent with what each section of the instrument is supposed to measure. Instrument validity is defined as the degree to which

inferences can be made based on the results from an instrument. The Web-based learning student survey (WBLSS) instrument was designed by the researcher to measure technical college developmental education students' individual characteristics, attitude, and their experiences with Web-based courses in pursuit of their academic success in such courses. Since the instrument was designed by the researcher, the reliability and validity of the survey might be compromised.

Creswell (2002) argued that if a study addresses only a few variables, researcher can design their own instrument. Gay and Airasian (2003) suggested that if the validity and reliability of the variables to be correlated are low, a larger sample size is needed. In another study, Johnson and Christensen (2004) also asserted that instruments developed by researchers are limited in validity and reliability. Such researcher designed instruments are limited to measure what they are intended to measure and their ability to obtain similar results under similar condition is also doubtful.

In order to minimize the effect of these limitations, an advisory panel of seven technical college instructors including three developmental education faculty, three faculty members who normally teach Web-based learning courses in technical areas, and a coordinator of the region's e-learning initiatives was setup to review the survey questionnaire and to provide face validity for the instrument (Johnson & Christensen, 2004). The instrument has been modified several times based on the recommendations of the panel. The instrument was further modified to avoid any "double barreled" questions.

Upon assistance from the college e-learning coordinator, several questions in the WBLSS survey instruments were adopted from LTC e-learning satisfaction survey (ESS) questionnaire with proper modifications. For example, the question item number 22 in the WBLSS instrument, "When needed, I felt comfortable asking my instructor for help" was adapted from the LTC's

ESS question, “Instructions on how to obtain academic support was available.” Also, item number 19 in the WBLSS instrument, framed by this researcher, “I find it easy to navigate around the course materials related to this class,” was adapted from LTC’s ESS question of “The course navigation was clear and easy to follow” (LTC Region 4 document, 2007).

For minimizing validity and reliability issues, similar surveys by different researchers in prediction and correlational studies on student success and persistence, including Pintrich and De Groot (1990), Harrell (2006), Roberts (1994), and Shepperd (2002) were carefully reviewed and the lessons learned were applied in developing this survey instrument. Several items were adopted with proper modifications from various instruments used to assess student motivation, faculty-student interactions, prior academic preparation, and comfort with technology. These survey instruments included LTC e-learning survey (LTC, 2007) and Community College Survey of Student Engagement (CCSSE, 2007) for LTC Region 4.

Factor analysis was employed in guiding the scale construction. It helped in the exclusion of some of the items from the scale if they lacked correlation or stable factor structure. A pilot test of the survey instrument was carried out in LTC Gulf Area Campus in Abbeville and in LTC Lafayette Campus during the summer semester of 2007 to find out the length of time needed for the survey, the appropriateness and clarity of the questions, and to test its content validity. Johnson and Christenson (2004) stated that it is a cardinal rule in research to “try out” or pilot test the questionnaire to find out whether it operates properly by conducting a pilot test with a minimum of five to ten people. A few questions were modified based on the knowledge gained from the pilot test.

A pre-dissertation pilot study using a version of the WBLSS survey was conducted at the main campus of LTC, Region 4 at Lafayette. The results of the survey would contribute to the

reliability and validity criteria of the survey instrument for the full study. Cronbach's coefficient alpha, the most commonly used method to compute internal consistency and reliability check for multiple item scales was calculated and applied during the pre-dissertation pilot study. The general range of Cronbach's coefficient alpha is between 0.0 and 1.0. The score of 0 indicates an absence of reliability and a score close to 1.0 indicates the greatest reliability. Generally, for research purposes, Cronbach's alpha should be .70 or higher for a survey instrument reliability (Fraenkel & Wallen, 2003). The Cronbach's coefficient alpha observed for the four sets of questionnaire items in the WBLSS instrument representing the four independent variable constructs during the pre-dissertation pilot study ranged from .60 - .79. These results established the survey instrument's internal consistency reliability during the pre-dissertation pilot tests.

In this full dissertation study the researcher dropped the quality of instruction variable, replacing it with the comfort with technology (CWT) variable. This was due to the researcher's observation that the CWT variable played a more critical role among the technical and career education students, majority of who were nontraditional. In the Web-based learning environment, it is assumed that technology plays a more critical role in finding the success factors among the developmental education students at LTC. This was mentioned by few students in the open-ended question section in the pilot study survey. The members of the expert panel advising this researcher also mentioned this factor.

Another pilot test survey hosted by SurveyMonkey.com was initiated to test the electronic version of the survey on August 12, 2008. Besides gaining experience in hosting and editing survey sites, checking the accuracy and content validity, the other primary reasons for this pilot survey were to check for site accessibility, password and other security measures, the ease of use, and testing the data collection methodology and its reliability.

Exploratory Factor Analysis

Exploratory factor analysis (EFA) is a statistical technique which explores the inter-relationships among variables to reveal if those variables can be grouped into a smaller set of factors (Coughlin & Knight, 2007). It is used to identify common underlying variables which are called factors within a larger set of measures. EFA aids the researcher in identifying patterns among the interrelationships of the items or variables. It can also be used to reduce a large number of variables into a smaller, representative number of manageable factors.

Exploratory factor analysis usually occurs during the early stages of research. EFA is essential to determine the underlying construct for a set of measured variables (Leech et al., 2008). The EFA is often recommended when researchers do not have any hypothesis about the underlying factor structure of their measure. To conduct EFA, the extraction method utilized in this study was the principal axis factoring with varimax rotation. It is important to mention that since EFA is exploratory in scope ("Exploratory and confirmatory," 2009). It is generally used to clarify and describe relationships among variables, not to test hypotheses or theories.

Data Analysis

Once the online survey data collection process was completed, the survey site was closed. The data was downloaded from the http://www.*SurveyMonkey.com* Web site to the researcher's computer. A copy of the data file was sent to the researcher's e-mail address at uno.edu. A back-up copy of the data was maintained for safe-keeping. The next step in data analysis was to import the downloaded survey data into a Microsoft Excel spreadsheet. Following this step, the data were opened (imported) into the current version of the Statistical Package for the Social Sciences (SPSS 17.0 for Windows) software for the statistical analysis. After loading the Excel data file,

SPSS treated each original item header as variable name (column header). It put the corresponding data as the field value for the variable.

The researcher employed necessary data cleaning technique and renamed the column headers with their appropriate variable names representing the corresponding data units. The variables were then recoded using the SPSS data transform menu. The recoded variables' names had an R at its end to signify recode. For example, if the raw variable name was PGPA (prior GPA) then its recoded name was PGPAR. Proper labels, data format, and length were entered for proper display of the data using SPSS.

Once the data for the dependent variable representing the mid-term course grade (MTSCORE) and the independent variables, PAP, CWT, IWF, and MOT were obtained from the survey and imported into the SPSS software package, it was ready for the necessary treatment for data cleaning and missing values. The composite values for the independent variables were obtained from the summated values of each individual cluster of four items representing the stated variable. Johnson and Christensen (2004) suggested the use of multiple items to measure abstract constructs to increase the reliability and validity of the measure. The authors also stressed the use of summated rating scale of multiple items as they provide more reliable composite scores and variability which helps researcher to make finer distinctions among the respondents. Once the data cleaning process and missing value treatment processes were completed, statistical data analysis involving descriptive and inferential statistics were ready to be deployed for analysis.

Multiple regression analysis utilizing Pearson correlational coefficient statistic was conducted to determine the relationship between the level of student performance as indicated by student's mid-term course grade (MTSCORE) and the independent predictor variables of PAP,

CWT, IWF, and MOT. Additionally, logistic regression analysis was conducted using a dichotomous dependent variable with “pass” or “fail” attributes based on the test score reported in survey questionnaire item 29 with a category of less than 70% and the independent variables of PAP, CWT, IWF, and MOT. The idea was to assess whether the four predictor variables could significantly predict the outcome variable of Pass or Fail in the various DE courses at the LTC.

In order to study the group differences in performances between the students intending to study practical nursing (PN) group and others or non-practical nursing (NPN) group, independent samples t test was employed. Additionally, to study the group differences in performances among the students with outside employment and the students without any outside employment, a similar t test was conducted.

Limitations

There were several limitations to this study. The independent and the dependent variables were measured with student’s self-reported data. Since the test scores for the dependent variable were self-reported by the students, some students might not have been forthcoming in reporting their proper scores or they might have reported incorrect data during the survey. This would result in non-response, missing, or wrong data. It was also not possible to monitor if a student took the survey more than once or if a student simply answered the questions without proper thought or attention. Such an activity would impose limitation on the results of this study.

The list of independent variables that had only four predictor variables contributed to the limitations of the study’s results. The survey instrument WBLSS, which was designed and developed by the researcher was also a limitation in the data collection process. The survey and the research context were limited to Louisiana Technical College developmental education students in 33 campuses within seven regions. The study and its findings cannot be generalized

or duplicated in other sectors of higher education or in other programs or modes of online learning. Neither can it be administered at other two-year colleges without further testing and proper modifications.

Exploratory factor analysis which utilized principal axis factoring extraction method with varimax rotation is exploratory in scope. It has various limitations. One of the limitations is that the correlations, the basis of factor analysis, describe relationships. No causal inferences can be drawn from the correlations based on exploratory factor analysis (Suhr, n.d.). The EFA is used to clarify and describe relationships among variables, not to test or confirm hypotheses. Another problem with EFA arises from the fact, that because the first factor explains the most amount of variance, most of the variables will have at least some relationship with the first factor. Therefore, the first factor becomes very generalized and difficult to interpret (Coughlin & Knight, 2007). As a result, many variables may load on more than one factor (double loading) thus adding complexity to the factor structure.

Factor analysis has always been very controversial (Vogt, 2007). It provides correlational evidence that can be used to discuss issues, but factor analysis cannot resolve issues that are open to interpretations. According to Vogt, factor analysis is a technique that we can use to find pattern in data, but the conclusions we draw will be based on the data only in part. The “analyses of patterns in the data leave much room for interpretation” (Vogt, p. 231). Therefore, the reliability and validity of the WBLSS survey instrument that was based on the EFA is subject to the limitations associated with the EFA and the interpretation technique.

Summary

This chapter presented the methods and procedures that were used to guide this study. The chapter included the research questions and the research design. Inferential statistics using

Pearson product moment correlation (r), t test, multiple regression, and logistic regression within the quantitative research framework were utilized to study the relationships between the independent variables and the dependent outcome variable. Cronbach alpha was computed to examine internal consistency reliability for multiple item scales was discussed. Independent samples t-tests were conducted to observe any group differences in student performance.

Data for the study were collected electronically utilizing the SurveyMonkey.com online survey tool from 33 LTC campuses across Louisiana using the WBLSS survey instrument designed by the researcher. The DE instructors in all the 33 campuses were given proper instructions for the survey process with URL addresses to provide to their students. The survey questionnaires, in both the full study and the pre-dissertation pilot study, were discussed. These questionnaires and the other documents used to solicit participants are presented at the end of this manuscript as appendices. The next chapter will discuss this study's findings.

CHAPTER FOUR: FINDINGS

Introduction

The purpose of this chapter is to present the data analyses and findings of this study. These findings were the results as the researcher was seeking answers to the following research questions involving developmental education (DE) course success in the Web-based learning environment at the Louisiana Technical College (LTC) among its academically underprepared students in their efforts to learn the basic skills to be successful in college-level course work. By identifying and examining the relationship between the Web-based developmental education students' individual characteristics and course success, this study addressed the following research questions.

The main research question of this study was: Is there any relationship between the individual factors of students' prior academic preparation, comfort with technology, interaction with faculty, and motivation, and students' course performance in the Web-based developmental education courses? In addition to the primary research question above, this study also addressed the following two secondary questions:

- Are there any differences in the performance levels among the students in the Web-based developmental education courses based on their intended program of study?
- Are there any differences in the performance levels in the Web-based developmental education courses among the students with employment and no employment?

The reasons that the study also looked into any group differences, if existed, in students' course performance levels based on their intended program of study, such as nursing and non-nursing, was because more than half of the students in the developmental education program opted for practical nursing or allied health as their intended program of study. Also, a greater

percentage of student enrollment in the LTC campuses are in nursing or health related programs. This may be due to the employment opportunities that exist, both locally and nationally, in this particular or related field. Since workforce development is LTC's main mission, it is important to study if course successes among the students are related to their intended program of study and/or future job opportunities upon completion.

Additionally, since a large percentage of the LTC students work part-time or full-time and since various researches (Kuh et al., 2006) show that outside employment affects student success, it was important to study such issues among the LTC's developmental education students who are underprepared for college-level coursework. For these students, course success in the developmental education program is very crucial as career education is one of their last resorts to fulfilling their American dream.

Another objective of this study was to assess the reliability and validity of the Web-based Learning Student Survey (WBLSS) scale that was developed by the researcher for this study. To assess any association or relationship between the dependent variable and the independent variables, multiple regression using Pearson product moment correlation coefficient (r) statistic was utilized in this study. Additionally, logistic regression model was utilized to predict the categorical outcome variable of course success or failure (pass or fail) among the students, using the similar set of independent variables. Other statistical models utilizing independent samples t test and ANOVA were also performed for various analyses including assessing any group differences related to this study. The following sections present these analyses and the related findings, beginning with the survey sample characteristics.

Sample Characteristics

The context and setting of this study was the developmental education (DE) programs at the Louisiana Technical College (LTC). The population for this study consisted of the students enrolled in the Web-based DE program that used PLATO Web-based Learning Network (PWLN) curriculum at 33 of the 38 LTC campuses during the Fall semester of 2008. The courses in which the participants were enrolled included developmental English (DVEN), developmental math (DVMA), developmental reading (DVRE), Allied health English (AHEN), Allied health math (AHMA), Allied health reading (AHRE), and Allied health science (AHSC). Students are placed in these courses based on their placement test scores or other deficiencies that need to be addressed before they can qualify for their intended program of study.

According to the LTC Student Record Office, the total number of students engaged in Web-based developmental education including the pre-Allied Health students for the Fall 2008 semester was 2053 (LCTCS IR Office, 2008). This figure excluded the 346 DE students in Region 7 which does not use PWLN. The data collection for this survey was done immediately following the students' Fall 2008 mid-term exams. By the mid-term period, over twenty percent of the DE students drop out or never show up for classes to take exams (B. Hansen and J. Bordelon, personal communication, December 10, 2008). Another 10% of the students were repeating their DE courses. This put the potential population for this Web-based survey at approximately 1435 DE students of the LTC. Initially, 423 participants responded to the survey hosted by SurveyMonkey.com. This puts the initial response rate for this survey at approximately 30 percent.

Among the 423 survey responses, 35 participants mentioned that they were repeating the courses that they were enrolled in. The survey questionnaire Item 12 (Appendix A), "This is my

first time attempting this particular course" was used to detect and exclude any student who was repeating the course so that the study sample consisted students with the common characteristics of first-time DE course enrollee. This would involve students with similar perspectives in terms of their initial experiences with the course environment and in their preparations for the mid-term exam. These 35 cases were excluded from the study's final analyses. Another 8 responses had multiple missing values making such cases unusable for the study. After careful examination and data cleaning, 380 valid cases were included in this study for the final analysis.

Sample Size Adequacy

Out of 1435 potential survey participants in the DE program during the Fall 2008 semester who were targeted for this survey through their DE instructors, 423 students responded and submitted the survey form. This puts this study's survey participation rate nearly at 30 percent. Harrell (2006) reported in a study that response rates for Web-based surveys generally vary in the range of 8-42% with a median response rate of 26%. A University of Texas report on the survey assessment response rates mentioned that online survey response rates vary with an average of 30% (The University of Texas, 2007). PeoplePulse (2008) puts the average combined response rates for online surveys at 26%. The total response rate of 30% for this survey puts this study's response rate at par with online survey averages. For the final data analysis, as the study could not include any repeating students, excluding the 35 repeaters and another 8 unusable cases because of multiple missing data entry, the survey yielded 380 valid cases for this dissertation study. This figure accounted for a valid survey participation rate of 26.5% for this study. It is in line with the median response rates reported by Harrell and others.

In prediction or correlation research, a recommended ratio of sample size and the number of predictor variable is about 15 subjects for every predictor variable (Stevens, 1992). The

number of predictor variable is related to the sample size. The larger the number of predictor variables, the larger the sample size or the number of participants needs to be (Creswell, 2002). This study had four independent variables. With 380 valid survey responses and 4 independent variables, it makes the ratio for this study to be 380 to 4. This ratio is same as 95 to 1. Such a ratio overwhelmingly satisfies the recommended subject to variable ratio of 15 to 1, as suggested by Stevens. Other researchers have suggested a recommended ratio of valid cases to the number of independent variables to be 10 to 1 at the minimum, and a preferred ratio to be 50 to 1. This study met all these sample size and data adequacy recommendations. It also compensated for any issues with the survey response rates mentioned in the previous section.

Respondent Demographics

The survey participants represented the different career paths or intended career path programs that included practical nursing, business, IT/computer tech, and other programs that offer diploma or associate degree curriculum in various LTC campuses across the state. Student demographics included different levels of prior academic preparations, enrollment status, male and female, traditional and nontraditional aged, part-time or full-time employed while pursuing their education. A snapshot of the respondent demographics is presented in Table 4.1.

The commonalities among the participants of this study included students being academically underprepared, facing a Web-based learning environment while pursuing their academic or career goals in a two-year technical college environment. An analysis of the survey data (Table 4.1) found that among the total of 380 respondents, an overwhelming 74.7% of the survey participants were female and 25.3% male students. As for the age groups, 60% of the respondents said they were 24 years of age or younger. That puts 40% of the students surveyed in the 25 years of age or older category.

Table 4.1
Respondent Profiles and Sample Representation (N = 380)

Category		No. of Students	Percent
Gender:	Female	284	74.7
	Male	96	25.3
Age Group:	18-24	228	60.0
	25-30	76	20.0
	Over 30	76	20.0
Program:	Nursing	201	53.0
	Business	42	11.0
	IT/Computer	32	8.4
	Other or Undecided	105	27.6
Employed:	Yes	229	60.0
	No	151	40.0
Enrolled:	Full Time Student	274	72.1
	Part Time Student	106	27.9
Education:	GED	74	19.5
	H. S. Diploma	201	52.8
	Some College	92	24.2
	Associate Degree or More	13	3.5
Fin. Aid:	Pell Grant	220	58.0
	Other	34	8.8
	N/A	126	33.2

About 53% of the students mentioned their intended program of study to be health occupation, 11% business, 8.4% information technology (IT), 27.6% other discipline that included the 2% undecided. Seventy-two percent of the students said they were enrolled full-time while about 28% reported themselves as part-time students. Regarding student employment, nearly 20% said they were employed full-time, 40% said they worked part-time and another 40% said they were not employed. About 67% of the students reported receiving some type of financial aid, while 33% said they did not receive any aid (Table 4.1).

The frequency distributions of the mid-term test scores are depicted in Table 4.2. The scores were self-reported by the students per the survey questionnaire item 29.

Table 4.2

Respondents' Mid-term Scores and Course Success Ratio (N = 380)

Category	Frequency	Percent
Range: Below 60%	12	3.2
60 - 69%	38	10.0
70 – 79%	85	22.4
80 – 89%	148	38.9
90 – 100%	97	25.5
Course: Success	329	86.6
Failure	51	13.4

According to the survey data, 25.5% of the participants reported receiving a score of 90%

or more, about 39% received a score in the 80-89% range, approximately 22% of the students received a score in the 70-79% range. This makes the passing rate in the courses approximately 87% since a student needs a minimum score 70% or more in the mid-term exam in their DE program courses to pass and go to the next level within the coursework irrespective of their programs or intended programs of study.

A student making any score less than 70% is given a grade of D or F, which are failing grades if received in the final exam of the courses. Accordingly, 13.4% students in the DE program were considered failing their mid-term exam (Table 4.2). This included the 10% of the students who received a score in the 60-69% level and a 3.2% of the students who were below the 60% score level. These results did not include the students who dropped out of the DE courses or who never showed up for the mid-term exams.

Exploratory Data Analysis

Prior to conducting any inferential statistics such as regression or other tests to address the research questions, several prerequisite tasks were performed to verify and deal with any issues involving the data for the study, as well as, the assumptions inherent in such statistical tests. These tasks included test for non-response bias, screening for missing data and outliers, conducting tests validating the assumptions of normality of data as required by these models.

Test for Non-response Bias

Huck (2004) argued that late survey respondents resemble more closely to the non-respondents. Huck suggested grouping respondents by arrival date as early responders and late responders. Comparing the dependent variables to see if and how early responders and late responders (non-responders) differ by using t tests can shed some light on the issue of non-

response bias and their effect on the study. Therefore, an independent sample t test between these two groups, early responders and late responders, was conducted using SPSS (Table 4.3).

Table 4.3

Group Comparison on MTSCORE, PAP, CWT, IWF, MOT using t test (n = 340 ER & 40 LR)

Variable	*M*	*SD*	*t*	*df*	*p*
MTSCORE Early Responder	82.21	10.39	2.192	378	.029
Late Responder	78.38	11.02			
Covariates:					
PAP Early Responder	13.71	2.736	-.035	378	.972
Late Responder	13.73	2.689			
CWT Early Responder	15.56	2.888	-.493	378	.622
Late Responder	15.80	2.554			
IWF Early Responder	16.19	3.055	.849	378	.396
Late Responder	15.75	3.176			
MOT Early Responder	14.94	2.662	.910	378	.363
Late Responder	14.53	2.819			

ER = Early Responder; LR = Late Responder

The *t* test group statistics showed (Table 4.3) that late responders were slightly different from the early responders in terms of their mid-term test score (p=.029). The inspection of the

two group means indicated that the average MTSCORE for late responders (78.38) was slightly lower than the score (82.21) for the early responders. The difference between the means was 3.8. The approximate effect size, Cohen's *d* of .4, demonstrates a medium effect size (Cohen, 1988). Since, SPSS software package does not readily display any effect size, its approximate value was calculated by hand using the formula: $d = (M_A - M_B)/SD_{\text{pooled}}$; where M_A and M_B are the means for the two groups being compared (Leech et al., 2008). This may influence the results of the findings to certain extent.

