DEVELOPMENT AND ANALYSIS OF A SURVEY ASSESSING ELEVENTH

GRADE HIGH SCHOOL STUDENTS' PREFERENCES FOR SPECIFIC TYPES OF

ONLINE COURSE STRUCTURES

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Development and Analysis of a Survey Assessing Eleventh Grade High School Students'

Preferences for Specific Types of Online Course Structures

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Abstract

Jonathan Burton. DEVELOPMENT AND ANALYSIS OF A SURVEY ASSESSING
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TYPES OF ONLINE COURSE STRUCTURES. (Under the direction of Dr. Clarence
Holland)

School of Education, January 8, 2009.

This dissertation describes an exploratory study to develop a survey that assesses high
school students' attitudes towards various modes of online course delivery. The primary
focus of the study was the development of a survey that could be used to determine these
preferences with a target population of high school juniors. A panel of experts in the
fields of online education and adolescent psychology examined the survey and provided
feedback during its development. Reliability was established with a Cronbach's alpha.
Validity was assessed through an exploratory factor analysis. Two factors emerged,
focusing on interaction and student learning. The predicted online course structure
rankings were validated with a Pearson product-moment correlation. The survey was
found to be reliable and valid, and the course structure rankings were internally
consistent. Survey results indicated a preference for hybrid courses with face-to-face
instruction. Suggestions for further research are also included.

Dedication

This dissertation is dedicated to my wonderful wife Sarah. I honestly do not know how I would have completed it without your support, both practically and emotionally. This project has been as much if not more work for you than for me. I am so grateful and appreciative of your sacrifices so that I could achieve this dream. You are an amazing wife, a terrific mother, and a true daughter of our King. Thank you!

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Dr. Holland, my committee chair and most frequent professor, was instrumental in giving me focus and direction, both in the dissertation as well as in my course work. My committee members – Dr. Randy Dunn and Dr. Jeff Crawford – were quite helpful with suggestions for direction, revisions, and improvements to the dissertation. My panel of experts – Dr. Eric Evenhuis, Mr. Harvey Klamm, and Dr. Connie Pearson – volunteered many hours to review and give input in the development of my survey. Mrs. Claudia Smith was also quite helpful with suggestions on the statistical approaches.

I also need to thank the many friends who walked through this journey with my family. Thank you to Peter and Stephanie, for allowing Sarah to come over with the girls so I could work. Thank you to Sami and Diana, for never complaining when I brought out my computer during our vacations so I could work on my courses or dissertation. Thank you to the many, many friends who have prayed with me through this process. It is much appreciated!

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Chapter 1: Introduction

This dissertation describes an exploratory study to develop a survey that assesses high school students' attitudes towards various modes of online course delivery. This first chapter will describe the transformation that is happening in education due to the explosive growth of online education, prompting interest in this study. After describing the context, the specific research problem will be stated, including the definition of key terms. Then, the importance of the study in light of current circumstances will be explained. An overview of the methodology will conclude this chapter.

Background

Distance learning, defined as any mode of instruction in which the teacher and learner are separated by location or time (Mupinga, 2005), comes in many different forms. Early examples include correspondence courses, audio tapes, and video tapes. With the advent and growing accessibility of the Internet, a new mode of distance learning in the form of online courses has emerged. This field has grown explosively, with 2.3 million college student enrollments in online courses in the fall of 2004 and a projected growth rate of 18% per year at the college level (Moskal, Dziuban, Upchurch, Hartman, & Truman, 2006).

High school involvement in online courses lags that of colleges, but currently the growth is even more explosive. As of 2003, approximately 210,000 high school students were enrolled in at least one online course (National Center for Education Statistics, 2003). Growth in virtual high school programs is projected from 20% to 50% per year. Currently, 24 states operate online programs for high schools, up from zero in 1996

(Cavanagh, 2006). Florida Virtual School (2008), the oldest state-wide online high school in the country (founded in 1997 with only 77 enrollments), typifies this growth, serving more than 52,000 students in 87,000 semester-long courses during the 2006-2007 school year, and with over 190,000 enrollments in semester-long courses in 2007-2008 (Florida Virtual School).

Given the rapid growth of these programs, research has lagged practice, forcing practitioners of online education to often operate on anecdotal evidence and professional judgment. The amount of available research for high school programs in particular is still small, although growing rapidly. Most high school programs have used data from the somewhat larger pool of research about college programs, assuming that data on older students applies to high school age students (Robyler & Marshall, 2002). The increasing availability of courses and the user-centered focus of the World Wide Web have prompted researchers to ponder if education needs to move away from its tendency to dictate the mode of learning for students and focus instead on student preferences (Norton & Hathaway, 2008; Phillips & Peters, 1999).