Additional tests for non-response bias were conducted between the independent groups of early responders and late responders (non-responders) on the important covariates (independent variables) of prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT) by using t tests. The statistical analyses found no significant differences between these two groups in term of PAP (p=.972), CWT (p=.622), IWF (p=.396), or MOT (p=.363), shown in Table 4.3. The differences between the two group means (early and late responders) on these factors of prior preparation, comfort with technology, interaction with faculty, and motivation were found to be not statistically significant. Accordingly, this researcher concluded that for this study, the non-response bias was not statistically significant when the covariates were taken into account.

Test for Outliers

Outliers are cases with unusual or extreme values at one or both ends of a sample distribution (Mertler & Vannatta, 2005). A common method to test for outlier is the box plots which "box in" cases that are located near the median value and the extreme values are located far away from the box. The box plot was employed in this study which detected an unlikely value for the MTSCORE of 39 for case number 83, RespondentID 680724816. The same

respondent reported a MTSCORE level of 90% or above. Upon further examination of this respondent's responses in detail and comparing similar responses with other participants, this researcher was of the opinion that the respondent might have made a typing error by entering 39 instead of 93. This particular outlier case was resolved by using 93 for the MTSCORE for this respondent and thereby, minimizing any outlier effect for the incident.

Test for Skewness and Kurtosis

Most common inferential statistics like *t* test, multiple regression, etc. assume that the dependent variable is normally distributed. Therefore, it is important to examine if the dependent variable of this study, MTSCORE, meets such assumptions. Therefore, for this study an examination of normality of the dependent variable MTSCORE was conducted using SPSS. For a normal distribution, Kurtosis and skewness values would be close to zero, but they can range between -1 and +1 (Mertler & Vannatta, 2005).

The skewness statistic observed for the MTSCORE data was -.618 with std. error of .125. The kurtosis value observed was -.250 with a std. error of .25 in this test for normality (Table 4.4). These values are within the acceptable range of normality. The mean value for MTSCORE was 81.8, std. error .539, median was 85, and standard deviation was 10.51. The sig. values of $p < .001$ for both Kolmogorov-Smirnov and Shapiro-Wilk tests of normality indicate a normal distribution of the dependent variable of MTSCORE for this study. Figure 4.1 and 4.2 show the histogram and the normal Q-Q Plot of the dependent variable MTSCORE.

The histogram plot (Figure 4.1) and the normal Q-Q plot (Figure 4.2) show the distribution of the dependent variable MTSCORE to be normal. According to Mertler & Vannatta, a normal distribution would produce a Q-Q plot in which plots fall close to the straight

line as seen in figure 4.2. Therefore, one can conclude that skewness and kurtosis are not a major issue with the sample data set for this study.

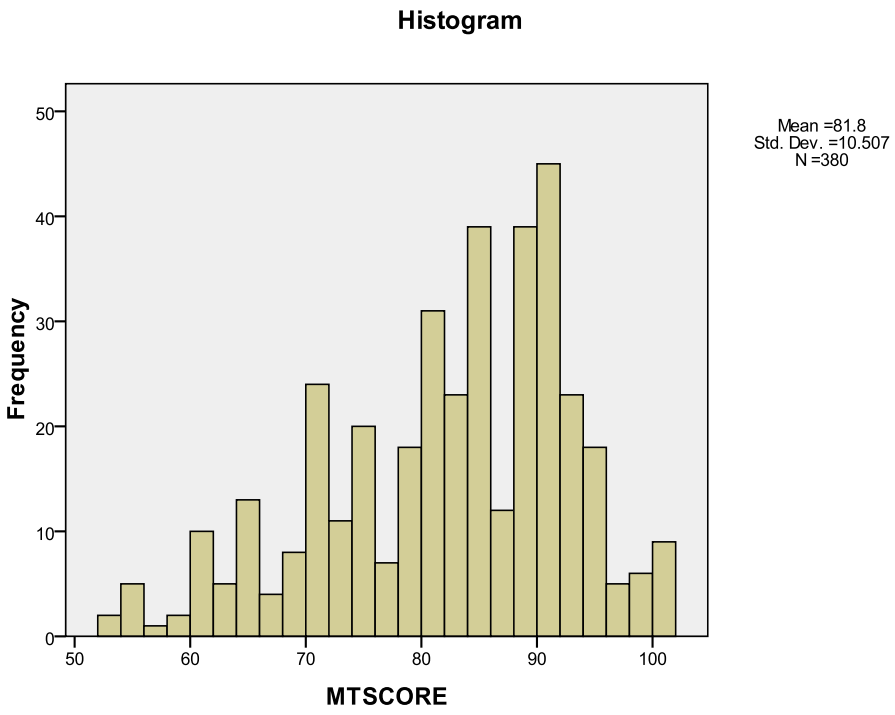


Figure 4.1 Normality Test

Figure 4.2: Q-Q Plot

Descriptive Statistics

After completion of exploratory data analysis as a part of the preliminary data evaluation, descriptive statistics procedures were carried out to derive the values for mean, standard deviation, standard error of the mean, skewness, and kurtosis on MTSCORE for everyone, nursing and non-nursing group, employed and not employed group. Table 4.4 shows the results of the SPSS descriptive statics. The output in Table 4.4 shows that for all the different groups, the MTSCORE variable has skewness value between -1 and 1, which is not of any major concern (Morgan, et al., 2005). Also, among the descriptive statistics for the independent variables, PAP, CWT, IWF, MOT shown in Table 4.4, the IWF variable with the skewness value of -1.049 is a little bit problematic. As a whole, its effect within the groups is not significant. The negative values show skewness to the left. The Kurtosis values are usually not of any major concern

because they do not seem to affect the results of most statistical analysis very much (Morgan, et al.).

Table 4.4

Descriptive Statistics MTSCORE for Different Groups and for PAP, CWT, IWF, MOT

Group	N	*M*	SD	*S.E.*	*Skewnesss*	*Kurtosis*
MTSCORE (For All)	380	81.80	10.507	.539	-.618	-.250
Nursing	201	83.55	9.572	.675	-.786	.585
Non-Nursing	179	79.84	11.169	.835	-.403	-.804
Employed	229	82.40	10.389	.687	-.730	.013
Not-Employed	151	80.90	10.654	.867	-.465	-.521
PAP	380	13.71	2.728	.140	-325	-.193
CWT	380	15.59	2.853	.146	-.559	.539
IWF	380	16.14	3.066	.157	-1.049	1.46
MOT	380	14.89	2.678	.137	-.307	-.303

Reliability and Validity of the Survey Instrument

Several statistical tests were conducted to establish reliability and validity of the WBLSS survey instrument. These tests included internal consistency reliability test using Cronbach's alpha coefficient and exploratory factor analysis. The following sections discuss the results of the tests conducted for the study.

Internal Consistency Reliability

To assess whether the items that were summed to create the composite independent study variable scores formed a reliable scale, the internal consistency reliability coefficients of Cronbach's alpha was computed for the multiple items representing the four independent variables, PAP, CWT, IWF, and MOT. The Cronbach's alpha coefficient for the four items on the WBLSS instrument for this dissertation study, item#13, item#14, item#15 and item #16, representing the independent variable prior academic preparation (PAP) was .58 as shown in Table 4.5. This value indicated a minimally adequate reliability, as in general, an alpha value of .70 or above is considered reliable (Leech, Barrett, & Morgan, 2005). On the other hand, a very high value of alpha (greater than .90) might signal the items to be repetitious.

Table 4.5

Cronbach's Alpha Coefficient for the WBLSS Scale

Scale	*Alpha Coefficient*
Prior Academic Preparation (PAP)	.58
WBLSS Item# 13, 14, 15 & 16	
Comfort with Technology (CWT)	.72
WBLSS Item# 17, 18, 19 & 20	
Interaction with Faculty (IWF)	.85
WBLSS Item# 21, 22, 23 & 24	
Motivation (MOT)	.66
WBLSS Item# 25, 26, 27, & 28	

The Cronbach's alpha coefficient for the four items, item#17, item#18, item#19, and item#20 in the WBLSS scale representing the independent variable of comfort with technology (CWT) was .72 (Table 4.5). According to Leech, Barrett, and Morgan (2005), this value indicates that the items form a scale that has reasonable internal consistency reliability. Additionally, the corrected item total correlation for each item in the CWT scale was moderately high making each of these items a good component for the summated rating scale.

The Cronbach's alpha coefficient for the four items, item#21, item#22, item#23, and item#24 representing the independent variable of interaction with faculty (IWF) was .85 (Table

4.5). This value indicates that the items form a scale that has high and strong internal consistency reliability. The corrected item total correlation for each item in the IWF scale was high, making each item a stronger component for the summated rating scale. The Cronbach's alpha coefficient for the four items, item#25, item#26, item#27, and item#28, representing the independent variable student motivation (MOT) was .66. This value indicates that the items form a scale that has fairly good internal consistency reliability.

Exploratory Factor Analysis

Exploratory factor analysis was conducted to examine the underlying structure of the variables used in the WBLSS scale by observing the related factor loadings. To achieve this goal, first, the correlational matrix and the KMO and Bartlett's test were conducted in SPSS 17 to assess the suitability of the data for factor analysis. Second, the Eigenvalues, initial and rotated, and factor variance were found. The extraction method utilized in the exploratory factor analysis (EFA) was the principal axis factoring. The rotation method was the varimax orthogonal rotation. Using SPSS version 17, all these processes were pre-selected for running the test. The results of the KMO and Bartlett's test are shown in Table 4.6.

The KMO and Bartlett's test of assumptions (Leech, Barrett, & Morgan, 2005) conducted in the factor analysis showed Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Table 4.6) to be .878. This number satisfied the condition, greater than .70, and thereby indicated that there were sufficient items for each factor. The sig. value of $p < .001$ indicated that the correlation matrix was significantly different from an identity matrix (Leech et al., 2005). The determinant value (.003) of the correlation or covariance matrix (greater than .0001) indicated no collinearity issues. For a value close to zero indicates high collinearity and a value of zero indicates no solution is possible (Leech et al., 2005).

Table 4.6

KMO and Bartlett's Test

Assessment	Results
KMO Measure of Sampling Adequacy	.878
Bartlett's Test of Sphericity	2143.750
Approx. Chi-Square	2143.750
df	120
Sig.	.000
Correlation Matrix Determinant	.003

Table 4.7 displays the data for the four factor loadings generated by SPSS. The data extraction method utilized was the principal axis factoring with varimax rotation to summarize all the variables in the WBLSS scale.

Table 4.7

Factor Loadings for the Rotated Factors

	Factor Loading			
Questionnaire Item	1	2	3	4
27-SelfDirect	.802	.110	.093	.162
25-CourseUtility	.767	.017	.184	.125
24-Opper2Intrac	.663	.128	.436	.167
26-Freedom	.651	.189	.230	.091
23-Support&Guide	.542	.137	.511	.136
20-EmailUse	.037	.621	.096	.116
17-ComfwComp	.045	.568	.107	.182
19-NavCourse	.274	.560	.222	.253
18-InternetUse	.148	.556	.046	.230
22-ComfSeekHelp	.414	.128	.644	.200
21-InsInteract	.296	.211	.592	.276
28-HrsSpent	.085	.064	.088	.010
14-PSKILLS	.291	.132	.256	.602
15-SSKILLS	.199	.160	.024	.554
16-COMPASS	.037	.158	.040	.387
13-High School GPA	-.020	.157	.155	.310
Eigenvalues	2.9	1.6	1.5	1.3
% of Variance	18.0	9.8	9.3	8.1

After rotation, the first factor accounted for 18.0% of the variance (Table 4.7). The second factor accounted for 9.8% of the variance, the third factor accounted for 9.3% of the variance, and the

fourth factor accounted for 8.1% of the variance. The first factor seems to index MOT. The items 27, 25, 26 in the WBLSS scale depicting self-directed nature of the course (.802), course utility (.767), and freedom to work anytime (.651) respectively, load on the first factor which seems to index MOT. Items 23 and 24, "support & guidance" and "opportunity to interact," although load well with MOT with loading factors of .542 and .663 respectively, they also cross load (double load) on the third factor that seems to index IWF with a loading factor of .511 and .436 respectively. Such loadings are open to interpretation. Coughlin and Knight (2007) suggest selecting items that relate strongly, items should evidence factor loadings of .40 or above. Coughlin and Knight also suggest deleting or dropping items that are double loaded with .40 or above on more than one factor. This adds to the complexity of the factor structure.

In an attempt to address this complex issue, I relied on the literature as an aid to help identify the factors associated with the instrument. On the issue of item 23, "support & guidance" and item 24, "opportunity to interact," I relied on Tinto (1993) to associate them with the IWF factor with respect to the WBLSS instrument. Tinto posited that academic integration through student-faculty interaction plays a critical role in student persistence. Also, the support and guidance of the faculty is integral part of student-faculty interaction. The other two items that load well on the third factor (IWF) are items 22 (.644), "felt comfortable asking instructor for help" and 21 (.592), "have been in touch with instructor."

Item 28, "number of hours spent on studies," does not load well on any particular factor. This item is included in the motivation (MOT) scale based on the review of the literature (Carroll, 1989). This particular item may have contributed to the apparent anomaly in the findings of this study with respect to motivation and course success. The factor analysis shows that items, 20, 17, 19, and 18 in the WBLSS scale load strongly on the second factor which

seems to index CWT. The factor analysis also found that items, 14, 15, 16, and 13, load strongly on the fourth factor which seems to index PAP (Table 4.7).

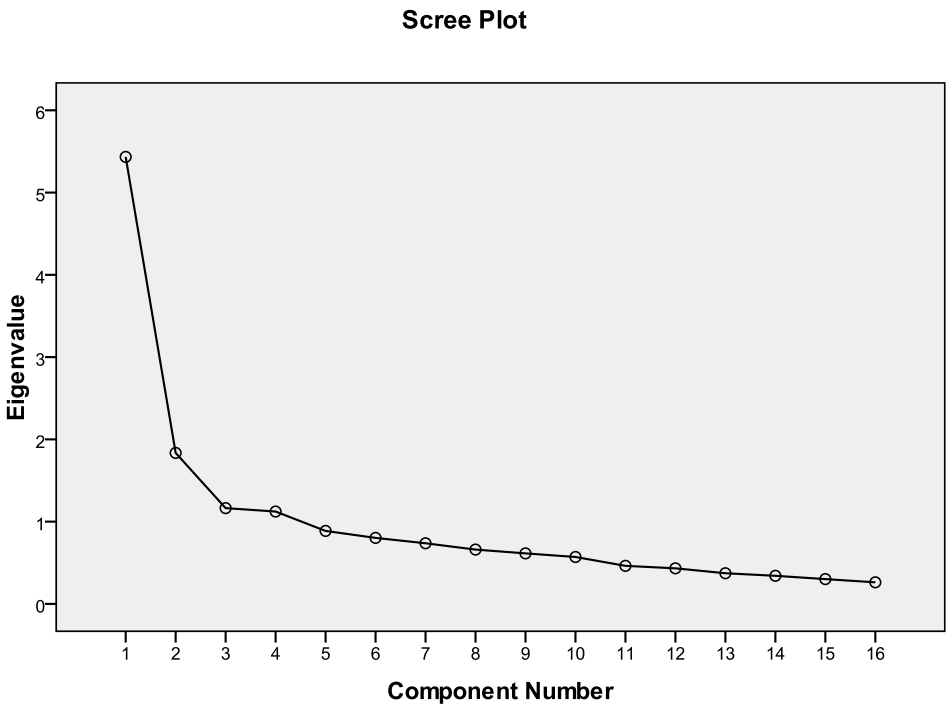


Figure 4.3: Scree Plot

The EFA test also identified four factors based on initial Eigenvalues greater than 1.0. "Kaiser's rule," the most widely accepted criterion developed by Kaiser, states that only those components whose eigenvalues are greater than 1.0 should be retained (Mertler & Vannatta, 2005). Also, the scree plot in figure 4.3 suggests four factors with eigenvalues greater than 1.0. The slope levels off after the four points. Two points in the vertical direction confirmed the two factors with significant eigenvalues, while the other two points in the slope had acceptable values of greater than 1.0. Therefore, the scree plot thus suggests four factors in this study.

These statistical methods including internal consistency reliability, exploratory factor analysis, content validity, and pilot study and full study tests demonstrate that the WBLSS instrument is a reasonably valid and reliable instrument within its limitations in scope and context.

The Primary Research Question

The primary research question guiding this study asked: Is there any relationship between the individual factors of students' prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT), and students' course performance (MTSCORE) in the Web-based developmental education courses?

To answer this question the multiple regression statistical model involving all four predictor variables, PAP, CWT, IWF, and MOT and the numerical criterion variable of mid-term score (MTSCORE) was conducted in this study primarily because of its versatility and precision (Creswell, 2002). The multiple regression model examines the significance of each independent variable to predict the dependent variable as well as the significance of the entire model to predict the dependent variable (Mertler & Vannatta, 2005).

Test for Multicollinearity

In addition to the prior procedures that were conducted as mentioned in the previous sections such as testing assumptions of normality, the issue of multicollinearity needed to be addressed prior to the execution of the multiple regression (MR) procedure and related analysis. As a result, the correlations among the predictor variables prior to running multiple regression were checked by conducting Pearson correlations using the SPSS bivariate procedure (Table 4.8). Throughout these tests the SPSS default or preset alpha level of .05 has been used.

Table 4.8

Intercorrelations for the Four Predictor Variables in the WBLSS Scale (N = 380)

Predictor Variable	1	2	3	4
1. Prior Prep (PAP)	1	.415**	.428**	.312**
2. Comfort w Tech (CWT)	.415**	1	.404**	.289**
3. Interaction w Faculty (IWF)	.428**	.404**	1	.629**
4. Motivation (MOT)	.312**	.289**	.629**	1

**Correlation is significant at the 0.01 level (2-tailed).

The correlation matrix in Table 4.8 with *p* value or significance level of less than .01 indicates that most of the independent predictor variables are within a good range of Pearson correlation factor of less than .500. Two factors with correlations of .629, involving the MOT and IWF variables exceeded the standard level of .500. This is a little problematic, but tolerable. Mertler and Vannatta (2005) suggested that if the intercorrelations value is .80 or higher, then it should be addressed by combining the variables involved to create a single measure that addresses a single construct. In this study, the data representing the study variables were within the fair range with respect to any collinearity issues. Next, multiple regression statistical procedures were conducted to answer the primary research question.

Multiple Regression Model

Multiple linear regression procedures were conducted in this study to examine any correlations and to determine the best linear combination of the factors under study, prior

academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT), for predicting the mid-term test score (MTSCORE), the dependent variable of this study. Prior to the MR test, assumptions of linearity and normality of data were checked and met as previously described.

The multiple regression model summary, adjusted R square value and other relevant data are presented in Table 4.9. The alpha level for this model was the SPSS default of .05. The adjusted R square value of .173 indicates that this model explains about 17% of the variance in the mid-term exam score (MTSCORE). The figures in Table 4.9 suggest that this model significantly predicts MTSCORE with a significance value of $p < .001$.

The combination of factors selected in this model significantly predicted MTSCORE, $F(4,375) = 20.81$, $p < .001$, with all four predictor variables contributing to this prediction model. The approximate adjusted R squared value of .2 indicates a medium effect size or Cohen's d (Gravetter & Wallnau, 2004). The beta weights and the sig. values in Table 4.9 suggest that the factor, active interactions with faculty (IWF) with a parameter estimate weight of .821 and sig. value of $p < .001$ contributed most to predicting MTSCORE. Also, the prior academic preparation (PAP) factor with an parameter estimate of .518 and sig. value of .013 contributed significantly in predicting course performance in the mid-term test (MTSCORE) among the LTC students in the Web-based DE program. Student motivation (MOT) with a parameter estimate of .447, although not significant at the .05 level, can be considered as minimally contributing to students' course performance factor of MTSCORE.

Table 4.9

Multiple Regression Analysis Summary for Predicting MTSCORE (N = 380)

Variable	*B*	*SEB*	*β*	*t*	Sig.
Prior Prep (PAP)	.518	.208	.135	2.487	.013*
Comfort w Tech (CWT)	.189	.197	.051	.958	.338
Interaction w Faculty (IWF)	.821	.222	.240	3.703	.000**
Motivation (MOT)	.447	.236	.114	1.894	.059
Constant	51.843	3.582		14.473	.000

Note. Adjusted R^2 = .173; F(4, 375) = 20.81, $p < .001$

*$p < .05$; **$p < .01$

According to this model, the factor, comfort with technology (CWT), with a parameter estimate of .189, did not have any statistical significance in predicting students' mid-term score (MTSCORE). Based on the values in the sig. column in Table 4.9, one can draw conclusions that two predictor variables, IWF and PAP, contributed significantly to MTSCORE and the variables, CWT and MOT, did not have any statistically significant contribution to the equation. This model shows that the variables PAP and IWF, when combined with MOT and CWT, significantly influence students' mid-term test performance. Using this model, a student's course performance (MTSCORE) in the mid-term test can be predicted with the following linear equation:

MTSCORE = 51.843 + .518 (PAP) + .189 (CWT) + .821 (IWF) + .447 (MOT)

Logistic Regression Model

Logistic regression model was utilized to assess whether the four predictor variables, prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT), significantly predicted LTC students' course success, using a pass or fail criterion, in the mid-term test in the Web-based developmental education courses. The dichotomous dependent variable was PassCourse (Pass = 1, Fail = 0). Table 4.10 presents the major findings of this test.

Table 4.10

Logistic Regression Predicting Odds of Mid-term Pass-Fail criterion (N = 380)

Variable	*B*	*SE*	*Odds Ratio*	*p*
Prior Academic Prep (PAP)	.142	.071	1.152	.047
Comfort with Tech (CWT)	.057	.062	1.058	.359
Interaction with Faculty (IWF)	.188	.066	1.207	.004
Motivation (MOT)	.125	.079	1.134	.113
Constant	-5.402	1.157	.005	.000

Among the four variables, IWF contributed most to predicting the pass/fail criterion with its significance value of *p* (.004). Another variable, PAP, also contributed significantly to the pass/fail odds ratio with its *p* value of .047. However, the logistic regression model also found that the other two test variables, CWT and MOT, did not have any statistical significance in their contribution in predicting students' course success probability.

Logistic regression is based on probabilities and odds. In a logistic regression application, odds are defined as the ratio of the probability that an event will occur divided by the probability that the event will not occur (Mertler & Vannatta, 2005). The odds ratio in this model indicates the odds of passing the mid-term test (MTSCORE > or = 70) improve by the factor under the odds ratio column corresponding to the selected variable. A value of more than one has increased odds or chances in predicting the dependent or the outcome variable. In this model, the confidence interval (CI) of 95% has been used, a default value for SPSS for this model.

The odds ratios depicted in the Table 4.10 suggest that the odds of passing the mid-term test are increasingly greater with increased student-faculty interactions, IWF (B = .188; odds ratio = 1.2) and with prior academic preparations, PAP (B = .142; odds ratio = 1.15). The model summary table in Appendix H shows a rough estimate of variance that suggests that 25% (Nagelkerke R Square) of the variance could be predicted from the combination of the four study variables. On the other hand, Cox & Snell R Square value of .137 suggests only 14% of such variance could be predicted from the combination of the four variables through this model. The model also suggests that students' comfort with technology has the minimum contribution in passing DE program courses when all the four dependent variables are combined.

The omnibus tests of model coefficients (Appendix H) suggest that the overall model is significant when all four independent variables are entered since the significance value is less than .001 ($p < .001$). Upon combining all the four predictor variables, PAP, CWT, IWF, and MOT together in this model, they significantly predict whether or not a student would pass the mid-term test, $\chi^2 = 56.21$, $df = 4$, N = 380, $p < .001$.

The Secondary Research Questions

First Secondary Research Question

The first of the two secondary research questions was: Are there any differences in the performance levels among the students in the Web-based developmental education courses based on their intended program of study? To answer this question, the independent samples *t* test was employed. The test is appropriate when the independent variable (IV) is defined as dichotomous or has two categories and the dependent variable (DV) is quantitative or scaled. In this study, the IVs were dichotomous (nursing/non-nursing) and the DV was approximately normal and scaled (MTSCORE). Therefore, the independent samples *t* test was appropriate.

An independent samples *t* test was performed which shows (Table 4.11) that the students intending to major in nursing programs were significantly different from the students whose intended majors are different on their mid-term test performance ($p = .001$). Upon examining the two group means it was found that average mid-term test performance (MTSCORE) for the students intending to study nursing ($M = 83.55$, $SD = 9.57$) is significantly more than the non-nursing students ($M = 79.84$, $SD = 11.17$). The difference between the two means is 3.71. The approximate effect size, Cohen's *d*, is .36, which is medium (Cohen, 1988).

Table 4.11

Group Comparison on Mid-term Score using t test (n = 201 Nursing major & 179 Non-nursing)

Variable	*M*	*SD*	*t*	*df*	*p*
Mid-term Score (MTSCORE)			3.459	352	.001
Intended Nursing Major	83.55	9.572			
Not Nursing Major	79.84	11.169			

Note. Equal variance not assumed

Table 4.11 presents the findings of this test. The *t*-value was found to be statistically significant, (t (352) = 3.46, $p < .001$). This indicates that there are significant differences between the two groups in terms of their performance in the mid-term test. Here, the Levene's test for the assumption of equal variances assessment was not met since Levene's *F* was statistically significant (.001). The sig. value of .001 was less than or equal to .05. Therefore, the variances are significantly different and the assumption of equal variances is violated (Morgan, et al., 2005). Therefore, in this case, equal variances were not assumed and the SPSS generated data was handled accordingly in presenting the findings.

Second Secondary Research Question

The second secondary research question for this study was: Are there any differences in the performance levels in the Web-based developmental education courses among the students with employment and no employment? To answer this question, the independent samples *t* test was employed. In this study, since the dependent variable of MTSCORE was also approximately

normal and scaled and the independent variable of employed or not, was dichotomous, the independent samples *t* test was appropriate. Table 4.12 presents the findings of this test.

Table 4.12

Group Comparison on Mid-term Score using t test (n = 229 Students Employed & 151 Students Not Employed)

Variable	*M*	*SD*	*t*	*df*	*p*
Mid-term Score (MTSCORE)			1.360	378	.175
Students with Employment	82.40	10.389			
Students No Employment	80.90	10.654			

An independent samples *t* test was performed which indicated (Table 4.12) that the students with employment were not significantly different from the students without employment in terms of their mid-term test performance ($t = 1.360$; $p = .175$). Inspecting the two group means it was found that average mid-term test performance (MTSCORE) for the students with employment ($M = 82.40$, $SD = 10.389$) is slightly more than the students without any employment ($M = 80.90$, $SD = 10.654$). The difference between the two means is 1.5. It makes the approximate effect size (d) to be .14. This value of Cohen's d signifies a small effect size (Cohen, 1988). Therefore, it can be said that outside employment was not an important factor in students' course performance in the Web-based developmental education program.

Since, the SPSS software package does not readily display any effect size the approximate value was calculated by hand using the formula:

$d = (M_A - M_B)/SD_{pooled}$; where M_A and M_B are the means for the two groups being compared (Leech et al., 2008).

Summary

This chapter presented the findings drawn from the data analyses of the study involving individual characteristics and course performance. The multiple regression model employed in this study showed that there was a significant positive correlation between the outcome variable, MTSCORE, and the predictor variables, when all the variables were combined. The adjusted R square value of .173 observed in the model summary indicated that this model explained about 17% of the variance in the students' mid-term test scores (MTSCORE).

Of the four predictor variables in the multiple regression model, the study found two variables in particular, interaction with faculty (IWF) and prior academic preparation (PAP), to contribute significantly to mid-term test scores (MTSCORE). The IWF factor with a parameter estimate of .821 and sig. value of $p < .001$ and the PAP factor with a beta weight of .518 and sig. value of .013 contributed most to predicting performance in the mid-term test (MTSCORE) among the LTC students in the Web-based DE program courses. The other two predictor variables, MOT and CWT, had no statistical significance in predicting MTSCORE.

The omnibus tests coefficients in the logistic regression model suggested that the overall model was significant when all four independent variables were entered in the model together. The model summary suggests that 25% (Nagelkerke R Square) of the variance could be predicted from the combination of the four variables in the model. The predictor variable, IWF with *B* value of .188 and sig. value of .004 and the variable PAP with *B* value of .142 and a sig. value of .047 contributed most to this logistic regression model. The odds ratios depicted in the Table 4.10 suggest that the odds of passing the mid-term test are increasingly greater with

increased student-faculty interactions, IWF (B = .188; odds ratio = 1.2) and with prior academic preparations, PAP (B = .142; odds ratio = 1.15).

In answering the first secondary research question involving the two groups, the students with intention to join nursing programs and the students in non-nursing programs, data analysis revealed that there were significant mean differences, 3.71, between these two groups in terms of mid-term test scores. The second secondary research question involved group differences in mid-term course performance between the students with employment and the students without employment. The study findings indicated that there were no significant differences between these two groups in terms of their course performances in the mid-term test.

The Cronbach's alpha coefficient computed for the items in the WBLSS survey scale representing the independent variables PAP, CWT, IWF, and MOT had a range of .58 - .85. This alpha range indicated that the items in each scale had reasonable to good internal consistency reliability. The factor analysis procedure identified four factors based on initial Eigen values greater than 1.0, validating the underlying structure composed of four factors selected for the WBLSS scale. These findings validated the researcher developed WBLSS instrument within its limitations, which was one of the purposes of this study.

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

Overview

This study was designed to identify and examine certain individual factors related to student characteristics that contribute to student success in Web-based developmental education courses among the academically underprepared students in Louisiana Technical College (LTC). Through such identification and analysis, a prediction model of student course success based on their individual characteristics was presented in Chapter Four. The factors reflecting individual characteristics that the researcher first gathered for this study, was based on the review of the literature and the knowledge gained through personal and professional experience in this field.

This chapter analyzes and discusses the results of the investigation with regard to the research questions posed in Chapter One. It also presents any possible implications of the findings of the study for research, theory, and practice, specifically in the area of technical and career education and workforce development. Additionally, the chapter offers recommendations for future research on the topic of student success in the Web-based developmental education environment at the two-year community and technical colleges.

Analysis and Discussion

The “open access and success for all” policies of the two-year colleges have brought many challenges as they strive to provide education to many underprepared students entering these colleges with deficient academic skills and different levels of preparation. Developmental education (DE) is a part of the answer to many of these issues of academic under-preparedness of a growing number of students who come from a diverse socioeconomic background, often from the disadvantaged communities (Cohen & Brawer, 2003). Moreover, facing various financial and logistic constraints, the two-year colleges have resorted to Web-based and other forms of

elearning to educate its ever growing, at-risk, underprepared students in the DE programs. With the current state and national economy in disarray, such trends of delivering DE programs will continue to grow to cut cost and "educate more for less." In order to emerge from these circumstances, it is crucial to find new solutions to enhance success of these students in meeting their academic and career needs and goals. Toward such goals, this study was conducted to develop a predictive model of students' course success in Web-based DE programs in a two-year college in Louisiana using individual characteristics as the predictor variables.

Individual Factors

The concept and definition of student success in higher education is complex and varied with its multifaceted perspectives and implications. Berge and Huang (2004) posited that variables and strategies regarding learner success which predict student persistence should be considered at the individual, course, program or institutional level since no one simple explanation or solution exists to help students toward course or degree completion. Accordingly, this study focused on the success factors at the individual and course levels by gaining insights on student perspectives regarding the factors that contribute to their course success. Identifying and examining the factors that predict student's academic success is critical to understanding student persistence and in developing solutions for retention issues in higher education.

Kuh et al. (2006) related student success to academic achievement, acquisition of desired knowledge, skills, and competencies, persistence, and attainment of educational objectives. This study looked at student success factors from the perspective of DE course success and student's individual characteristics. Individual characteristics are inherent, unique traits that often manifest in observable behaviors. Individual characteristics are generally responsible for an individual's unique learning styles, abilities, and academic success. With the unique situation and course

settings of the LTC developmental education program, this researcher gathered four predictor variables based on the review of the literature and professional experience to investigate their correlation and contribution to students' course success (MTSCORE) in the Web-based DE program. These variables included students' prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT).

This researcher is aware that there are various individual factors that influence academic or course success. The reasons for keeping this study limited to only four factors were to keep this study simple and manageable in terms of resource and time without sacrificing the quality of this research. Two variables, IWF and PAP, among the four, were found to contribute significantly to influence students' mid-term test scores (MTSCORE), the dependent or outcome variable of the study. The other two variables, CWT and MOT, did not have any statistical significance in students' mid-term test performance.

Such mixed findings were interesting as well as surprising to the researcher of this study. The study's findings regarding the variables, interaction with faculty (IWF) and prior academic preparation (PAP), provided support to some of the well known and widely cited models and theories including Tinto (1993), Bean and Metzner (1985), and Kuh et al. (2006). On the other hand, the findings regarding the variables comfort with technology (CWT) and motivation (MOT) did not align well with some of the established theories and models regarding technological self-efficacy (Miltiadou & Yu, 2000; Pintrich & De Groot, 1990) and motivation (Bandura, 1986; Schunk, 2004; Carroll, 1989; Weiner, et al. 1971).

The reasons for such an anomaly could be various. Among some of the reasons, it could be the context of the study and the participants, which are different from the four year colleges upon which most of the established theories and models are based. It could also lie on the survey

instrument and in the data gathering process. Additional research on this topic involving two-year technical college students would shed more light on these findings.

Conceptual framework

The conceptual framework for this study focused on one of the two major aspects affecting students' learning and academic success. The two aspects that influence learning and course success are student's individual characteristic and institutional characteristics. These two aspects are regarded by many literatures as the primary agents influencing student success. The conceptual framework in this study (Figure 2.1, Chapter Two) involved the aspect of individual characteristics and its relationship with student learning and course success. The model was adapted from the Kuh et al. (2006) model of student success which refers to student's individual characteristic as student behavior. The four individual characteristics that this study focused on were students' prior academic preparation, comfort with technology, interaction with faculty, and motivation.

The conceptual framework depicted in Figure 2.1 shows the relationships between the independent variables of PAP, CWT, IWF, and MOT and the dependent variable of mid-term score (MTSCORE). As depicted in the conceptual framework, course success (MTSCORE), which is considered to represent student success, is dependent on individual learning, indicated by the direction of the arrow. Web-based learning effectiveness, which is a subset of learning in general, affects student grade or course performance. The independent or predictor variables, PAP, CWT, IWF, and MOT, related to student attributes or individual characteristics, were assumed to affect learning and course performance of the DE students in LTC's Web-based learning environment.

Per findings of this study, the two variables that positively influenced students' mid-term course performance (MTSCORE) significantly were IWF and PAP. The other two variables did not have any significant influences on MTSCORE. These two predictor variables were CWT and MOT. These findings suggest that the conceptual framework was partly effective in depicting the concept relating individual characteristics to students' course success in the context of this study.

Based on the study's findings and the review of the related literature, further research on this topic involving two-year technical college DE students should be done which should expand the study's independent variable list to include individual factors such as self-efficacy and individual learning style. Moreover, the conceptual framework should also be somewhat modified or expanded to take into account any new construct depicting individual characteristics. The conceptual framework depicted did provide guidance for this study and the results of this study do partially validate the framework in light of the existing literature on this subject.

The Survey Instrument

For this study the data needed to address the research questions was gathered by using a survey instrument developed by the researcher. The rationale for designing the LTC Web-based learning student survey (WBLSS) instrument was that no reliable and valid instrument could be found that measures the factors used in this study, focusing the underprepared technical college students in the Web-based learning environment.

The content validity of the survey instrument, Web-based learning student survey (WBLSS), was based on the feedback from a group of experienced Web-based and online instructors. The group included developmental education instructors at technical and community colleges. The instrument was pilot tested several times before its deployment in the full study for this dissertation. The internal consistency reliability for the WBLSS survey instrument utilized

during this full study was tested using the Cronbach's alpha coefficient. For the prior academic preparation (PAP) sub scale the Cronbach's alpha coefficient was .58 (Table 4.5, Chapter Four). The Cronbach's alpha for CWT was .72, alpha coefficient for IWF was .85 and the alpha coefficient for MOT was .66. Each of the components of the WBLSS survey instrument exceeded the minimum internal consistency reliability alpha coefficient of .50 (Huck, 2004). Generally, a Cronbach's alpha coefficient value of .70 or above is considered reliable. These alpha values for the WBLSS scale indicated more than the minimally adequate reliability of Cronbach's alpha coefficients (Leech, Barrett, & Morgan, 2005).

In order to test construct validity of the Web-based Learning Student Survey (WBLSS) instrument, Exploratory Factor Analysis (EFA) procedures were employed. The EFA test identified four factors based on the initial Eigenvalues greater than 1.0 (Figure 4.7, Chapter Four). The "Kaiser's rule," which is the most widely accepted criterion developed by Kaiser, states that only those components whose eigenvalues are greater than 1 should be retained (Mertler & Vannatta, 2005).

The results of the statistical tests conducted in this study, including internal consistency reliability test, exploratory factor analysis, content validity, and pilot and full study testing demonstrate that the WBLSS instrument is a reasonably valid and reliable instrument within its limitations in scope and context. However, in spite of these results, the limited testing and validation methodology lends this survey instrument vulnerable to reliability and validity issues.

Primary Research Question

The primary research question guiding this study asked: Is there any relationship between the individual factors of students' prior academic preparation, comfort with technology,

interaction with faculty, motivation, and students' course performance in the Web-based developmental education courses?

To answer this question multiple regression statistical model was employed which involved all four selected predictor variables, PAP, CWT, IWF, and MOT and the numerical criterion variable of mid-term test score (MTSCORE). This model was selected primarily because of its versatility and precision (Creswell, 2002). Multiple regression method examines the significance of each independent variable as well as the significance of the entire model to predict the dependent variable.

Significant Predictor

The multiple regression model analysis summary for predicting the mid-term test scores (MTSCORE) as depicted in Table 4.9, Chapter Four, found two of the predictor variables, IWF and PAP, to be statistically significant. The beta weights and the sig. values suggest that the variable, active interactions with faculty (IWF), with a parameter estimate coefficient of .821 and sig. value of $p < .001$ and the variable, prior academic preparation (PAP), with a beta coefficient of .518 and sig. value of .013 contributed most in predicting course performance in the mid-term test (MTSCORE) among the developmental education students at the LTC.

These findings suggest that active interactions with faculty (IWF) contributed most to predicting MTSCORE and to the model. These values are statistically very significant. The findings are consistent with Chickering and Gamson's (1987) "Principles of good practice in undergraduate education," the first principle among the seven. The principle states that contacts between students and faculty, suggesting frequent student-faculty interactions in and out of classrooms, to be very important in student involvement and their academic success. The

significant value of the IWF factor in this study's findings concurs with Chickering and Gamson's first principle of good practice in undergraduate education.

In dealing with underprepared students' academic success, Cross (1971) also stressed the importance of student-faculty interactions, prompt feedback, and support and encouragement. Several items in the WBLSS measuring the IWF factors directly mentioned these attributes. The significance of the IWF variable revealed in the MR test supports Cross's findings. Tinto's (1993) model on student persistence points to academic and social integration of traditional students. The model posits positive relationship between student-faculty interactions and academic success. The results of this study partially validates Tinto's model in LTC's developmental education context which include both traditional and nontraditional students.

Additionally, Braxton, Sullivan, & Johnson (1997) reported that the critical issues in student success in online courses are related to student's sense of belonging. This sense of belonging, in essence, is interacting and bonding with faculty and fellow students. From personal experience and professional practices involving teaching and learning, this researcher agrees with the findings of this study regarding the IWF factor which plays a significant role in student's academic engagement and success. Furthermore, Kuh et al. (2006) cited the importance of students' interactions with faculty and peer in their framework of student success. This study's findings with respect to the interaction with faculty (IWF) variable, agree with Kuh, et al. framework, upon which the framework of this study was founded.

In addition to IWF, another variable of this study, prior academic preparation, also contributed significantly in predicting student's course performance in mid-term test. Hearn's (2006) statement referring student success to be heavily influenced by precollege background and experience is also reflected in this study's findings as observed in the MR model relating to

the PAP factor. Boylan (1999) mentioned that among variety of reasons, lack of previous academic preparedness contributed most to student failures in colleges. Wojciechowski and Palmer's (2005) study on online community college students found positive correlations between student's placement test scores and course success. In this study the COMPASS placement score was an important item measuring the PAP scale, which revealed significant correlations with student course success.

Tinto (1993) asserted that the skills students bring with them to college shape their persistence and academic success. The findings of this study shows that Tinto's visionary observations can even be traced in the course success of the developmental education students in the Web-based environment at the Louisiana Technical College as well. Also, Pascarella and Terenzini (2005) in their study asserted that the best predictor of whether a student will graduate or not are academic preparation and motivation. This study's findings support Tinto as well as Pascarella and Terenzini's earlier observations regarding prior academic preparation and students' course or academic success.

The Kuh et al. (2006) framework of student success also illustrates the roles of students' prior academic experience and interaction with faculty in enhancing student persistence and academic success. In developing a framework for promoting success for all, Perna and Thomas (2006) posited that prior academic preparation was an important part of college readiness. Academic performance and achievements are often regarded as valuable indicators in the student success process. The findings of this study partially validates Perna and Thomas's framework, success for all, by revealing significant relationship between the independent variable of prior academic preparation and the dependent variable of mid-term test score. It also partially validated Tinto's (1993) academic and social integration (IWF), Chickering and Gamson's

(1987) prior academic preparation (PAP) and faculty-student interaction, and Kuh et al. (2006) student behaviors and interaction with faculty (IWF), and prior academic preparation (PAP) relating to course performance, which in turn points to academic achievement.

The logistic regression model found the same two variables, IWF and PAP, to be statistically significant (Table 4.10). For the IWF, the *p* value was .004 and for PAP, the *p* value was .047. The alpha value for the model was SPSS default or preset value of .05. Therefore both of these models came up with the same conclusion regarding the contribution of the predictor variable of IWF and PAP to their respective models and their significance in the study.

Non-significant Predictor

In the multiple regression (MR) model, student motivation (MOT), with a parameter estimate of .447 and the sig. value of .059 did not have any statistical significance. Neither did the CWT variable. Therefore, the variables MOT and CWT did not contribute in predicting student performance in the mid-term tests.

The findings regarding the MOT factor does not resonate well with the literature on motivation and academic success. Various study findings in online learning, including Perez & Foshay (2002), Chang (2005), and Linnenbrink and Pintrich (2002) report greater significance for motivation and its contribution to student success and academic achievements. In their seven principles of good practices in undergraduate education, Chickering and Gamson's (1987) fifth principle of good practice referred to students' efforts and dedication to learning, a measure of motivation, to have major influence on student success. This study's findings relating to the MOT factor failed to support these assertions.

The self-efficacy aspect in Bandura's (1986) social cognitive learning theory is regarded as a significant motivator and predictor of academic performance and course success in

traditional classroom learning (Lee, 2001). The MOT scale in the WBLSS instrument had several items reflecting student's self-efficacy. Schunk (2004) also asserted that motivation and self-efficacy are especially significant in school learning and academic achievements. The reasons for this study's findings regarding the motivation (MOT) factor contributing very minimally to the model may highlight issues with the MOT scale in the study or other student or environmental factors.

The factor representing the comfort with technology (CWT) construct in the MR model was statistically not significant. Therefore, it had no contribution to course performance according to this model's findings. The reasons for such findings could be that nowadays majority of students entering the LTC are well versed in digital literacy. Students know how to use computers or the Web before they enter college. Also, the logistic regression model found CWT variable to be not significant in predicting students' mid-term test scores (MTSCORE). Chickering and Ehrmann (1995) posited that incorporating technology as lever would further enhance the "seven principles" of good practice in undergraduate education and would thereby enhance student success. This study did not find student's comfort with technology (CWT) factor as a significant contributor in the course success model designed by the researcher of this study. This finding was also in contrast with the comments in the pilot study that underprepared students' comfort with technology and technological competencies play crucial roles in students' course success. This study finds that students' comfort with technology factor was not significant in predicting student course success in the DE program at the LTC.

Combined Effects of Predictors

According to the figures in Table 4.9, Chapter Four, the combination of the four factors selected in this model significantly predicted MTSCORE, with $F(4,375) = 20.81$, $p < .001$. The

adjusted R squared value of .173 indicates a small effect size or Cohen's d (Gravetter & Wallnau, 2004). Furthermore, the adjusted R square value indicates that this model explains 17% of the variance in the mid-term test score (MTSCORE) of the LTC Web-based DE students.