Most research studies about student preferences for online course delivery have focused on the attitudes of students currently enrolled in online courses (Howland & Moore, 2002; Katz, 2002; Kirkwood & Price, 2005; Morris, Wu, & Finnegan, 2005; Thompson & Heng-Yu, 2005). While these researchers have sometimes asked students for their perspective on online courses prior to taking the course, the focus of the studies has been to determine the student attributes that lead to the successful completion of online courses. A few recent studies (Artino, 2007; Li & Irby, 2008; Robinson & Doverspike, 2006; Tung & Chang, 2007) have begun to explore the reasons that students

select online course options as opposed to traditional face-to-face courses, but the question as to what type of online course structure students prefer has not really been examined. Another issue confusing the literature is that many different types of online courses exist (Kachel, Henry, & Keller, 2005). Many of the studies only focus on one format of an online course (but not the same format in each study), making generalization difficult.

Problem Statement

In light of these issues, this exploratory study developed a survey to examine what course structures high school students most prefer for online courses. As the survey was generated as part of the research, the study also examined the reliability and validity of the survey instrument, demonstrating its effectiveness in addressing this question.

Research Questions

To demonstrate the reliability, validity and usefulness of the survey, the following three research questions were explored:

1. Do the items on the survey demonstrate an appropriate level of internal consistency, as measured by a Cronbach's alpha?

2. Do the targeted constructs of interaction, accountability, and student learning emerge in an exploratory factor analysis?

3. Do the predicted course structure preferences significantly correlate with students' overall average scores on the survey?

Target Population

For consistency in analyzing student responses, the target population was high school juniors.

Definition of Key Terms

The survey focused on six types of course structures. Each of these course structures is defined below.

1. Fully synchronous, fully online (all content is available online, taught in an interactive real-time environment with scheduled meeting times).

2. Fully asynchronous, fully online (all content is available online, discussions are managed through e-mail or discussion boards, in which students and the teacher do not communicate in a real-time environment).

3. Mixed asynchronous and synchronous, fully online (all content is available online, some portion of content or discussions (or both) occur in a real-time interactive environment with scheduled meetings between the teacher and students).

4. Hybrid, with face-to-face instruction (most, but not all, content is available online, and students must meet face-to-face at scheduled meetings with the teacher for a portion of course content).

5. Hybrid, with face-to-face facilitation (most, if not all, content is available online, but students meet regularly with a face-to-face facilitator who monitors progress, provides tutoring assistance, and administers specific components of the course (e.g. tests, laboratories)).

6. Traditional (most content, if not all, is presented in a face-to-face setting, and students are required to regularly and frequently attend class sessions in person as opposed to online. This course structure, which is clearly not an

online format, was included to provide a comparison to the five previous online formats).

Professional Significance of the Study

Given the rapid growth and large participation in online courses, little debate remains regarding the permanence of online education. From a practical standpoint, high schools that wish to develop online course opportunities for their students have two approaches: develop their own material, or encourage students to take advantage of existing courses. Schools with a particular philosophical or religious view may find that existing courses do not blend well with their educational mission, forcing them to explore the creation of their own online courses. Given the costs and time involved in this endeavor, schools need to know what style of courses students are interested in taking. Studies have shown that online courses typically cost significantly more to develop and cost almost as much to deliver to students in a given school term as traditional courses (Association for the Study of Higher Education, 2006). To make school-developed online courses cost effective, schools need to use a particular course with a large number of students, making it critical to determine what style of courses are most likely to attract students.

Overview of Methodology

This exploratory study involved the development of a survey instrument used to assess high school student course structure preferences for online courses. After the instrument was initially developed, the survey was examined by a panel of experts (two experts in the field of online high school education and one expert in the field of adolescent psychology) and modified based on their recommendations. A pilot

administration of the survey revealed no confusion or ambiguity with the items on the survey. The survey was then administered to several different groups of high school students. A single overall average score for the instrument was calculated to determine students' preferences for face-to-face versus online course structures. A Cronbach's alpha was used to determine the reliability of the instrument. In addition to the face validity established by the panel of experts, construct-related evidence of validity was shown through an exploratory factor analysis. The factor analysis examined the internal structure of the survey to determine if the targeted constructs in the survey were being measured. The student course structure preference rankings were calculated based on the student responses to the survey. The rankings were validated by comparing the rankings to the average overall score with a Pearson product-moment correlation.