Based on the beta values and the values in the sig. column, Table 4.9, Chapter Four, conclusions can be drawn that two of the predictor variables, IWF and PAP, contributed to the equation significantly in the MR model of this study. The other two variables, MOT and CWT, did not contribute significantly. However, this model shows that there is a significant positive correlation between the outcome variable, MTSCORE and the combined predictor variables of PAP, CWT, IWF, and MOT. Using the MR model and the results of Table 4.9, students' course performance could be predicted with the following linear equation:

MTSCORE = 51.843 + .518 (PAP) + .189 (CWT) + .821 (IWF) + .447 (MOT)

For this study, the logistic regression procedures were performed using the variable PassCourseR (PassCourse Recode) as the dichotomous dependent variable, whether a respondent passed or failed in the mid-term exam of the attempted DE course and PAP, CWT, IWF, MOT as the predictor variables. The omnibus tests of model coefficients suggest that the overall model is significant when all four independent variables are entered together. This is evident because the significance value is less than .001 ($p < .001$). The model summary gives a rough estimate of variance that suggests 25% (Nagelkerke R Square) of the variance could be predicted from the combination of the four variables. On the other hand, Cox & Snell R Square value of .137 suggests only 14% of such variance could be predicted from the combination of the four variables through this model which is statistically significant.

Like the MR model, the LR model test results and the figures in Table 4.10, Chapter 4, suggest that with increased student faculty interactions (IWF) and prior academic preparations

(PAP), the odds of passing developmental education courses increases. This is in line with student success or persistence models as mentioned by Tinto (1993), Pascarella and Terenzini (2005), Chickering and Gamson (1987), and Kuh et al. (2006).

This study's findings concur with a host of literature including a report by the Louisiana Board of Regents (BOR) to the Louisiana House Education Committee which emphasized the importance of rigorous high school curriculum for preparing students for success in their postsecondary programs of study (BOR, 2004). Shea, Fredericksen & Pickett (2001) reported Pearson correlation of .631, examining student satisfaction and interaction with instructor in their study of students' learning performance and outcomes in internet based distance education courses. To a certain extent, the findings of this study support the claims by Shea, et al. In another study, Perez & Foshay (2002) indicated that motivation factors were very important and critical in internet-based learning in developmental mathematics. The claims made by Perez & Foshay (2002) relating motivation to course success in online courses did not show any significance in this study.

The Secondary Research Questions

Secondary Research Question 1

There were two secondary research questions concerning group level performances among the LTC developmental education students in their Web-based DE courses. The first of the two secondary research questions asked, "If there were any differences in the performance levels among the students in the Web-based developmental education courses, based on their intended program of study." One of the group's program or intended program of study was nursing or health occupation, while the other group's program of study was grouped together as non-nursing. Majority of the students, a little over 50%, intended to study nursing or healthcare

related studies. All the other programs combined together, constituted the other half of the survey participants for this study.

An independent samples *t* test performed shows (Table 4.11, Chapter Four) that the students intending to major in nursing programs were significantly different from the students whose intended majors were different on their mid-term test performance ($p = .001$). The test was found to be statistically significant, $t\ (352) = 3.46$, $p < .001$. This finding indicates that there were significant differences between the two groups in terms of their performance in the mid-term test. Also, the two group means were also different. The average mid-term test performance (MTSCORE) for the students intending to study nursing ($M = 83.55$, $SD = 9.57$) was significantly more than the non-nursing students ($M = 79.84$, $SD = 11.17$). The difference between the two means was 3.71. The approximate effect size (d) was .36, generally, a medium effect size (Cohen, 1988).

This finding may relate to the course or program utility and course-driven motivation factors in students' course performance in the Web-based developmental education program. The findings partially agree with the utility of education component of Bean and Metzner's (1985) model of nontraditional student persistence. The average age of a typical LTC student being 25 (LTC SES, 2008). The majority of these students were career-seeking. The study's results are in agreement with Bean and Metzner's model that posits that non-traditional students place more importance on the utility of education factor. It is important to mention that even though only 40% of the survey participants were 25 years or older, many survey participants have attributes of nontraditional students such as working student, students with family responsibilities, or enrolled part-time. The students choosing a field that has immediate job prospects upon completion could be more motivated to do well in the course. This finding may have some

implications in terms of which programs or curriculum thrive and which ones weaken in terms of enrollment and completion rates and their subsequent funding in these times of economic hardships and budget deficits.

Secondary Research Question 2

The secondary research question 2 for this study asked, "If there were any differences in the performance levels in the Web-based developmental education courses among the students with employment and no employment." To answer this question, the independent samples t test was utilized.

The independent samples *t* test performed showed (Table 4.12, Chapter Four) that the students with employment were not significantly different from the students without employment in terms of their mid-term test performance ($p = .175$). Their group means were also not very different with respect to their mid-term test performance (MTSCORE). The study findings suggest that there were no significant differences between these two groups. Therefore, it can be said that employment was not an important factor in students' course performance in the Web-based developmental education program at the LTC. This finding was contrary to Kuh et al.'s (2006) assertion that working more than 30 hours per week increases the risk factors that threatens student persistence and graduation from college.

However, Kuh et al. (2006) study involved mainly four-year college students which normally focus on academics, unlike the two-year technical colleges that generally focus in career training and encourage their students on the importance of employment, internships, and work-based studies. In Bean and Metzner (1985) model of nontraditional student persistence, environmental variable like employment, plays an important role in the study. This study on two-year technical college DE students may contribute to the model suggesting that the student

employment factor may not make any difference in terms of course success in the case of career and technical college students.

Conclusions

For decades, community and technical colleges have expanded access to higher education for millions of Americans from all walks of live through its open access policies. In recent years, it has opened up the new frontiers of Web-based learning to thousands of individuals who otherwise might not have been able to participate in postsecondary education. Most of these innovative Web-based course offerings are generally for the accomplished learners (Perez & Foshay, 2002). The LTC has initiated a bold experiment of offering Web-based DE courses which includes remedial mathematics, English, writing, and science to its academically underprepared students. Majority of the LTC campuses do not have any alternative traditional means of classroom instruction in the DE program. This study was designed to identify and examine the factors that best predict student success in Web-based DE courses at the LTC.

Among the four predictor variables of students' prior academic preparation, comfort with technology, interaction with faculty, and motivation that were assumed by the researcher to have correlations to course success, two predictor variables showed significant statistical significance in their relationship with the outcome variable of MTSCORE, depicting levels of student performance. These two predictor variables are interaction with faculty (IWF) and prior academic preparation (PAP). These two predictor variables in this study add support to the conceptual framework which included Tinto (1993); and Bean and Metzner's (1985) models relating to student persistence and Kuh, et al. (2006) framework for student success. The other two variables, MOT and CWT were found statistically to be not significant.

The study's results also partially validated the researcher's conceptual framework depicting individual characteristics and course success (Fig. 2.1, Chapter Two). The framework states that academic course success is dependent on various individual characteristics including student interaction with faculty, prior academic preparation, comfort with technology, and motivation. Using this conceptual framework as a guide and the selected statistical models as the tools the researcher addressed the following research questions with the data collected from the online survey using the WBLSS survey instrument.

The primary research question of this study asked: Is there any relationship between the individual factors of students' prior academic preparation, comfort with technology, interaction with faculty, and motivation, and students' course performance in the Web-based developmental education courses?

Using multiple regression model the study found that two individual factors, interaction with faculty and prior academic preparation have statistically significant positive relationship with the dependent variable of students' course performance (MTSCORE) in the Web-based developmental education courses. The two other independent variables, comfort with technology and motivation did not have any significant relationship with students' course performance in the Web-based developmental education courses.

Secondary research question number one asked are there any differences in the performance levels among the students in the Web-based developmental education courses based on their intended program of study. Using independent samples *t* test the study found that there was a difference in the group performance level among the students in the Web-based DE students based on their intended program of study. The study found that the students intending to

major in the nursing programs performed significantly better in the mid-term test than the students in the non-nursing programs.

Secondary research question number two asked, are there any differences in the performance levels in the Web-based developmental education courses among the students with employment and no employment? Using independent samples *t* test the study found that there was no significant difference in the performance levels among the students with employment and the students with no employment in the Web-based developmental education courses.

This study is very significant since student success in DE has profound implications in expanding college access and success, two major goals of the two-year colleges across America. For many academically underprepared students at LTC, college and career success first depend on their success in DE. Since the literature shows that teaching and learning can be adapted to individual characteristics to maximize learning and success, identifying the individual factors and their relationship with Web-based DE course success is the key to academic success of many underprepared students at two-year colleges like the LTC. While it may take a village to educate a child, it is the individual characteristics which play a significant role in learning and academic success among the college-going, underprepared, adults in community and technical colleges across America.

Implications for Theory, Policy, and Practice

Student success is one of the major goals of any educational institution. The issue of student success in colleges has received considerable attention in higher education literature. In the last ten years the topic has registered more than two thousand dissertation abstracts (Braxton, 2006) signaling its importance to every stakeholder in the higher education spectrum. Higher

education institutions also dedicate most of their human and financial resources towards developing and implementing programs that help their students to succeed.

One measure of student success is student outcomes. Student outcomes, in turn, can be designated as individual student persistence or program retention. Facing budget and personnel constraints, higher education institutions are increasingly offering courses through the Web or other online media. The community and technical colleges are at the forefront of such online instructional delivery. In 2000-2001, two-thirds of the two-year and four-year colleges offered some DE courses online (NCES, 2003). However, the issues like lesser online persistence rates being reported compared to traditional face-to-face courses (Carr, 2000) across community colleges, the two-year colleges are beginning to develop programs and services to address the problems with low persistence and retention rates in online programs.

This issue becomes more critical and the situation more "slippery slope" when the academic success of underprepared, at-risk students is considered. More than one in three entering community and technical college students is being placed in developmental education courses (NCES, 2004). These DE courses at the technical college campuses in Louisiana, with few exceptions, are being delivered only through the Web. The need for developmental education is ever increasing with more underprepared and working adults participating in postsecondary education necessitated by prevailing economic, demographic and social forces (McCabe & Day, 1998). Facing a changing economy and workforce needs, it is very important that the technical college administration take a closer look at these problems and take appropriate measures to address the issue of student success in Web-based developmental education programs to achieve desired goals. The findings of this study may help in developing a part of the roadmap to student success for the two-year postsecondary institutions.

Implications for Theory

On the topic of theoretical implications of this study's findings, it is important to mention that the research and knowledge base in the area of Web-based developmental education involving the two-year technical colleges is very limited or non-existent. The findings of this study will add to that inadequate knowledge base. Any such contribution to the subject of student success dealing with the at-risk, underprepared students seeking career education would generate further interest in future research among the higher education students and practitioners. The findings of this research would also inform the existing and future theories and models dealing with student success in this particular field of career education, often overlooked by the mainstream higher education researchers and professionals. Tinto and Pusser (2006) emphasized the importance of research on DE that would shed more light on the critical linkage between institutional actions to enhance education for academically underprepared students and their persistence and course success.

The findings of the two significant variables, interaction with faculty (IWF) and prior academic preparation (PAP) supports Chickering and Gamson's (1987) first principle of good practice in undergraduate education which stresses contacts between students and faculty for academic engagement and student success. The study's findings also partially concur with various well-known theories and models involving student success and persistence. They include Tinto's (1993) theory involving student persistence, Cross's (1971) framework on remedial education, Boylan and Saxon (1999), Bean and Metzner's (1985) model on nontraditional students, Pascarella and Terenzini (2005), and Kuh, et al. (2006) framework of student success. The findings that were not significant, MOT and CWT may also inform research and theories about certain exceptions in the case of underprepared students in technical colleges seeking

career education. For that to happen, more research and studies on this topic involving two-year technical college students are needed.

Implications for Policy

The findings of this study may have some implications on the policy of Web-based developmental education in LTC or similar institutions. For the LTC or any similar institution facing issues with student success in the DE programs, the first step toward solutions is identifying the factors and issues that can help predict student success in the Web-based learning environment. As this study's findings have highlighted that faculty-student interaction (IWF) and students' prior academic preparations (PAP) are significant factors for student course success, the faculty and administration at LTC should first look into the existing policies involving student and faculty interaction and academic requirements of the entering students. If the existing policies are not adequate or too stringent then the institution needs to look for policy modifications that would help students succeed in their academic and career goals. These new policies should facilitate and enhance faculty-student interactions, especially between the instructors and the underprepared students.

The colleges should also implement policies that encourage coordination with local high schools to address the issue of prior academic preparation (PAP) in preparing the future students for success. The existing "Early College" and dual enrollment policies address mainly the academically advanced students in high schools. More should be done to address academic deficiencies among the high school students before they enter college as underprepared. The college should also revisit its policies regarding developmental education, Web-based learning as it is being practiced, and its placement and exit test scores for its skills-based diploma programs and align those policies with student success criteria in light of this study's findings.

Implications for Practice

The study's findings could have several implications in the practice of Web-based developmental education at two-year colleges including at the LTC. The significance of student faculty interaction (IWF) and prior academic preparation (PAP) in their relationship with course success and academic achievements is well known in higher education. Various literatures have suggested such correlations. The findings of this study may shed some light in incorporating some of the ideas into practice. One such idea would be implementation of active faculty-student interactions, more specifically, facilitating interactions and cooperation among the faculty members and the DE students. Offering additional help in the form of "learning communities" to these underprepared and at-risk students would certainly instill knowledge and confidence and thereby increase the probability of success among the DE students at LTC. It may help the college counselors and academic advisors in coming up with ideas to involve and motivate their students more aggressively through new and innovative ways.

Student success and study skills workshops as well as orientation courses designed specifically for the underprepared students could be offered to engage and motivate the DE students. The campuses should offer study skills workshops for the underprepared students at the beginning of the semester. Motivational professionals at the campuses can help raise students' self-esteem and their sense of purpose.

An ideal student dataset for a successful developmental program should contain extensive information on a student's background, prior academic preparation and performance, and their experiences with remediation (Bettinger & Long, 2003). The dataset should also contain the individual risk factors so that special attention and customized intervention schemes can be designed and deployed at the individual level. The author of this study believes, an extensive

dataset on students' background and individual characteristics along with an insight into students' experiences in the program would shed much needed light on what needs to be addressed to make success for all a real possibility.

A full-fledged research at multiple community and technical college campuses with wider student participation may shed more light on these issues. On the other hand, further study may also suggest that Web-based learning may not be an option for certain students. In such cases the administration should look into other options including traditional face-to-face classroom instructions for such students if "success for all" is an institutional goal. Preparing academically deficient underprepared students for college-level course success is a real challenge facing any college.

For the LTC, "success for all" is an integral part of its mission of workforce development. The challenges in the DE classrooms, where over 30% of its students are struggling everyday to learn to be "college-level course-ready" while they are at the college already as academically underprepared, are very serious. Therefore, to prepare these underprepared students as this study's PAP variable suggests, the LTC and other two-year colleges need to work with the secondary educational institutions and area high schools to address the issue of solid basic foundation in math, English, and other core courses so that the issue of underprepared students flowing into colleges are reined in at the source. Also, proper funding at the college level may somewhat address this issue with better resources for instruction and faculty student interactions.

The findings from the secondary research question regarding group differences in student performance in the nursing and the other programs may suggest that LTC being a career education institution whose primary mission is workforce development, it may benefit by

scanning the employment and workforce horizon inquiring about business and industry's needs. Through such knowledge it may align its courses and programs with industry's needs in terms of potential employment for its completers. At the same time, one should be extremely prudent not to give in to the short-term market needs. The LTC leadership needs to look at the long term goals and perspectives in term of the market's needs and the direction of the new economy.

Suggestions for Future Research

This study was conducted to identify the factors that predict student performance in Web-based developmental education courses in a technical college. The research in the area of Web-based or online instruction covering two-year technical college developmental education students is rare or non-existent. Unlike community or four-year colleges, students in two-year technical colleges come to learn the skills and knowledge needed to join the workforce immediately upon completing their courses or programs. Since today's workforce is becoming more competitive and knowledge-driven, additional research involving technical college students are called for covering various aspects of learning and academic success, specifically, in the Web-centered learning environment. Tinto and Pusser (2006) emphasized the importance of research on DE that would shed more light on the critical linkage between institutional actions to enhance education for academically underprepared students and their persistence and course success.

Additional research predicting student success that involves more participants and includes wider demographic and geographic areas is recommended. A mixed mode research involving both quantitative and qualitative approaches would cover more ground and would include in-depth perspectives of student participants. Such researches in the same topic would be beneficial for the technical college community. Further research involving these participants in other Web-based credit courses would also shed new lights in technical college Web-based

education courses as the community and technical college system gears up for the next stage in online course offerings for credit (LCTCSOnline, 2009) using the Louisiana Optical Network Initiative (LONI) connecting the supercomputers at Louisiana's major research universities.

Another suggestion for future research is to expand the study's independent variables to include demographic, institutional, and other individual factors such as individual learning styles and self-efficacy that were not covered in this study. The aspect of field-dependence and field-independence should be covered in future studies. Such studies could shed light into the student success issue among the underprepared students from a different perspective. The demographic factors could include ethnicity and socio-economic-status (SES). Institutional and environmental factors such as institutional policies, funding, and teaching methodologies should be included in future research involving the topic of student success in DE courses in the LTC. Such studies involving the two-year technical colleges would add to the literature which is dearth or almost nonexistent in technical or career education domain involving underprepared students in the Web-based learning environment.

Since this study did not involve the students in LTC campuses in region 7, as those campuses do not use PLATO Web-based instruction for their developmental education, a study comparing student success in DE programs between and among the students of Region 7 and the rest of the LTC campuses that use PLATO would be very interesting and useful. Such a study could address the issues of student success in Web-based instruction versus traditional classroom instruction. Other similar studies could expand the variable list and shed some light regarding cost, efficiency, effectiveness, student retention and success in these two different modes of instruction delivery and pedagogy. Further testing and improvement of the survey scale would be beneficial to similar future studies.

The factor analysis conducted as a part of the WBLSS scale development process was exploratory factor analysis (EFA). Since EFA is basically exploratory in scope, the validity of the WBLSS survey instrument has various limitations. The EFA is used to clarify and describe relationships among variables, not to test or confirm hypotheses. In order to improve the reliability and validity of the WBLSS scale and to test certain hypotheses, future studies should be conducted to include confirmatory factor analysis (CFA) among other reliability and validity tests. Such studies would add to the improvement of the WBLSS scale and aid in similar studies related to Web-based developmental education course success at the LTC in the future.

References

ACT (2007). *America's most widely accepted college entrance exam*. Retrieved Sept. 7, 2007 from http://www.act.org/aap

Alderman, M. K. (1990). Motivation for At-Risk students. Retrieved April 10, 2007 from EBSCO database, UNO Library http://www.uno.edu.

Allen, I. E. & Seaman, J. (2007). Making the grade: Online education in the United States, 2006. *The Sloan Consortium*, Retrieved February 10, 2007, from http://www.sloan-c.org.

Ashburn, E. (2007). A 2-Year start on the future: Community colleges put renewed emphasis on helping their students succeed. *The Chronicle of Higher Education. LIV*(9), B1-B4.

Astin, A. (1977). *Four critical years*. San Francisco: Jossey-Bass.

Astin, A. (1998). Remedial education and civic responsibility. *National Crosstalk.* Retrieved July 1, 2008, from http://www.highereducation.org/crosstalk/ct0798/voices0798-astin.shtml

Bahr, P. R. (2007). *The Mathew effect in postsecondary remediation: Testing the efficacy of remediation across varying depths and breadths of under-preparation.* Wayne State University, Detroit, MI. Retrieved February 22, 2008, from http://www.airweb.org/images/bahr_712_proposal.pdf

Bailey, T., Calcagno, J., Jenkins, D., Kienzl, G., & Leinbach, T. (2005). *Community college student success: What institutional characteristics make a difference?* New York, NY: Community College Research Center, Columbia University. Retrieved March 20, 2008 from http://www.achievingthedream.org/_images/_index03/CC_Student_Success_What_Institutional_Char.pdf

Baily, T., Jeong, D., & Cho, S. (2008). *Referral, enrollment, and completion in developmental education sequences in community colleges.* New York, NY: Community College Research Center, Columbia University. Retrieved January 10, 2009, from http://ccrc.tc.columbia.edu/ContentByType.asp?t=1

Bandura, A. (1977). Self-efficacy: Toward a Unifying Theory of Behavioral Change. *Psychological Review, 84*(2), 191-215. Retrieved March 23, 2008, from http://www.des.emory.edu/mfp/Bandura1977PR.pdf

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Bargh, J., & Ferguson, M. (2000). Beyond behaviorism: On the automaticity of higher mental

processes. *Psychological Bulletin, 126*, 925-945. Retrieved January 8, 2008, from http://www.psyencelab.com/library/documents/docs/Beyond%20Behaviorism%20_On%20the%20Automaticity%20of%20Higher%20Mental%20Processes.pdf

Bauman, G., Bustillos, L., Bensimon, E., Brown, C., & Bartee, R. (2005). *Achieving Equitable Educational Outcomes with All Students: The Institution's Roles and Responsibilities.* Association of American Colleges and Universities. Retrieved February 13, 2007, from http://www.aacu.org/inclusive_excellence/documents/Bauman_et_al.pdf

Bean, J. P. (1985). Interaction effects based on class level in an explanatory model of college student dropout syndrome. *American Educational Research Journal, 22*(1), 35-64.

Bean, J. P. & Metzner, B. S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research, 55*(4), 485-540.

Berge, Z. & Huang, Y. (2004). A model for sustainable student retention: A holistic perspective on the student dropout problem with special attention to e-learning. *Distance Online Symposium, The American Center for the Study of Distance Education. 13* (5). Retrieved September 15, 2007 from http://www.ed.psu.edu/acsde/deos/deosnews/deosnews13_5.pdf

Bettinger, E. P., & Long, B. T. (2003). *The role and effect of remedial education in two-year colleges.* Cambridge, MA: National Bureau of Economic Research.

Bettinger, E. P., & Long, B. T. (2005, May). *Addressing the needs of under-prepared students in higher education: Does college remediation work?* Cambridge, MA: National Bureau of Economic Research. Retrieved February 15, 2008, from http://www.nber.org/papers/w11325

Board of Regents (BOR). (2001). *The Louisiana Board of Regents Master Plan.* Retrieved July 10, 2006, from http://www.regents.state.la.us/pdfs/Planning/masterplan2001.pdf

Board of Regents. (2004). Tops Reporting System: Report to the House Education Committee. Retrieved July 15, 2007, from the Louisiana Board of Regents Web site: http://www.regents.state.la.us

Board of Regents (2007). *Practical nursing retention study: An effort to understand and resolve the retention crisis in practical nursing.* Louisiana Technical College.

Board of Regents (BOR). (2008). Statewide General Education Course Articulation Matrix, AY 2008-09. Retrieved December 13, 2008, from http://www.regents.state.la.us/pdfs/Planning/Articulation/2008-2009_General%20Education%20Matrix.pdf

Bonk, C. J. & Dennen, V. (2003). Framework for research, design, benchmarks, training and

pedagogy in web-based distance education. In M. Moore & W. G. Anderson (Eds.) *Handbook of Distance Education* (pp. 331-348). Mahwah, NJ: Lawrence Erlbaum.

Boylan, H.R. (1999). *Making the case for developmental education.* Retrieved January 27, 2008, from National Center for Developmental Education Web site: http://www.nade.net/documents/Articles/MakingtheCase.pdf

Boylan, H. R., & Bonham, B. S. (1992). The impact of developmental education programs. *Research in Developmental Education*, *9*(5), 1-4.

Boylan, H. R., Bonham, B. S., & Bliss, L. (1994). Who are the developmental students? *Research in Developmental Education, 11* (2), 1-4.

Boylan, H. R., Bonham, B. S., & Bliss, L. B. (1997). Program components and their relationship to student performance. *Journal of Developmental Education, 20* (3). Retrieved November 11, 2007, from http://www.ncde.appstate.edu/reserve_reading/program_components.html

Boylan, H. R., Bonham, B. S., & White, S. R. (1999). Developmental and remedial education in postsecondary education. *New directions for higher education, 108*, 87-101.

Boylan, H., & Saxon, D. P. (1999). *What works in remediation: Lessons from 30 years of research.* Retrieved January 27, 2008, from National Center for Developmental Education Web site: http://www.ncde.appstate.edu/reserve_reading/what_works.htm

Braxton, J. M. (2006). *Faculty professional choices in teaching that foster student success.* Retrieved June 15, 2008, from http://nces.ed.gov/IPEDS/research/pdf/resp_Robertson_rev.pdf

Braxton, J., Sullivan, S. & Johnson, R. (1997). Apprising Tinto's theory of college student departure. In J. C. Smart (Ed.), Higher Education: Handbook of theory and research. New York: Agathon Press.

Brier, E. (1984). Bridging the academic preparation gap: A historical view. *Journal of Developmental Education, 8*(1), 2-5.

Brown, B. & Liedholm, C. (2002). Can Web courses replace the classroom in principles of microeconomics? *The American Economic Review, 92*(2), 444-448.

Bruner, J. S. (1966). *Toward a Theory of Instruction*, Cambridge, Mass.: Belkapp Press.

Bueschel, A. C. (2003). *The missing link: The role of community colleges in the transitions between high school and college.* Stanford University. Retrieved February 22, 2008, from http://www.stanford.edu/group/bridgeproject/community_college_rept_for_web.pdf

Burbules, N. & Callister, T. (2000). Universities in transition: The promise and challenges of new technologies. *Teacher's College Record 102*(2), 271-293.

Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *Chronicle of Higher Education, Information Technology Section.* Retrieved July 10, 2007, from http://www.chronicle.com/free/v46/i23/23a00101.htm

Carroll, J. B. (1989). The Carroll model: A 25-year retrospective and prospective view. *Educational Researcher, 18*(1), 26-31.

Casazza, M. E. (1999). Who are we and where did we come from? *Journal of Developmental Education. 23*(1), 2-7. Retrieved February 10, 2008, from http://www.ncde.appstate.edu/reserve_reading/V23-1casazza_who.htm

Casazza, M., & Silverman, S. (1996). *Learning assistance and developmental education.* San Francisco: Jossey-Bass.

Chang, M. (2005). Applying self-regulated learning strategies in a web-based instruction: An investigation of motivation perception. *Computer Assisted Language Learning. 18*(3), 217-230.

Chen, N., & Lin, K. (2002). *Factors affecting e-learning for achievement.* Retrieved February 10, 2008, from http://lttf.ieee.org/icalt2002/proceedings/t502_icalt148_End.pdf

Chickering, A. W., & Ehrmann, S. C. (1995). Implementing the seven principles: Technology as lever. *American Association for Higher Education,* retrieved July 1, 2007 from the American Association for Higher Education website: http://www.aahe.org/technology/ehrmann.htm

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin, 39*(7), 3-7. Retrieved December 17, 2007, from http://www.uis.edu/liberalstudies/students/documents/sevenprinciples.pdf

Chung, C. (2005). Theory, practice, and the future of developmental education. *Journal of Developmental Education. 28* (3), 2-10.

Clark, R. E. (1983). Reconsidering research on learning from media. *Review of Educational Research, 53*(4), 445-460.

Cohen, A. M., & Brawer, F. B. (2003). *The American community college* (4th ed.). San Francisco, CA: Jossey-Bass.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Community College Survey of Student Engagement (CCSSE, 2007). Institutional Report 2007 for LTC Region 4. The University of Texas: Austin, Texas

COMPASS. (2007). Retrieve Sept. 7, 2007 from http://www.act.org/compass.

Coughlin, M. A. & Knight, W. (2007). *Exploratory Factor Analysis (EFA).* Retrieved April 21, 2009, from www.spss.com/airseries.

Creswell, J. W. (2002). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research.* Upper Saddle River, NJ: Pearson Education, Inc.

Cross, K. P. (1971). Access and Accommodation in Higher Education. *Research Reporter, Center for Research and Development in Higher Education, 6*(2), 6-8.

Cross, K. P. (1971). *Beyond the open door.* San Francisco, CA: Jossey-Bass.

Cross, K. P. (1976). *Accent on learning.* San Francisco, CA: Jossey-Bass.

Darby, D. W. (2004). Under-prepared college students' perceptions of the impact of technology integration in a developmental reading course. (Doctoral dissertation, University of New Orleans, 2004).

Deci, E. L. & Ryan, R. M. (1994). Promoting self-determinated education. *Scandinavian Journal of Educational Research, 38,* 3-14.

Duffy, T. M. & Cunningham, D. J. (1996). Constructivism: Implications for the design and delivery of instruction, In D. H. Jonassen, (Ed.) *Handbook of Research for Educational Communications and Technology,* NY: Macmillan.

Duffy, T. & Jonassen, D. (1992). *Constructivism and the technology of instruction: A conversation*. Hillsdale, NJ: Lawrence Erlbaum Assoc. Inc.

Education Commission of the States (ECS). (2002). *State policies on community college remedial education: Findings from a national survey.* Center for Community College Policy. Retrieved February 17, 2008, from http://www.maricopa.edu/bwd/pdfs/statepolicies.pdf

Eison, James. (2002). Teaching strategies for the twenty-first century. In R. M. Diamond, (Ed.) *Field guide to academic leadership* (pp.157-173). San Francisco: Jossey-Bass

ERC. (2006). LA Board of Regents External Review Committee. (2006, March). *Statewide external review committee report: Practical Nursing Program.* Baton Rouge, LA

ERI. (2007). ERI Inc. (2007, May). *Practical Nursing Retention Study: An effort to understand and resolve the retention crisis in practical nursing.* Baton Rouge, LA: LTC.

Exploratory and confirmatory factor analysis. (2009, March 27). Articles. Retrieved April 21, 2009, from allnurses.com Web site: http://allnurses.com/ nursing-articles/exploratory-confirmatory-factor-384827.html

Fogg, P. (2007). Cashing in on virtual courses. *The Chronicle of Higher Education.* Retrieved March 17, 2007, from http://chronicle.com/faculty

Fraenkel, J. & Wallen, N. (2003). *How to design and evaluate research in education (5th ed.).* New York: McGraw-Hill.

Gagne, R. M. (1985). *The conditions of learning (4th ed.).* New York: Holt, Rinehart, & Winston.

Garrison, D. R., Kanuka, H., & Hawes, D. (2002). *Blended learning: Archetypes for more effective undergraduate learning experiences.* University of Calgary: Learning Commons.

Gay, L. R. & Airasian, P. (2003). *Educational research: Competencies for analysis and applications.* Upper Saddle River, NJ: Pearson Education, Inc.

Gephart, R. (1999). Paradigms and research methods. *Research Methods Forum.* Retrieved March 10, 2008, from http://division.aomonline.org/rm/1999_RMD_Forum_Paradigms_and_Research_Methods.htm

Gerlaugh, K., Thompson, L., Boylan, H., & Davis, H. (2007). National study of developmental education II: Baseline data for community colleges. *Research in Developmental Education, 20*(4), 1-4.

Gilbert, W. (2000). Retention in distance education telecourses and receptions of faculty contact: A comparision of traditional and nontraditional community college students (Doctoral dissertation, The Florida State University). *Dissertation Abstracts International.* Retrieved November 3, 2007, from http://wwwlib.umi.com/dissertations/fullcit/9973240

Graham, S. & Weiner, B. (1996). Theories and principles of motivation. In D. C. Berliner & R. Calfee (Eds.), *Handbook of educational psychology,* 63-84. New York: Macmillan.

Gravetter, F. J. & Wallnau, L. B. (2004). *Statistics for the Behavioral Sciences (6th Ed.).* United States: Thomson Wadsworth Publishing

Grosset, J. M. (1991). Patterns of integration, commitment, and student characteristics and retention among younger and older students. *Research in Higher Education. 32*(2), 159-178.

Grubb, W. N. (2001, February). *From black box to Pandora's Box: Evaluating*

remedial/developmental education. Community College Research Center, Teachers College, Columbia University.

Harrell, I. L. (2006). Using student characteristics to predict the persistence of community college students in online courses (Doctoral dissertation, The Florida State University, 2006). *Dissertation Abstract International.* Retrieved August 12, 2007, from http://proquest.umi.com.ezproxy.uno.edu. Pub No. AAT 3216495.

Hearn, J. C. (2006). *Student success: What research suggests for policy and practice.* Retrieved July 7, 2007, from http://nces.ed.gov/IPEDS/research/papers.asp

Hoyt, J. (1999). Remedial Education and Student Attrition. *Community College Review*, *27*(2), 52-72. Retrieved June 19, 2005, from http://crw.sagepub.com/cgi/reprint/27/2/51

Huck, S. W. (2004). *Reading statistics and research (4th edition)*. Boston: Pearson Education Inc.

Ignash, J. M. (1997). *Implementing Effective Policies for Remedial and Developmental Education.* San Francisco: Jossey Bass.

Israel, G. D. (1992). *Sampling issues: Nonresponse. Retrieved July 2, 2008, from* http://edis.ifas.ufl.edu.

Johnson, B. & Christensen, L. (2000). *Educational Research: Quantitative and Qualitative approaches.* Boston: Allyn and Bacon.

Johnson, B. & Christensen, L. (2004). *Educational research: Quantitative, qualitative, and mixed approaches.* Boston: Pearson Education, Inc.

Jonassen, D. (1993). A manifesto for a constructivist approach to technology in higher education. In T. Duffy, D. Jonassen, & J. Lowyck (Eds), Designing constructivist learning environments. Heidelberg, FRG: Springer-Verlag. Retrieved May 25, 2007 from http://apu.gcal.ac.uk/clti/papers/tmpaper11.html

Knowles, M. S. (1970). *The modern practice of adult education: Andragogy versus pedagogy.* New York: Cambridge Books.

Kuh, G. D., Cruce, T., Shoup, R., Kinzie, J., & Gonyea, R. M. (2007). *Unmasking the effects of student engagement on college grades and persistence.* Center for Postsecondary Research. Indiana University, Bloomington. Retrieved January 25, 2008, from http://nsse.iub.edu/uploads/AERA_2007_Kuh_et_al.pdf

Kuh, G., Kinzie, J., Buckley, J., Bridges, B. & Hayek, J. (2006). *What matters to student success: A review of the literature.* Commissioned report for the National Symposium on Postsecondary Student Success: Spearheading a dialog on student success. Retrieved March 12, 2008, from http://nces.ed.gov/IPEDS/research/pdf/Kuh_Team_Report.pdf

Kuh, G. D., Kinzie, J., Schuh, J. H., and Whitt, E. J. (2005). *Student Success in College: Creating conditions that matter.* San Francisco, CA: Jossey-Bass.

LCTCS (2007). Louisiana Community and Technical College System. Retrieved March 1, 2007, from http://www.lctcs.edu

LCTCS Website (2008). Average ACT Scores of Enrolled Full-Time, Degree Seeking Freshmen Academic Year 2002-2003 to 2005-2006. Retrieved March 8, 2008, from http://www.lctcs.edu/assets/IR/ACTScores.pdf

LCTCS Online (2008) *LCTCSOnline: An initiative of the Louisiana Community and Technical College System.* Retrieved December 17, 2008, from http://www.lctcsonline.edu/

LCTCSOnline (2009). LCTCS Online course offerings. Retrieved January 2, 2009, from http://www.lctcsonline.edu/

Lee, C. (2001). Validation of the self-efficacy scale. Retrieved March 3, 2008, from http://homepages.findlay.edu/clee/projects/self_efficacy_scale.htm

Leech, N., Barrett, K., & Morgan, G. (2005). *SPSS for intermediate statistics: Use and interpretation (2nd Edition).* Mahwah, NJ: LEA Publishers.

Leech, N. L., Barrett, K. C., & Morgan, G. A. (2008). *SPSS for intermediate statistics: Use and interpretation (3 rd. edition).* New York: Lawrence Erlbaum Associates.

Lefoe, G. (1998). Creating constructivist learning environments on the Web: The challenge in higher education. *ASCILITE*. Retrieved May 5, 2007, from http://www.ascilite.org.au/conferences/wollongong98/asc98-pdf/lefoe00162.pdf

Linnenbrink, E. & Pintrich, P. (2002). Motivation as an enabler for academic success. *School Psychology Review, 31*(3) 313-327.

Louisiana Technical College Website. (n.d.). Retrieved March 1, 2007, from http://www.ltc.edu.

Louisiana Technical College, Greater Acadiana Region IV. (n.d.). *Online learning.* Retrieved May 25, 2007, from http://www.ltc.edu/greateracadianaregion/onlinelearning/index.html

LTC Document. (2008). *Louisiana Community & Technical College System: LTC 2008-2009 planning session.* PLATO Learning.

LTC Website. (n.d.). *LTC's new structure.* Retrieved June 20, 2008, from http://www.ltc.edu

LTC Policy. (2007). Retrieved March 1, 2007, from http://www.ltc.edu.

LTC SES (2008). Louisiana Technical College, Student Enrollment Service.

LTC Website. (2008). Retrieved March 7, 2008, from http://www.ltc.edu/technical_education.asp

LTC Website. (2008a). *Evaluation of instruction by students.* Retrieved June 27, 2008, from http://www.ltc.edu/greateracadianaregion/admin/index.htm

LTC Region 4 Website. (n.d.). *Financial aid programs.* Retrieved June 27, 2008, from http://www.ltc.edu/greateracadianaregion/students/finaid/index.htm

Manning, C. (2006). *The history of higher education in Louisiana.* Chalmette, LA: Louisiana Institute of Higher Education

Master Plan. (2001). *The Louisiana Board of Regents Master Plan.* Retrieved July 10, 2006, from http://www.regents.state.la.us/pdfs/Planning/masterplan2001.pdf

McCabe, R. H. (2000). *No one to waste: A report to public decision makers and community college leaders.* Washington, DC: American Association of Community Colleges.

McCabe, R. H., & Day, P. R. (Eds.). (1998). *Developmental education: A twenty-first century social and economic imperative.* Mission Viejo, CA: League for Innovation in the Community College.

McCabe, J., & Powell, B. (2004). "In my class? No." Professors' accounts of grade inflation. In W. E. Becker & M. L. Andrews (Eds.), *The scholarship of teaching and learning in higher education: Contributions of research universities*. Bloomingdale, IN: Indiana University Press.

McLaren, C. (2004). A comparision of student persistence and performance in online and classroom business statistics experiences. *Decision Sciences 2*(1), 1-10.

Merriam, S. B., & Caffarella, R. S. (1999). *Learning in Adulthood: A comprehensive guide.* San Francisco: Jossey-Bass.

Mertler, C. A, & Vannatta, R. A. (2005). *Advanced and Multivariate Statistical Methods (3rd ed.).*Glendale, CA: PYRCZAK Publishing.

Meyer, K. A., Bruwelheide, J. & Poulin, R. (2006). Why they stayed: Near-perfect retention in an online certification program in Library Media. *The SLOAN Consortium. 10* (4). Retrieved September 10, 2007, from http://www.sloan-c.org/publications/JALN/v10n4/v10n4_meyer2.asp

Miltiadou, M., & Yu, C. H. (2000). *Validation of the Online Technologies Self-Efficacy Scale (OTSES).* Retrieved March 3, 2008, from

http://www.creative-wisdom.com/pub/efficacy.pdf

Moore, M. G., & Kearsley, G. (1996). *Distance education: A systems view.* Belmont, CA: Wadsworth Publishing Co.

Morgan, G., Leech, N., Gloeckner, & Barrett, K. (2005). *SPSS for introductory statistics: Use and interpretation (2nd Edition).* Mahwah, NJ: LEA Publishers.

National Association for Developmental Education (NADE). (2008). *Definition of developmental education.* Retrieved March 1, 2008 from http://www.nade.net/aboutDevEd/definition.html

National Association of State Boards of Education (NASBE). (2008). *High school redesign initiative.* Retrieved April 10, 2008 from http://www.nasbe.org/index.php/prjects-separator/hsr

National Center for Education Statistics (NCES). (2002). *Nontraditional Undergraduates: Findings from the Condition of Education 2002.* Retrieved August 11, 2007, from http://nces.ed.gov/programs/coe/2002/analyses/nontraditional/index.asp

National Center for Education Statistics (NCES). (2003). *Distance education at degree-granting postsecondary institution:2000-2001.* Retrieved July 10, 2007, from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003017

National Center for Education Statistics. (2003). *National Education Longitudinal Study: 1988-2000.* Washington, DC: Retrieved December 12, 2008, from http://nces.ed.gov/surveys/NELS88/

National Center for Education Statistics (NCES). (2004). *Remedial education at degree-granting postsecondary institutions in fall 2000.* Washington, DC: U.S. Department of Education, Institute of Educational Sciences. Retrieved February 10, 2008, from http://nces.ed.gov/surveys/peqis/publications/2004010/

National Center for Higher Education Management Systems (NCHEMS). (2007). *Student pipeline: Transition and completion rates from 9th grade to college.* Retrieved June 20, 2008, from http://www.higheredinfo.org/dbrowser/index.php?submeasure=119&year=2004&level=nation&mode=data&state=0

Noel-Levitz. (2006). *Student success in developmental math: Strategies to overcome a primary barrier to retention.* Retrieved August 27, 2007, from http://www.noellevitz.com

Northern Alberta Institute of Technology. (n.d.). *New roles for instructors and learners:*

Integrating technology to enhance student success. Retrieved June 27, 2008, from http://content.library.utoronto.ca/rcat/services/presentationnoteslunch/nexus_jensen/nexus_jensen.pdf

Olson, K. (2007). *Survey participation, nonresponse bias, measurement of error bias, and total bias.* University of Michigan. Retrieved June 27, 2008, from http://poq.oxfordjournals.org/cgi/reprint/70/5/737.pdf

Online Dictionary (n.d.). Dictionary.com Retrieved May 20, 2007 from http://dictionary.reference.com

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of Research (Vol. 2).* San Francisco: Jossey-Bass.

Pearson, C., & Royse, D. (2001). Teaching students how to learn, in D. Royse, (Ed.), *Teaching tips for college and university instructors: A practical guide* (pp. 121-134). Needham Heights, MA: Allyn & Bacon.

Perez, S., & Foshay, R. (2002). Adding up the distance: Can developmental studies work in a distance learning environment? *The Journal, 29* (8), 16-20. Retrieved March 27, 2006 from the EBSCO database of UNO library, http://www.uno.edu

Perna, L. W. & Thomas, S. L. (2006). *A framework for reducing the college success gap and promoting success for all.* Commissioned report for the National Symposium on Postsecondary Student Success: Spearheading a dialog on student success. Retrieved July 10, 2008, from http://nces.ed.gov/IPEDS/research/pdf/Perna_Thomas_Report.pdf

Pintrich, P., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology. 82 (1), 33-40.*

Pintrich, P. & Schunk, D. (2002). *Motivation in education: Theory, research, and applications (2nd ed.).* Upper Saddle, NJ: Prentice-Hall, Inc.

PeoplePulse. (2008). Survey response rates. Retrieved January 3, 2009, from http://www.peoplepulse.com.au/Survey-Response-Rates.htm

Plato Learning, Inc. (2003). *Instructional Models.* Retrieved April 3, 2006, Plato Learning Website: http://platosupport.plato.com

Plato Web Learning Network. (n.d.). Retrieved January 16, 2007 from http://www.plato.com/About-Us/Our-Technology/PLATO-Web-Learning-Network.aspx

Plato Learning. (2005). *40-Campus LTC offers consistent, pedagogically-sound developmental education courses with Plato Learning.* Retrieved April 22, 2007, from http://www.plato.com

Plato Learning, Inc. (2007). *PLATO eduTest Assessment.* Retrieved April 13, 2007, Plato Learning Website: http://www.plato.com

PLATO Report (March, 2007). PLATO Learning Inc. Status and Data Report – Louisiana Technical College, Region 4. Developmental Education Program.

PLATO Website. (2008). *Developmental education courses.*Retrieved June 20, 2008, from http://www.plato.com/Post-Secondary-Solutions/Developmental-Education-Courses.aspx

Quinn, D. W. (2003). *Report on the Plato Web Learning Network Implementation for Developmental Education at Miami-Dade College.* Retrieved March 20, 2006, from Plato Learning Website http://platosupport.plato.com

Roberts, C. (1994). The influence of personal and environmental factors on the mathematics achievement of student in the college developmental program. (Doctoral dissertation, Grambling State University, 1994).

Roueche, J. E., & Rouche, S. D. (1993). *Between a rock and a hard place: The at-risk student in the open-door college.* Washington, DC: Community College Press.

Rouche, J., and Rouche, S. (1999). *High Stakes, High Performance: Making Remedial Education Work.* Washington, DC: Community College Press.

Schunk, D. H. (2004). *Learning theories: An educational perspective.* Upper Saddle River, NJ: Pearson Education, Inc.

Shea, P. J., Fredericksen, E. E., & Pickett, A. (2001). Student Satisfaction and Reported Learning in the SUNY Learning Network. Retrieved October 10, 2007, from The State University of New York Website http://sln.suny.edu

Shepperd, R. S. (2002). Predictors of student success in distance education courses (Doctoral dissertation, West Virginia University). *Dissertation Abstracts International.* Retrieved November 10, 2006, from http://proquest.umi.com.ezproxy.uno.edu. Pub No. AAT 3076382

Snow, R., Corno, L., & Jackson, D. (1996). Individual differences in affective and conative functions. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 243-310). New York: Macmillan.

SPSS Document. (2004). *SPSS Survey tips*. Retrieved June 22, 2008, from http://www.spss.com.

Stansfield, M., McLellan, E., & Connolly, T. (2004). Enhancing student performance in online learning and traditional face-to-face class delivery. *Journal of Information Technology Education, 3,* 173-188.

Starks, G. (1994). Retention and developmental education: What the research has to Say. In M. Maxwell (Ed.) *From access to success.* Clearwater, FL: H&H Publishing.

Stevens, J. (1992). *Applied multivariate statistics for the social sciences (2nd ed.).* Hillsdale, NJ: Lawrence Erlbaum Associates.

Suhr, D. (n.d.). *Exploratory or confirmatory factor analysis?* Retrieved April 21, 2009, from http://www2.sas.com/proceedings/sugi31/200-31.pdf

SurveyMonkey Website. (2008). *The simple way to create surveys.*Retrieved June 20, 2008, from http://www.surveymonkey.com/Default.aspx

SurveyMonkey Website. (2009). Online help center. http://www.surveymonkey.com/helpcenter/Answer.aspx?HelpID=478

Terenzini, P. T., et al. (1994). The transition to college: Diverse students, diverse stories. *EDRS*. Retrieved July 1, 2007, from University of New Orleans Online Library Website: http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/29/a8/28.pdf

The Pell Institute. (2004). *Indicators of opportunity in higher education: Fall 2004 Status report.* Washington, DC. Retrieved February 17, 2008, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1b/c4/be.pdf

The University of Texas at Austin. (2007). Instructional assessment resources: Assess teaching response rates. Retrieved January 3, 2009, from http://www.utexas.edu/academic/diia/assessment/iar/teaching/gather/method/survey-Response.php

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45* (1), 89 – 125.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd. Ed.). Chicago: University of Chicago Press.

Tinto, V. (1998). Colleges as communities: Taking research on student persistence seriously. *Review of Higher Education. 21*(2), 167-177.

Tinto, V. and Pusser, B. (2006). *Moving from theory to action: Building a model of institutional action for student success.* Retrieved December 15, 2008, from http://nces.ed.gov/IPEDS/research/pdf/Tinto_Pusser_Report.pdf

Ury, G. & Ury, C. (2005). Online, On-ground: What's the difference. *The 21 st. Annua Conference on Distance Teaching and Learning.* Retrieved May 21, 2007, from

http://www.uwex.edu/disted/conference/

U.S. Department of Education. (1983). *A nation at risk.* Retrieved April 25, 2008, from *http://www.ed.gov/pubs/NatAtRisk/intro.html*

U. S. Department of Education, National Center for Education Statistics. (1996). *Remedial education at higher education institutions in Fall 1995,* NCES 97-584. Retrieved March 20, 2006, from National Center for Education Statistics Web Site: http://nces.ed.gov

U.S. Department of Education, National Center for Education Statistics. (1996). *Remedial education at higher education institutions in Fall 1995,* NCES 97-584. Retrieved March 20, 2006, from National Center for Education Statistics Web Site: http://nces.ed.gov

U.S. Department of Education. (n.d.). *Family Educational Rights and Privacy Act (FERPA).* Retrieved June 21, 2008, from http://www.ed.gov/policy/gen/guid/fpco/ferpa/index.html

Vogt, W. P. (2007). *Quantitative research methods for professionals.* New York, NY: Pearson.

Weiner, B. (1974). *Achievement motivation and attribution theory.* Morristown, NJ.: General Learning Press.

Weiner, B., Frieze, I. H., Kukla, A., Reed, L., Rest. S., & Rosenbaum, R. M. (1971). *Perceiving the causes of success and failure.* Morristown, NJ: General Learning Press.

Weissman, J., Silk, E., & Bulakowski, C. (1997) Assessing developmental education policies. *Research in Higher Education, 38* (2), 187-200. Retrieved August 10, 2007, from the University of New Orleans Online Library http://web.ebscohost.com.ezproxy.uno.edu/ehost/pdf?vid=3&hid=109&sid=c6ad0597-3d11-4142-ae02-6832faf0969d%40sessionmgr103

Witkin, H., Moore, C., Goodenough, D. & Cox, P. (1977). Field-dependent and field-independent cognitive styles and their educational implications. *Review of Educational Research, 47,* 1-64.

Wojciechowski, A. & Palmer, L. (2005). Individual student characteristics: Can any be predictors of success in online classes? *Online Journal of Distance Learning Administration, 8*(2). Retrieved February 22, 2008, from http://www.westga.edu/~distance/ojdla/summer82/wojciecho

Wright, B. D. (1997). Evaluating Learning in Individual Courses. In Gaff, J.G., Ratcliff, J.L. and Associates (1997). *Handbook of the Undergraduate Curriculum.* San Francisco, CA: Jossey Bass (pp. 571-589).

Wylie, J. R. (2004). Non-Traditional Student Attrition in Higher Education: A Theoretical Model

of Separation, Disengagement then Dropout. SELF Research Center, University of Western Sydney, Australia. Retrieved August 13, 2007, from http://www.aare.edu.au/05pap/wyl05439.pdf

Yan, W. & Gaier, E. L. (1994). Causal attributions for college success and failure: An Asian-American comparison. *Journal of Cross-Cultural Psychology.* Retrieved June 14, 2007, from http://jcc.sagepub.com

Zhou, W. (2006). A predictive model on identifying successful institutional practices designed to enhance the performance of community college developmental students. (Doctoral dissertation, The University of Texas at Austin, 2006). *Dissertation Abstract International.* Retrieved March 7, 2008, from http://proquest.umi.com.ezproxy.uno.edu. Pub No. AAT 3267839.

Appendix A
WBLSS Survey Questionnaire

Dear Participant,

I am a doctoral candidate at the University of New Orleans under the guidance of Dr. Marietta Del Favero. In an effort to better understand the individual factors influencing student success in Web-based learning, I am conducting this survey for my dissertation project titled "The influence of individual factors on Web-based developmental education course success in a two-year technical college." Your participation and input are very important for this research study. Through your input, researchers can gain valuable insight that may help predict and improve developmental and Pre-Allied Health education course success at LTC.

The survey should not take more than 5 minutes to complete. Your participation in this anonymous survey is voluntary and your responses will be kept completely confidential. SurveyMonkey upholds the strictest privacy policy. By completing the survey, you are giving your informed consent. You may choose not to participate, or to stop completing the survey at any time. There will be no penalty, it will not affect your grades. The results of the survey may be included in a research study that may be published. Any report published will not identify you.

In exchange for your time and efforts in completing this survey, you will be included in a drawing for a chance to win one of four (4) $25.00 gift cards. In order to participate in the drawing, please enter your e-mail address and/or a telephone number at the end of the survey in the additional comments/suggestions section.

If you have any questions concerning this survey, please contact the investigator, Naba Das, at ndas1@uno.edu or Dr. Del Favero at mdelfave@uno.edu. Thank you in advance for your participation. Your input will provide valuable information and insight into Web-based learning and student course success at the LTC.

Sincerely,

Naba Das
Doctoral Candidate, University of New Orleans

The survey questionnaire - Demographics

Please select the options that best describe you: Every question requires a response. Thank you!

1. The PLATO Web-based course(s) that I am currently enrolled in:

- ☐ Developmental English (DVEN)
- ☐ Developmental Math (DVMA)

☐ Developmental Reading (DVRE)
☐ Allied Health English (AHEN)
☐ Allied Health Math (AHMA)
☐ Allied Health Reading (AHRE)
☐ Allied Health Science (AHSC)

2. My program or intended program of study is:

☐ Health Occupation ☐ Business ☐ IT/Computer ☐ Other ☐ Undecided

3. Gender

☐ Male ☐ Female

4. The highest academic level I have completed is:

☐ GED ☐ H.S. Diploma ☐ Some College ☐ Associate Degree ☐ BA/BS

5. I belong to the Age-group:

☐ 18-24 ☐ 25-30 ☐ 31-40 ☐ 41-50 ☐ over 50

6. I attend school:

☐ Part-time ☐ Full-time

7. I am employed:

☐ Part-time ☐ Full-time ☐ N/A

8. I have Internet access at home.

☐ Yes ☐ No

9. Type of financial aid received:

☐ Pell Grant ☐ TOPS ☐ GI Bill ☐ WIA ☐ LRS ☐ STEP ☐ N/A

10. I have family obligations to care for:

☐ Dependent children ☐ Dependent adults ☐ N/A

11. My preferred learning method is:

Pure classroom Pure online Blended/combination

12. This is my first time attempting this particular course

True False

The Questionnaire:
13. My Grade Point Average (GPA) in high school was:

1.99 or less
2.00 - 2.49
2.50 - 2.99
3.00 - 3.49
3.50 - 4.00

14. The skills that I had gained previously helped me to be on task in this course with less anxiety.

Strongly Disagree Disagree Neutral Agree Strongly Agree

15. The study skills that I learned in high school helped me to prepare well for this class.

Strongly Disagree Disagree Neutral Agree Strongly Agree

16. My placement score (COMPASS) prior to enrolling in this course was very close to meeting the cut-off score for this class.

Strongly Disagree Disagree Neutral Agree Strongly Agree

17. I was familiar with computers before I started this Web-based class.

Strongly Disagree Disagree Neutral Agree Strongly Agree

18. I use the Internet on a regular basis to be more productive in my study.

Strongly Disagree Disagree Neutral Agree Strongly Agree

19. I find it easy to navigate around the course materials related to this class.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

20. I feel confident communicating with people through e-mail.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

21. Throughout this course, I have been in touch with my instructor on a regular basis.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

22. When needed, I felt comfortable asking my instructor for help.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

23. The support and guidance provided by the instructor in this class has been:

☐ Poor ☐ Fair ☐ Neutral ☐ Good ☐ Excellent

24. The course setting provided ample opportunities for appropriate interactions with the instructor.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

25. I believe this course will help me in achieving my career goals.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

26. The freedom to work anytime during the day or night at my own pace is very motivating.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

27. The self-directed nature of this course helped me to stay focused.

☐ Strongly ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Disagree

28. On an average, the total number of hours I spend per week studying for this course is:

☐ 0-2 hrs. ☐ 3-5 hrs. ☐ 6-8 hrs. ☐ 9-11 hrs. ☐ 12 hrs. or more

29. My score on the mid-term exam for this course is:

☐ Below 60% ☐ 60-69% ☐ 70-79% ☐ 80-89% ☐ 90% or above

30. I would recommend this course to anyone needing remediation.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

31. At times, problems with technology at the campus slowed down my progress in this course.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

32. My mid-term exam score in this course is (Please enter your numerical score):

33. Additional comments/suggestions. Please enter your e-mail address and/or telephone number if you wish to be in the drawing for a $25.00 gift card (optional).

Thank you for participating in this survey. Please click submit, if completed.

APPENDIX A1
(Pre-dissertation Pilot Study Survey Questionnaire)

Student Name: Course Name: Program/Dept:

Gender: Male ____ Female ____ Age Group: 17 - 24 ☐ 25 or over ☐ Date:

Please read each item carefully and respond with appropriate check mark below:

1. I was familiar with computer and internet basics before I started the class.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

2. My prior academic preparations helped me to be on task with less anxiety and frustrations.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

3. The critical thinking and study skills I learned in high school helped me in preparing for this class and in completing necessary assignments on time.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

4. My Math COMPASS score prior to enrollment in this course was:

☐ 55 or more ☐ 47 - 54 ☐ 42 - 46 ☐ 21 - 41 ☐ 20 or less ☐ don't know

5. The Web-based course materials were easy to navigate and understand.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

6. The instructor provided adequate direction and supervision for completion of assignments.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

7. Difficult topics were explained using a variety of multimedia tools and/or teaching strategies.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

8. The feedback and turnaround time for grades were:

☐ Excellent ☐ Good ☐ Neutral ☐ Fair ☐ Poor

9. During the course, I attempted to contact my instructor:

☐ Very Frequently ☐ Frequently ☐ Sometimes ☐ Rarely ☐ Never

10. I felt comfortable asking my instructor for help.

☐ Excellent ☐ Good ☐ Neutral ☐ Fair ☐ Poor

11. The support and guidance provided by the instructor and accessibility to the instructor was:

☐ Excellent ☐ Good ☐ Neutral ☐ Fair ☐ Poor

12. As a whole the course experiences were very positive and beneficial for my future.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

13. I know why I am in this course and I have very high expectations from it.

☐ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

14. For this course on average, I spent ____hours beyond regular classroom work per week:

☐ 0 - 2 hrs. ☐ 3 – 5 hrs. ☐ 6 – 8 hrs. ☐ 9 – 11 hrs. ☐ 12 hrs. or more.

15. The self-directed nature of this course helped me to learn, organize, plan, and motivate

☐ Better ☐ Somewhat better ☐ Neutral ☐ Lesser ☐ Worse

16. I found managing time and balancing my academic and personal life:

☐ Very Easy ☐ Easy ☐ Challenging ☐ Difficult ☐ Impossible

Appendix B

UNO IRB Approval Letter

University Committee for the Protection of Human Subjects in Research
University of New Orleans

Campus Correspondence

Principal Investigator: Marietta Del Favero

Co-Investigator: Nabakrishna Das

Date: August 19, 2008

Protocol Title: "The Influence of Individual Factors on Web-based Developmental Education Course Success in a Two-year Technical College"

IRB#: 01Sep08

The IRB has deemed that the research and procedures described in this protocol application are exempt from federal regulations under 45 CFR 46.101category 2 due to the fact that this research may involve the use of educational tests, survey procedures, interview procedures or observation of public behavior.

Exempt protocols do not have an expiration date; however, if there are any changes made to this protocol that may cause it to be no longer exempt from CFR 46, the IRB requires another standard application from the investigator(s) which should provide the same information that is in this application with changes that may have changed the exempt status.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best wishes on your project!

Sincerely,

Robert D. Laird, Chair
UNO Committee for the Protection of Human Subjects in Research

Appendix C

Web-based Survey Letter of Consent

Dear Participant,

I am a doctoral candidate at the University of New Orleans under the guidance of Dr. Marietta Del Favero. In an effort to better understand the individual factors influencing student success in Web-based learning, I am conducting this survey for my dissertation project titled "The influence of individual factors on Web-based developmental education course success in a two-year technical college." Your participation and input are very important for this research study. Through your input, researchers can gain valuable insight that may help predict and improve developmental and Pre-Allied Health education course success at LTC.

The survey should not take more than 5 minutes to complete. Your participation in this anonymous survey is voluntary and your responses will be kept completely confidential. SurveyMonkey upholds the strictest privacy policy. By completing the survey, you are giving your informed consent. You may choose not to participate, or to stop completing the survey at any time. There will be no penalty; it will not affect your grades. The results of the survey may be included in a research study that may be published. Any report published will not identify you.

In exchange for your time and efforts in completing this survey, you will be included in a drawing for a chance to win one of four (4) $25.00 gift cards. In order to participate in the drawing, please enter your e-mail address and/or a telephone number at the end of the survey in the additional comments/suggestions section.

If you have any questions concerning this survey, please contact the investigator, Naba Das, at ndas1@uno.edu or Dr. Del Favero at mdelfave@uno.edu. Thank you in advance for your participation. Your input will provide valuable information and insight into Web-based learning and student course success at the LTC.

Sincerely,

Naba Das
Doctoral Candidate, University of New Orleans

Appendix D
Permission from LTC to Conduct Survey

LOUISIANA COMMUNITY & TECHNICAL COLLEGE SYSTEM

August 18, 2008

Dr. Marietta Del Favero, Associate Professor
University of New Orleans
2000 Lakeshore Dr.
University of New Orleans
New Orleans, LA 70148

Dear Dr. Del Favero,

Please accept this document as acknowledgement and permission for Mr. Nabakrishna Das to proceed with research within the Louisiana Technical College. We understand that Mr. Das will be conducting surveys statewide online survey among the LTC developmental education students as part of his doctoral dissertation at the University of New Orleans. We also understand that these surveys will includes all the campuses of LTC, except the Region 7 campuses that do not use the PWLN Web-based learning courseware.

We enthusiastically support Mr. Das in his pursuit of this degree, and if there is any assistance we may lend, please feel welcome to call on us.

Sincerely,

(Signed)

James R. “Jimmy” Sawtelle III
Vice President for Career and Technical Education

Cc: Mr. Jim Henderson, Senior Vice President for Career & Technical Education
Dr. Robert Bell, Senior Vice President, Academic and Student Affairs
Ms. Jennifer Daly, Director of Institutional Research
Ms. Phyllis Dupuis, Regional Director, LTC Region 4
Louisiana Technical College Regional Directors

July 7, 2008

Mr. Jimmy Sawtelle
Vice-President of Career and Technical Education
Louisiana Community and Technical College System
265 South Foster Drive
Baton Rouge, LA 70806

Dear Mr. Sawtelle,

My name is Nabakrishna Das and I am a doctoral student at the University of New Orleans. As part of my doctoral dissertation, I am studying the influence and relationship of certain individual factors on students' course success in the Web-based developmental education (DVED) programs at Louisiana Technical College (LTC). The study requires administering an anonymous, cross sectional survey to the DVED students using PLATO Web Learning Network (PWLN). The survey will be delivered to the participants using the SurveyMonkey.com, an online survey application tool/portal.

The survey is confidential and anonymous. The research data reported will not identify any individual, student or instructor. Students will be informed that their participation in this survey is voluntary.

I believe that the study will shed some light on the DVED students' experiences and perceptions, as well as, on the factors affecting their course success in the Web-based learning environment at LTC, facilitated by PLATO Web Learning Network (PWLN). I will be glad to share my findings with the LTC administration.

Therefore, I request your permission to conduct the survey at all the campuses of the LTC, except the Region 7 campuses, which do not use PWLN Web-based courseware.

This study is being conducted under the supervision of Dr. Marietta Del Favero, Associate Professor, University of New Orleans. Dr. Del Favero can be reached either by email, mdelfave@uno.edu or by phone, (504) 280-6446. I can be reached by email, ndas@ltc.edu or by phone, (337) 255-6141.

Thank you for your consideration and help in this matter.

Sincerely,

Nabakrishna Das
Doctoral Student
University of New Orleans

APPENDIX E
(Examples of E-mail Communications with LTC faculty & Staff)

Ms. Margie Mixon

Subject Matter Expert, Developmental Education

Chief Academic Officer, LTC Region 8

Louisiana Technical College

Dear Ms. Mixon:

My name is Nabakrishna (Naba) Das and I am a doctoral student at the University of New Orleans. I am also an IT instructor at LTC, Lafayette Campus. As part of my doctoral dissertation, I am studying the influence and relationship of certain individual factors on students' course success in the Web-based developmental education (DVED) programs at Louisiana Technical College (LTC). The study requires administering an anonymous, cross sectional survey to the DVED and Pre-Nursing students using PLATO Web Learning Network (PWLN). The survey will be delivered to the participants using the SurveyMonkey.com, an online survey application tool/portal.

The survey is confidential and anonymous. The research data reported will not identify any individual, student, instructor or campus. Students will be informed that their participation in this survey is voluntary.

I believe that the study will shed some light on the DVED students' experiences and perceptions, as well as, on the factors affecting their course success in the Web-based learning environment at LTC, facilitated by PLATO Web Learning Network (PWLN). I will be glad to share my findings with the LTC faculty and administration once the study is complete.

Therefore, I would request your help and guidance in conducting this survey. The online survey is planned after the Fall 2008 mid-term exam (October, 2008).

This study is being conducted under the supervision of Dr. Marietta Del Favero, Associate Professor, University of New Orleans. Dr. Del Favero can be reached either by email, mdelfave@uno.edu or by phone, (504) 280-6446. I can be reached by email, ndas@ltc.edu or by phone, (337) 255-6141.

Sincerely,

Naba Das

To: LTC Developmental Education Faculty Member

Dear Faculty Member:

I am a doctoral student at the University of New Orleans (UNO) in the higher education administration with a concentration in community and technical college education. As part of my dissertation, I am conducting a study on the influence and relationship of certain individual factors on students' course success in the Web-based developmental education (DVED) programs at Louisiana Technical College (LTC). The study requires administering an anonymous online survey to the LTC DVED and Pre-Nursing students that use PLATO Web Learning Network (PWLN). The survey will be delivered using SurveyMonkey.com, an online survey application during the middle of the Fall 2008 semester.

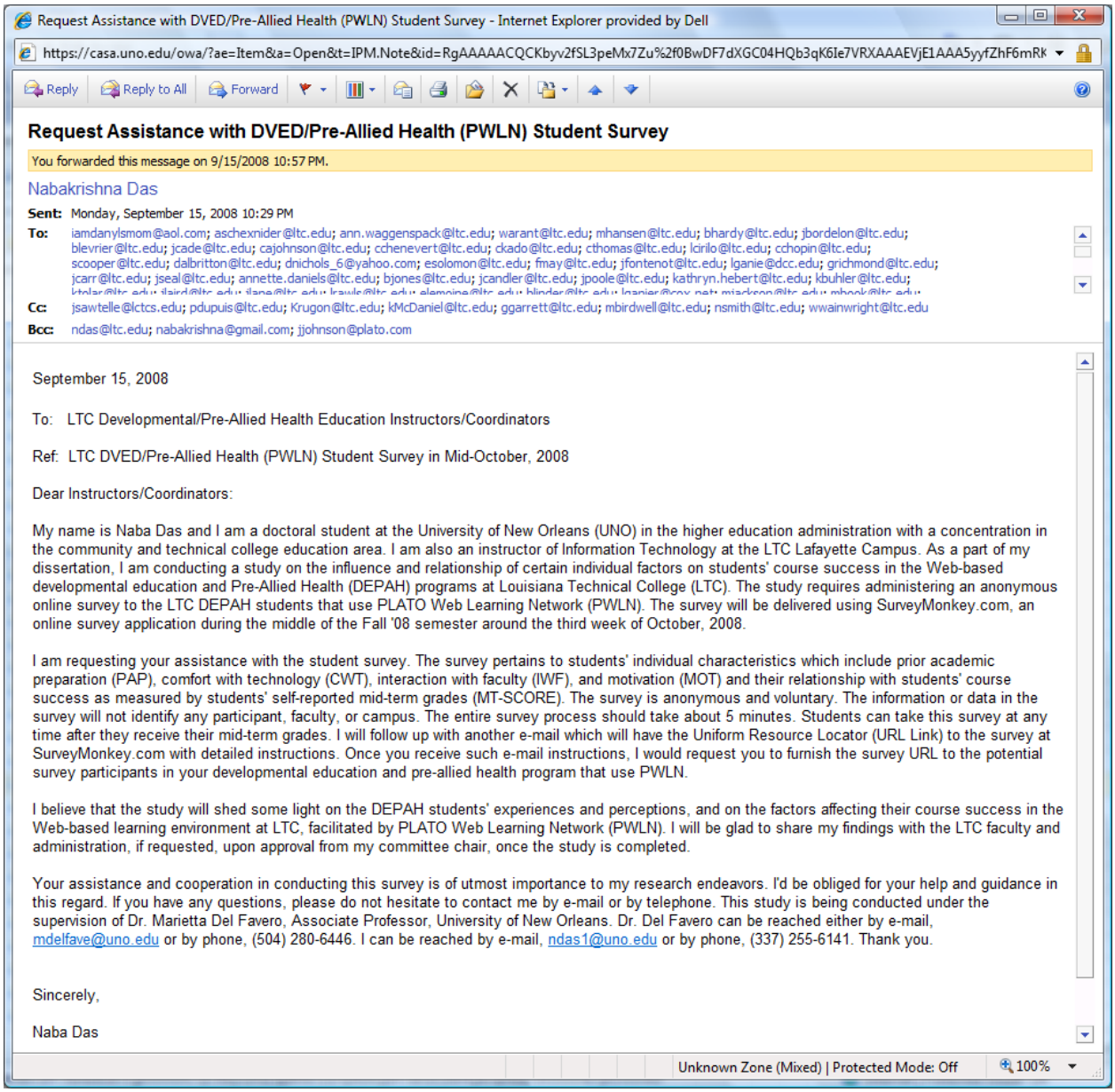
I am requesting your assistance with the student survey. The survey is about students' individual characteristics like prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT) and their relationship with students' course success as measured by the self-reported mid-term grade (MTSCORE). The survey is anonymous and voluntary. The information or data in the survey will not identify any participant, faculty, or campus. The entire survey process should take 5 to 10 minutes. Students can take this survey at any time after they receive their mid-term grades. I will follow up with another e-mail which will have the Uniform Resource Locator (URL Link) to the survey at SurveyMonkey.com with detailed instructions. Once you receive such e-mail instruction, I would request you to furnish the survey URL to the potential survey participant in your DVED class. The survey is limited to the students taking a course for the first time. Any student repeating a course should not participate in this survey.

I believe that the study will shed some light on the DVED students' experiences and perceptions, as well as, on the factors affecting their course success in the Web-based learning environment at LTC, facilitated by PLATO Web Learning Network (PWLN). I will be glad to share my findings with the LTC faculty and administration upon approval from my committee chair once the study is complete.

Once again, I would request your help and cooperation in conducting this research survey at your campus. This study is being conducted under the supervision of Dr. Marietta Del Favero, Associate Professor, University of New Orleans. Dr. Del Favero can be reached either by email, mdelfave@uno.edu or by phone, (504) 280-6446. I can be reached by email, ndas1@uno.edu or by phone, (337) 255-6141.

Sincerely,

Naba Das



Request Assistance with DVED/Pre-Allied Health (PWLN) Student Survey - Internet Explorer provided by Dell

https://casa.uno.edu/owa/?ae=Item&a=Open&t=IPM.Note&id=RgAAAAACQCKbyv2fSL3peMx7Zu%2f0BwDF7dXGC04HQb3qK6Ie7VRXAAAEVjE1AAA5yyfZhF6mRk

Reply | Reply to All | Forward

Request Assistance with DVED/Pre-Allied Health (PWLN) Student Survey

You forwarded this message on 9/15/2008 10:57 PM.

Nabakrishna Das

Sent: Monday, September 15, 2008 10:29 PM

To: iamdanylsmom@aol.com; aschexnider@ltc.edu; ann.waggenspack@ltc.edu; warant@ltc.edu; mhansen@ltc.edu; bhardy@ltc.edu; jbordelon@ltc.edu; blevrier@ltc.edu; jcade@ltc.edu; cajohnson@ltc.edu; cchenevert@ltc.edu; ckado@ltc.edu; cthomas@ltc.edu; lcirilo@ltc.edu; cchopin@ltc.edu; scooper@ltc.edu; dalbritton@ltc.edu; dnichols_6@yahoo.com; esolomon@ltc.edu; fmay@ltc.edu; jfontenot@ltc.edu; lganie@dcc.edu; grichmond@ltc.edu; jcarr@ltc.edu; jseal@ltc.edu; annette.daniels@ltc.edu; bjones@ltc.edu; jcandler@ltc.edu; jpoole@ltc.edu; kathryn.hebert@ltc.edu; kbuhler@ltc.edu;

Cc: jsawtelle@lctcs.edu; pdupuis@ltc.edu; Krugon@ltc.edu; kMcDaniel@ltc.edu; ggarrett@ltc.edu; mbirdwell@ltc.edu; nsmith@ltc.edu; wwainwright@ltc.edu

Bcc: ndas@ltc.edu; nabakrishna@gmail.com; jjohnson@plato.com

September 15, 2008

To: LTC Developmental/Pre-Allied Health Education Instructors/Coordinators

Ref: LTC DVED/Pre-Allied Health (PWLN) Student Survey in Mid-October, 2008

Dear Instructors/Coordinators:

My name is Naba Das and I am a doctoral student at the University of New Orleans (UNO) in the higher education administration with a concentration in the community and technical college education area. I am also an instructor of Information Technology at the LTC Lafayette Campus. As a part of my dissertation, I am conducting a study on the influence and relationship of certain individual factors on students' course success in the Web-based developmental education and Pre-Allied Health (DEPAH) programs at Louisiana Technical College (LTC). The study requires administering an anonymous online survey to the LTC DEPAH students that use PLATO Web Learning Network (PWLN). The survey will be delivered using SurveyMonkey.com, an online survey application during the middle of the Fall '08 semester around the third week of October, 2008.

I am requesting your assistance with the student survey. The survey pertains to students' individual characteristics which include prior academic preparation (PAP), comfort with technology (CWT), interaction with faculty (IWF), and motivation (MOT) and their relationship with students' course success as measured by students' self-reported mid-term grades (MT-SCORE). The survey is anonymous and voluntary. The information or data in the survey will not identify any participant, faculty, or campus. The entire survey process should take about 5 minutes. Students can take this survey at any time after they receive their mid-term grades. I will follow up with another e-mail which will have the Uniform Resource Locator (URL Link) to the survey at SurveyMonkey.com with detailed instructions. Once you receive such e-mail instructions, I would request you to furnish the survey URL to the potential survey participants in your developmental education and pre-allied health program that use PWLN.

I believe that the study will shed some light on the DEPAH students' experiences and perceptions, and on the factors affecting their course success in the Web-based learning environment at LTC, facilitated by PLATO Web Learning Network (PWLN). I will be glad to share my findings with the LTC faculty and administration, if requested, upon approval from my committee chair, once the study is completed.

Your assistance and cooperation in conducting this survey is of utmost importance to my research endeavors. I'd be obliged for your help and guidance in this regard. If you have any questions, please do not hesitate to contact me by e-mail or by telephone. This study is being conducted under the supervision of Dr. Marietta Del Favero, Associate Professor, University of New Orleans. Dr. Del Favero can be reached either by e-mail, mdelfave@uno.edu or by phone, (504) 280-6446. I can be reached by e-mail, ndas1@uno.edu or by phone, (337) 255-6141. Thank you.

Sincerely,

Naba Das

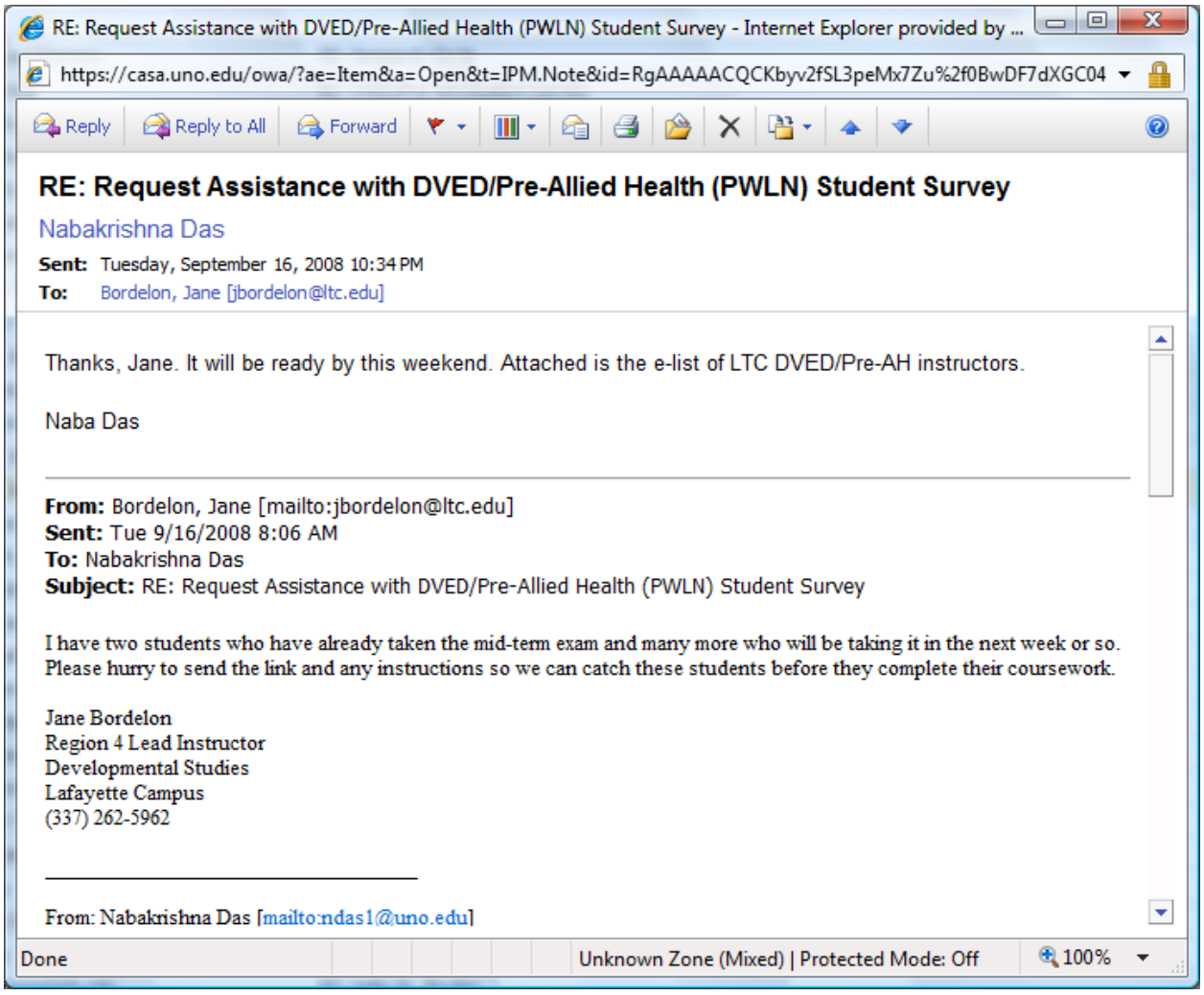
Unknown Zone (Mixed) | Protected Mode: Off | 100%

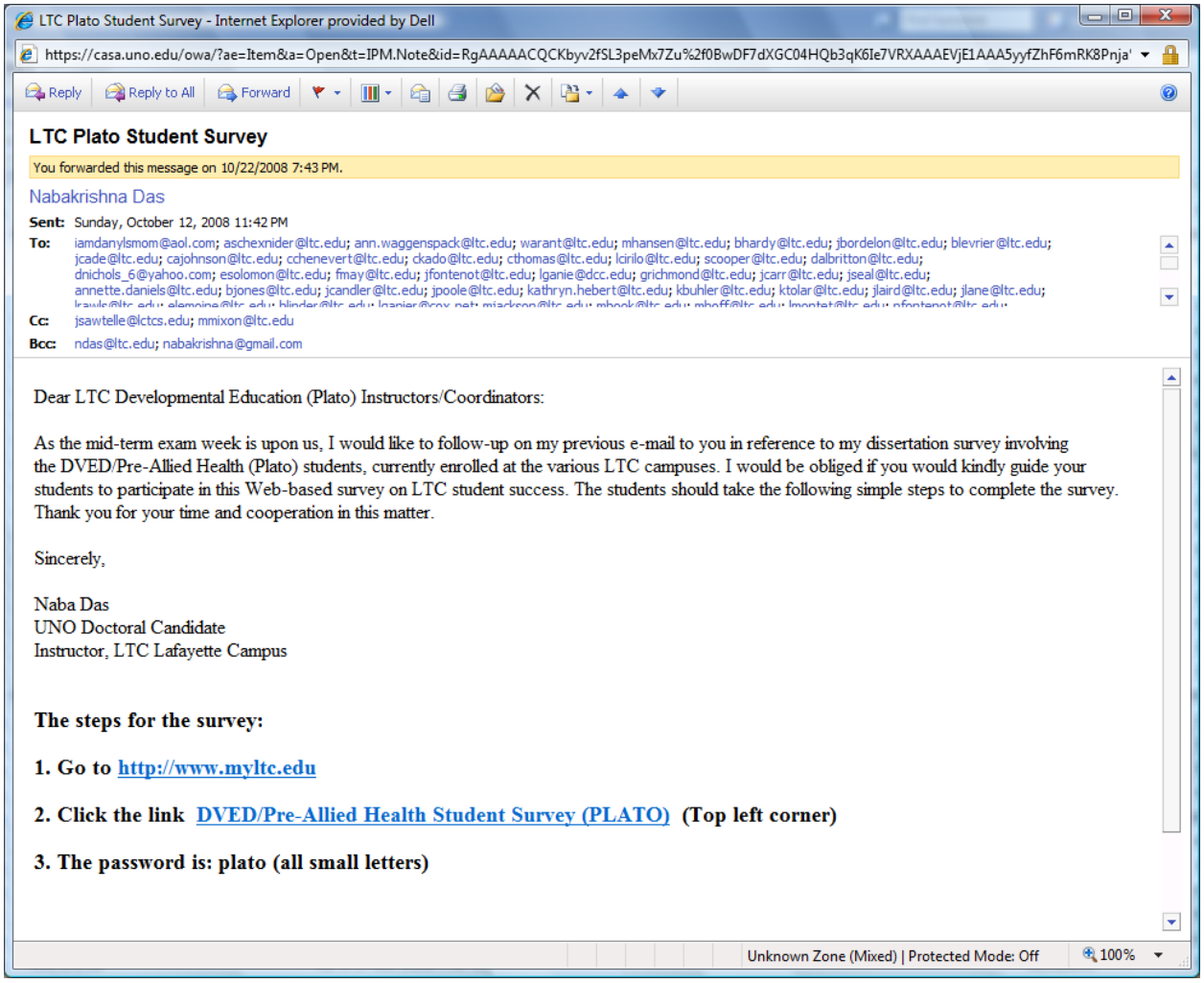
From: Sawtelle, Jimmy [mailto:jsawtelle@lctcs.edu]
Sent: Tue 9/16/2008 1:35 AM
Subject: RE: Request Assistance with DVED/Pre-Allied Health (PWLN) Student Survey

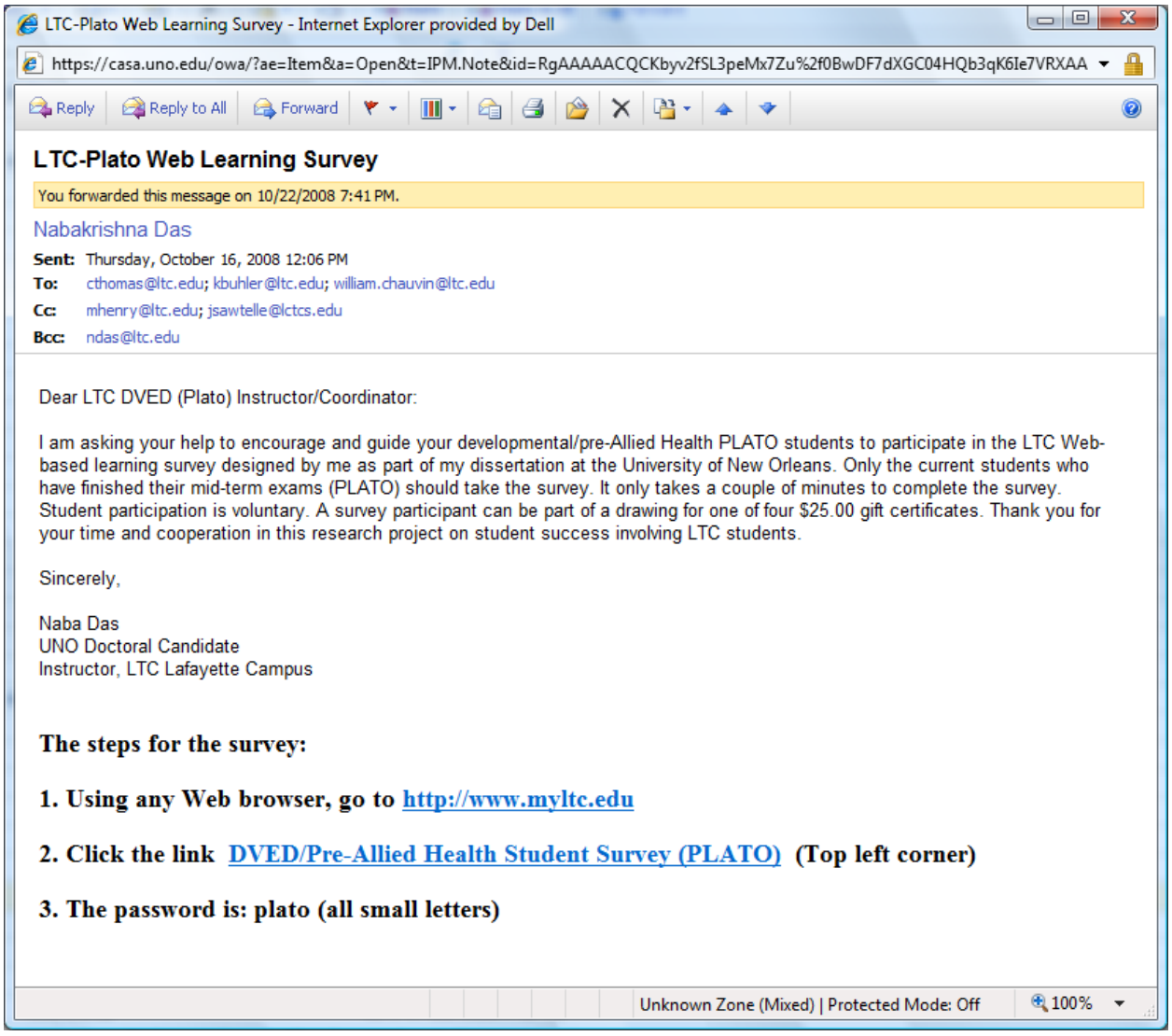
Greetings Everyone,

Just a note to support for Mr. Naba Das who is working towards his dissertation. Mr. Das is a talented and dedicated instructor and leader within LTC, Region 4's Lafayette Campus. Any assistance here is much appreciated. We wish Naba all the best as he works towards completion of his doctorate from the University of New Orleans...

Thank you,
Jimmy


RE: Request Assistance with DVED/Pre-Allied Health (PWLN) Student Survey - Internet Explorer provided by ...
https://casa.uno.edu/owa/?ae=Item&a=Open&t=IPM.Note&id=RgAAAAACQCKbyv2fSL3peMx7Zu%2f0BwDF7dXGC04
Reply
Reply to All
Forward
RE: Request Assistance with DVED/Pre-Allied Health (PWLN) Student Survey
Nabakrishna Das
Sent: Tuesday, September 16, 2008 10:34 PM
To: Bordelon, Jane [jbordelon@ltc.edu]
Thanks, Jane. It will be ready by this weekend. Attached is the e-list of LTC DVED/Pre-AH instructors.
Naba Das
From: Bordelon, Jane [mailto:jbordelon@ltc.edu]
Sent: Tue 9/16/2008 8:06 AM
To: Nabakrishna Das
Subject: RE: Request Assistance with DVED/Pre-Allied Health (PWLN) Student Survey
I have two students who have already taken the mid-term exam and many more who will be taking it in the next week or so. Please hurry to send the link and any instructions so we can catch these students before they complete their coursework.
Jane Bordelon
Region 4 Lead Instructor
Developmental Studies
Lafayette Campus
(337) 262-5962
From: Nabakrishna Das [mailto:ndas1@uno.edu]
Done
Unknown Zone (Mixed) | Protected Mode: Off
100%


LTC Plato Student Survey - Internet Explorer provided by Dell
https://casa.uno.edu/owa/?ae=Item&a=Open&t=IPM.Note&id=RgAAAAACQCKbyv2fSL3peMx7Zu%2f0BwDF7dXGC04HQb3qK6Ie7VRXAAAEVjE1AAA5yyfZhF6mRK8Pnja
Reply
Reply to All
Forward
LTC Plato Student Survey
You forwarded this message on 10/22/2008 7:43 PM.
Nabakrishna Das
Sent: Sunday, October 12, 2008 11:42 PM
To: iamdanylsmom@aol.com; aschexnider@ltc.edu; ann.waggenspack@ltc.edu; warant@ltc.edu; mhansen@ltc.edu; bhardy@ltc.edu; jbordelon@ltc.edu; blevrier@ltc.edu; jcade@ltc.edu; cajohnson@ltc.edu; cchenevert@ltc.edu; ckado@ltc.edu; cthomas@ltc.edu; lcirilo@ltc.edu; scooper@ltc.edu; dalbritton@ltc.edu; dnichols_6@yahoo.com; esolomon@ltc.edu; fmay@ltc.edu; jfontenot@ltc.edu; lganie@dcc.edu; grichmond@ltc.edu; jcarr@ltc.edu; jseal@ltc.edu; annette.daniels@ltc.edu; bjones@ltc.edu; jcandler@ltc.edu; jpoole@ltc.edu; kathryn.hebert@ltc.edu; kbuhler@ltc.edu; ktolar@ltc.edu; jlaird@ltc.edu; jlane@ltc.edu;
Cc: jsawtelle@lctcs.edu; mmixon@ltc.edu
Bcc: ndas@ltc.edu; nabakrishna@gmail.com
Dear LTC Developmental Education (Plato) Instructors/Coordinators:
As the mid-term exam week is upon us, I would like to follow-up on my previous e-mail to you in reference to my dissertation survey involving the DVED/Pre-Allied Health (Plato) students, currently enrolled at the various LTC campuses. I would be obliged if you would kindly guide your students to participate in this Web-based survey on LTC student success. The students should take the following simple steps to complete the survey. Thank you for your time and cooperation in this matter.
Sincerely,
Naba Das
UNO Doctoral Candidate
Instructor, LTC Lafayette Campus
The steps for the survey:
1. Go to http://www.myltc.edu
2. Click the link DVED/Pre-Allied Health Student Survey (PLATO) (Top left corner)
3. The password is: plato (all small letters)
Unknown Zone (Mixed) | Protected Mode: Off
100%


LTC-Plato Web Learning Survey - Internet Explorer provided by Dell
https://casa.uno.edu/owa/?ae=Item&a=Open&t=IPM.Note&id=RgAAAAACQCKbyv2fSL3peMx7Zu%2f0BwDF7dXGC04HQb3qK6Ie7VRXAA
Reply
Reply to All
Forward
LTC-Plato Web Learning Survey
You forwarded this message on 10/22/2008 7:41 PM.
Nabakrishna Das
Sent: Thursday, October 16, 2008 12:06 PM
To: cthomas@ltc.edu; kbuhler@ltc.edu; william.chauvin@ltc.edu
Cc: mhenry@ltc.edu; jsawtelle@lctcs.edu
Bcc: ndas@ltc.edu
Dear LTC DVED (Plato) Instructor/Coordinator:
I am asking your help to encourage and guide your developmental/pre-Allied Health PLATO students to participate in the LTC Web-based learning survey designed by me as part of my dissertation at the University of New Orleans. Only the current students who have finished their mid-term exams (PLATO) should take the survey. It only takes a couple of minutes to complete the survey. Student participation is voluntary. A survey participant can be part of a drawing for one of four $25.00 gift certificates. Thank you for your time and cooperation in this research project on student success involving LTC students.
Sincerely,
Naba Das
UNO Doctoral Candidate
Instructor, LTC Lafayette Campus
The steps for the survey:
1. Using any Web browser, go to http://www.myltc.edu
2. Click the link DVED/Pre-Allied Health Student Survey (PLATO) (Top left corner)
3. The password is: plato (all small letters)
Unknown Zone (Mixed) | Protected Mode: Off
100%

O.K. As each student completes his/her midterm I will have each take the survey. Brenda

---

From: Nabakrishna Das [mailto:ndas1@uno.edu]
Sent: Mon 10/13/2008 1:13 PM
To: Rice, Brenda
Subject: RE: LTC Plato Student Survey

Yes, ma'am. The students are asked about their mid-term scores in the survey. It's the student's self-reported score. Therefore, a student need to take this survey after they take the mid-term exam. The survey will remain open throughout the month of October, 08. Thank you for your time and help.

Naba Das

From: Rice, Brenda [mailto:brice@ltc.edu]
Sent: Mon 10/13/2008 12:18 PM
To: Nabakrishna Das
Subject: RE: LTC Plato Student Survey

O.K., let me say this. We had to dismiss class for several days due to the hurricanes. Many of my students have not reached mid-term. However, several will be taking the mid-term in the next week to week and a half. I do have a few that have completed. So, do you want only students who have completed their mid-term exams to take the survey?
Brenda

From: Nabakrishna Das [mailto:ndas1@uno.edu]
Sent: Mon 10/13/2008 11:30 AM
To: Rice, Brenda
Subject: RE: LTC Plato Student Survey

Thank you Ms. Rice. The students take the survey after they complete their mid-term. I will definitely let you know about the results once the study is complete.

Regards,

Naba Das

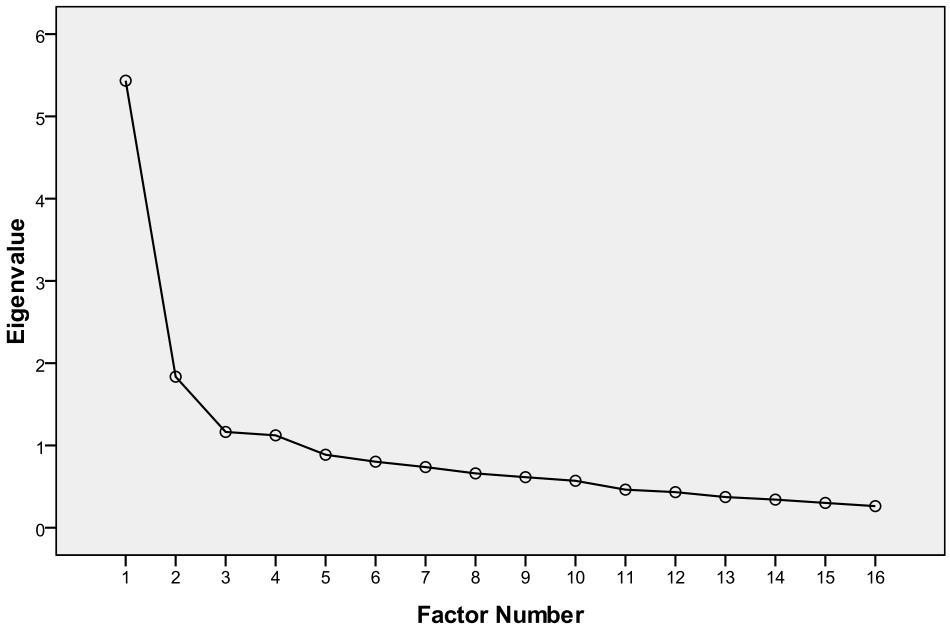
Appendix F

Factor Analysis

Factor	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.434	33.961	33.961	2.881	18.008	18.008
2	1.835	11.471	45.432	1.572	9.826	27.835
3	1.164	7.276	52.707	1.485	9.281	37.116
4	1.123	7.017	59.725	1.292	8.077	45.192
5	.887	5.544	65.268			
6	.802	5.015	70.283			
7	.737	4.606	74.889			
8	.660	4.127	79.016			
9	.614	3.838	82.854			
10	.570	3.564	86.419			
11	.463	2.891	89.310			
12	.432	2.703	92.013			
13	.373	2.329	94.342			
14	.342	2.135	96.477			
15	.301	1.884	98.361			
16	.262	1.639	100.000			

Extraction Method: Principal Axis Factoring.

Scree Plot



Factor Matrix[a]

a. 4 factors extracted. 14 iterations required.

Rotated Factor Matrix[a]

	Factor			
	1	2	3	4
SelfDirectR	.802	.110	.093	.162
CourseUtilityR	.767	.017	.184	.125
Opper2IntracR	.663	.128	.436	.167
FreedomR	.651	.189	.230	.091
SupportR	.542	.137	.511	.136
EmailUseR	.037	.621	.096	.116
ComfwCompR	.045	.568	.107	.182
NavCourseR	.274	.560	.222	.253
InternetUseR	.148	.556	.046	.230
ComfSeekHelpR	.414	.128	.644	.200
InsInteractR	.296	.211	.592	.276
HrsSpentR	.085	.064	.088	.010
PSKILLSR	.291	.132	.256	.602
SSKILLSR	.199	.160	.024	.554
COMPASSR	.037	.158	.040	.387
PGPAR	-.020	.157	.155	.310

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Factor Transformation Matrix

Factor	1	2	3	4
1	.693	.378	.474	.391
2	-.544	.740	-.109	.380
3	-.330	-.545	.347	.689
4	.341	-.113	-.802	.478

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax with Kaiser Normalization.

Appendix G

Multiple Regression Model

Correlations

[DataSet1] C:\NDAS\UNO\DissSurveySPSS\DataSetFR121808.sav

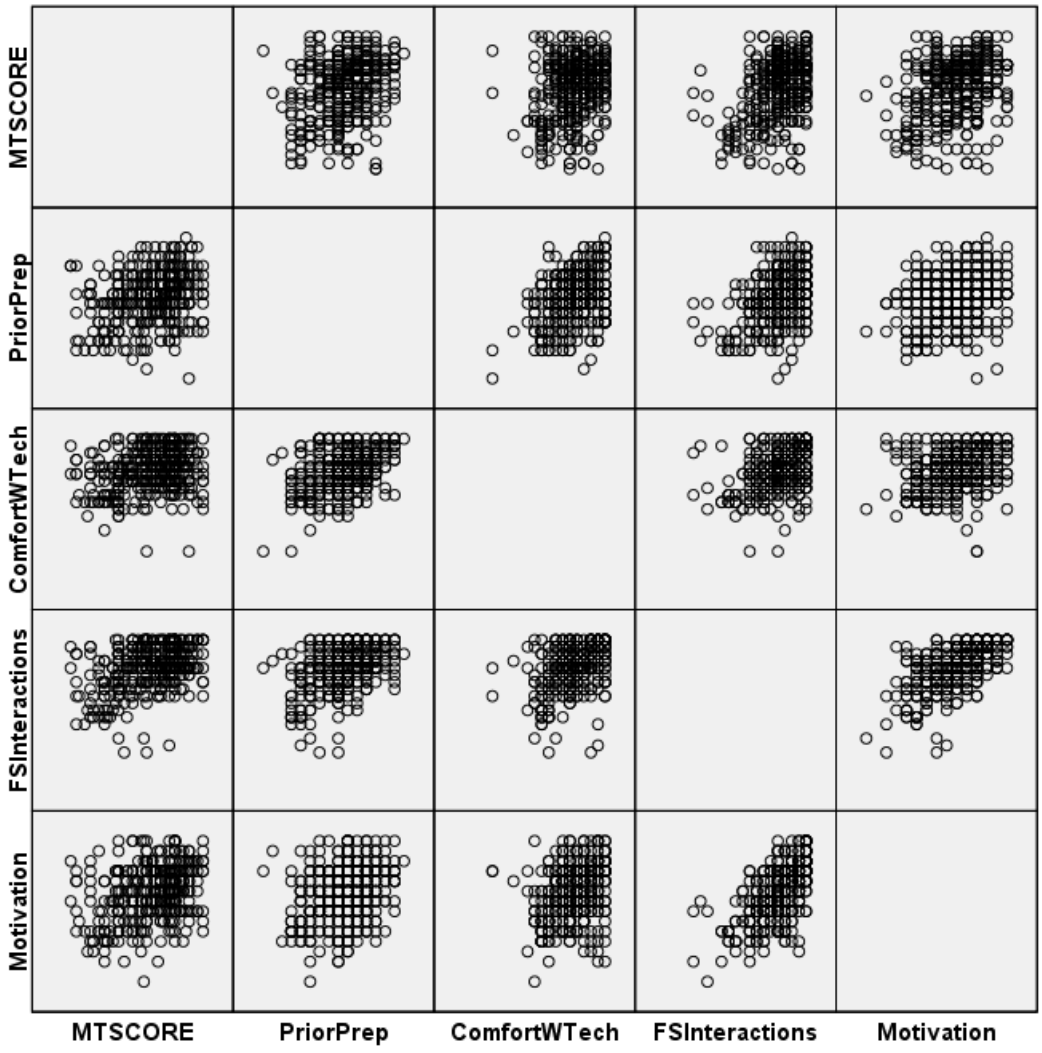
Correlations[a]

		PriorPrep	ComfortWTech	FSInteractions	Motivation
PriorPrep	Pearson Correlation	1	.415**	.428**	.312**
	Sig. (2-tailed)		.000	.000	.000
ComfortWTech	Pearson Correlation	.415**	1	.404**	.289**
	Sig. (2-tailed)	.000		.000	.000
FSInteractions	Pearson Correlation	.428**	.404**	1	.629**
	Sig. (2-tailed)	.000	.000		.000
Motivation	Pearson Correlation	.312**	.289**	.629**	1
	Sig. (2-tailed)	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

a. Listwise N=380

Graph


MTSCORE
PriorPrep
ComfortWTech
FSInteractions
Motivation
MTSCORE
PriorPrep
ComfortWTech
FSInteractions
Motivation

Descriptive Statistics

	Mean	Std. Deviation	N
MTSCORE	81.80	10.507	380
PriorPrep	13.71	2.728	380
ComfortWTech	15.59	2.853	380
FSInteractions	16.14	3.066	380
Motivation	14.89	2.678	380

Correlations

		MTSCORE	PriorPrep	ComfortWTech	FSInteractions	Motivation
Pearson Correlation	MTSCORE	1.000	.294	.237	.390	.321
	PriorPrep	.294	1.000	.415	.428	.312
	ComfortWTech	.237	.415	1.000	.404	.289
	FSInteractions	.390	.428	.404	1.000	.629
	Motivation	.321	.312	.289	.629	1.000
Sig. (1-tailed)	MTSCORE	.	.000	.000	.000	.000
	PriorPrep	.000	.	.000	.000	.000
	ComfortWTech	.000	.000	.	.000	.000
	FSInteractions	.000	.000	.000	.	.000
	Motivation	.000	.000	.000	.000	.
N	MTSCORE	380	380	380	380	380
	PriorPrep	380	380	380	380	380
	ComfortWTech	380	380	380	380	380
	FSInteractions	380	380	380	380	380
	Motivation	380	380	380	380	380

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	Motivation, ComfortWTech, PriorPrep, FSInteractions[a]	.	Enter

a. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.426[a]	.182	.173	9.555

a. Predictors: (Constant), Motivation, ComfortWTech, PriorPrep, FSInteractions

b. Dependent Variable: MTSCORE

ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7600.547	4	1900.137	20.812	.000[a]
	Residual	34237.650	375	91.300		
	Total	41838.197	379			

a. Predictors: (Constant), Motivation, ComfortWTech, PriorPrep, FSInteractions

b. Dependent Variable: MTSCORE

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	51.843	3.582		14.473	.000		
	PriorPrep	.518	.208	.135	2.487	.013	.745	1.342
	ComfortWTech	.189	.197	.051	.958	.338	.764	1.308
	FSInteractions	.821	.222	.240	3.703	.000	.521	1.918
	Motivation	.447	.236	.114	1.894	.059	.602	1.661

a. Dependent Variable: MTSCORE

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	PriorPrep	ComfortWTech	FSInteractions	Motivation
1	1	4.924	1.000	.00	.00	.00	.00	.00
	2	.028	13.368	.00	.32	.15	.11	.24
	3	.021	15.304	.06	.64	.50	.02	.00
	4	.016	17.543	.67	.00	.25	.28	.02
	5	.011	21.172	.27	.04	.10	.58	.74

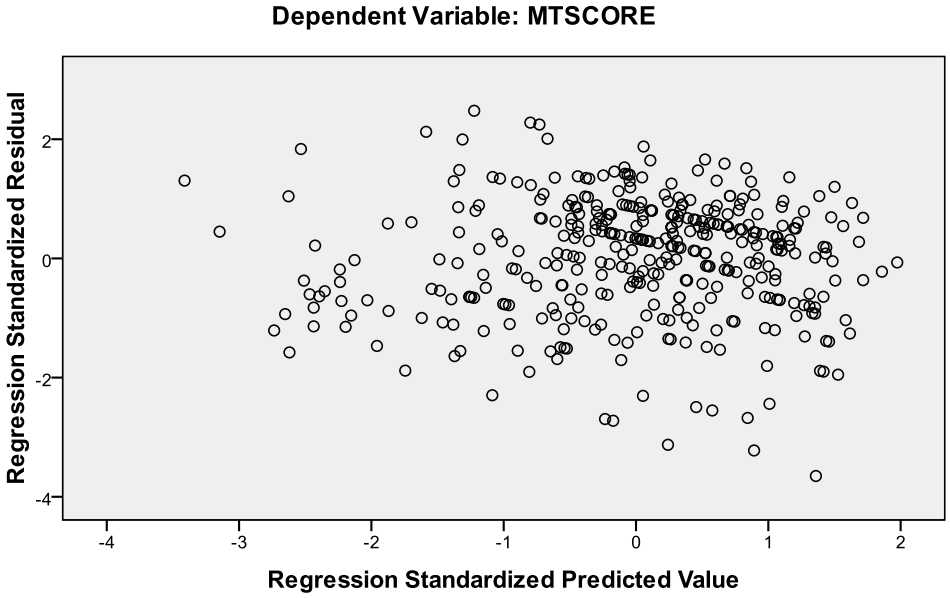
a. Dependent Variable: MTSCORE

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	66.52	90.64	81.80	4.478	380
Residual	-34.891	23.675	.000	9.505	380
Std. Predicted Value	-3.412	1.974	.000	1.000	380
Std. Residual	-3.652	2.478	.000	.995	380

a. Dependent Variable: MTSCORE

Scatterplot



Appendix H

Logistic Regression Model

Logistic Regression

[DataSet1] C:\NDAS\UNO\DissSurveySPSS\DataSetFR121808.sav

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	380	100.0
	Missing Cases	0	.0
	Total	380	100.0
Unselected Cases		0	.0
Total		380	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
Fail	0
Pass	1

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted		
			PassCourseR		Percentage Correct
			Fail	Pass	
Step 0	PassCourseR	Fail	0	50	.0
		Pass	0	330	100.0
Overall Percentage					86.8

a. Constant is included in the model.

Classification Table[a,b]

Observed			Predicted		
			PassCourseR		Percentage Correct
			Fail	Pass	
Step 0	PassCourseR	Fail	0	50	.0
		Pass	0	330	100.0
	Overall Percentage				86.8

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	1.887	.152	154.624	1	.000	6.600

Variables not in the Equation

			Score	Df	Sig.
Step 0	Variables	PAP	28.318	1	.000
		CWT	18.377	1	.000
		IWF	53.049	1	.000
		MOT	31.230	1	.000
		Overall Statistics	60.892	4	.000

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	Df	Sig.
Step 1	Step	56.207	4	.000
	Block	56.207	4	.000
	Model	56.207	4	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	239.720[a]	.137	.254

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Classification Table[a]

Observed			Predicted		
			PassCourseR		Percentage Correct
			Fail	Pass	
Step 1	PassCourseR	Fail	13	37	26.0
		Pass	7	323	97.9
	Overall Percentage				88.4

a. The cut value is .500

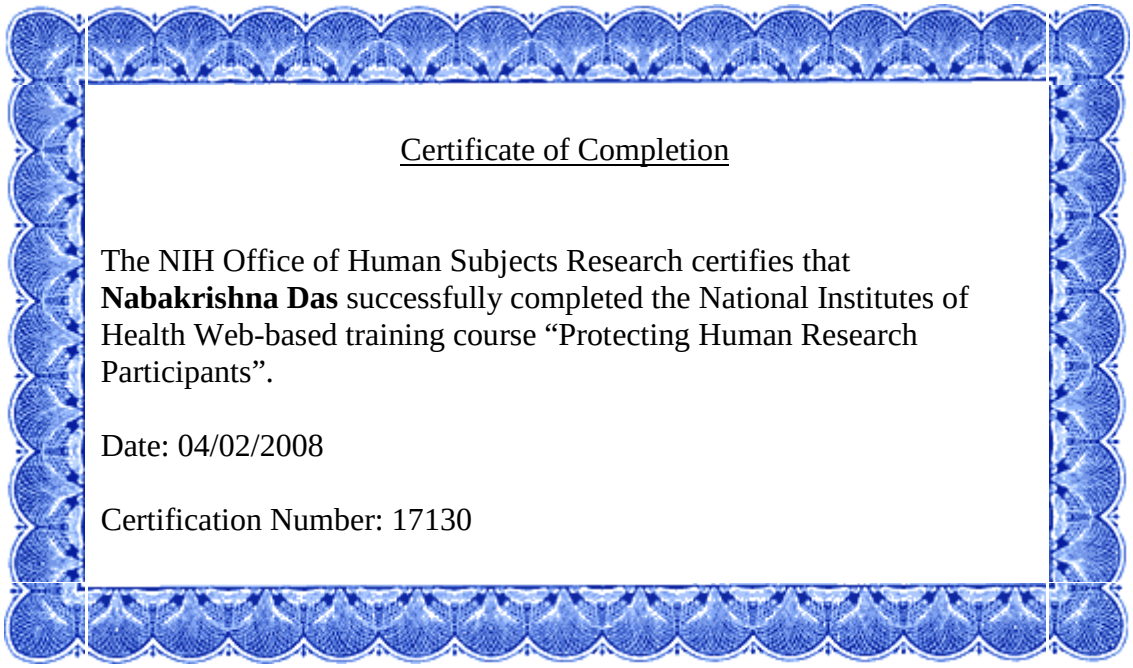
Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	PAP	.142	.071	3.959	1	.047	1.152	1.002	1.325
	CWT	.057	.062	.840	1	.359	1.058	.938	1.194
	IWF	.188	.066	8.213	1	.004	1.207	1.061	1.373
	MOT	.125	.079	2.511	1	.113	1.134	.971	1.324
	Constant	-5.402	1.157	21.810	1	.000	.005		

a. Variable(s) entered on step 1: PAP, CWT, IWF, MOT.

Appendix I

NIH Certificate



Certificate of Completion

The NIH Office of Human Subjects Research certifies that **Nabakrishna Das** successfully completed the National Institutes of Health Web-based training course “Protecting Human Research Participants”.

Date: 04/02/2008

Certification Number: 17130

Vita

Nabakrishna Das, “Naba,” is an instructor at the Louisiana Technical College (LTC), Lafayette Campus, Louisiana. He is the department head of the Information and Communication Technology (ICT) department and the academic chair for the ICT programs at LTC Region 4. Mr. Das has been teaching at the LTC since 1990. He is a Cisco, Novell, and Microsoft certified professional/engineer. Originally from Assam, India, Mr. Das has a diverse educational and professional background that includes engineering, computer science, and education.

Mr. Das’s research interests include e-learning, student success, equity in education, and college access and success for the economically and socially disadvantaged students. Mr. Das is involved with various professional organizations. He is a member of the Phi Kappa Phi honor society. At the LTC, Lafayette Campus, Mr. Das is the advisor and sponsor of the Information Technology Club.