Chapter 2: Literature Review

The research literature related to online education is growing and clearly shows a developing field. A noticeable deficit in research exists about online education in high school settings. When focusing on student attitudes towards online courses, the research typically addresses three common themes: (a) the attributes of online learners, (b) the role of technology in education, and (c) the reasons why students choose online courses. These themes are not independent of each other, but they form a framework to discuss what is known about student preferences for online courses. The effectiveness of blending online tools with a traditional face-to-face classroom to form a hybrid course is an area of growing interest in the literature. Additionally, as this research project involves the development of a new survey instrument, methods of establishing and validating a survey are discussed. Lastly, predicted directions for online education are investigated, followed by a discussion of the need for this study.

The Available Research

The available research literature related to online courses is overwhelmingly based on studies involving graduate and undergraduate college students. Of those at the high school level, many pieces of literature are professional opinion pieces authored by leaders of online high school programs or studies that were commissioned by online programs (Fox, 2006; Lake, 2006; Pape, 2005; Pascopella, 2003; Podoll & Randle, 2005; Purnell, 2005; Starkman, 2007; Vrasidas, Zembylas, & Chamberlain, 2003), leaving a relative dearth of peer-reviewed, referenced research articles on high school online programs. Mupinga (2005) notes the confusion that many schools have towards the role

of online courses for high school students. He specifically notes the tendency to haphazardly use online courses to fix difficult problems in schools, such as educating behaviorally challenging students or managing overcrowded classrooms, without having a clear plan or justification for doing so. Liz Pape, the president and chief executive officer of Virtual High School, one of the largest online high school programs in the country, recognizes the lack of well-researched information. "Because virtual schools are still relatively new, evidence on whether online education is improving student achievement is just beginning to be collected…. Little data exists, however, for school board members and administrators who are seeking measurable indicators of success" (Pape, p. 13).

Robyler and Marshall (2002), authors of one of the most significant studies on predicting success of high school students in online courses, note the current dependence high school programs have on data from sources related to college students. Robyler (2006), while noting the unique social and psychological needs of high school students relative to college students, explains that research shows this dependence to be acceptable: "Most studies examined postsecondary programs, which have been around longer than secondary ones, but the quality indicators are always nearly identical to those for K-12 programs" (p. 57). Even so, more research on high school online programs is desirable. Fortunately, this deficit is likely to be remedied in the next few years. As recently as 2001, researchers were deeply frustrated over the lack of quality investigations into online education at the college level (Christensen, Anakwe, & Kessler, 2001), and that complaint has now evaporated from the literature.

Attributes of Online Learners

Many studies have been undertaken to determine the characteristics of students who enroll in online classes. Robinson and Doverspike (2006) found that students with a strong sense of self-discipline and high behavioral control were more likely to take an online course and experience success. Beyth-Marom, Saporta, and Caspi (2005) note that student learning styles play a significant role in selecting online opportunities, when choosing from a variety of online course options. Like Robinson and Doverspike, Beyth-Marom et al. found that students with independent styles were more likely to select options with an asynchronous approach, while those who showed stronger preference for interaction not surprisingly selected synchronous learning opportunities. Drennan, Kennedy, and Pisarski (2005) found highly similar results in their study. Another study, which compared students in online courses to students in face-to-face courses, found that online students were much more comfortable with electronic communication, had better access to the Internet (making these types of classes more convenient), and had noticeably better typing skills. Students in the face-to-face classes considered class participation essential and had a stronger preference for group work (Haigh, 2007). In short, most major studies have found that students in fully asynchronous online courses tend to be independent learners with a high degree of confidence in their technological skills. Students who are more relational or less confident in their technological skills prefer a more synchronous environment.

Katz (2002) compared two different styles of distance courses. One group of students was in a fully synchronous distance classroom in which they watched their professor in real-time via television, and they had two-way verbal communication with

the instructor. The other group watched the lessons via the web after they were recorded. All communication with the instructor in the second group was asynchronous. Those who showed a positive attitude towards the fully synchronous course rated highly on the importance of feeling satisfied with learning, having greater control of their learning, and being motivated to study. Katz concluded that these traits are consistent with those who desire a more relational approach to learning. His findings were consistent with other researchers for those who preferred the asynchronous approach. These students rated highly on the desire for independence in their learning.

Complicating any analysis of student attributes in online classes is the finding that regardless of their learning style, most students (including those enrolled in online classes) prefer the style of traditional face-to-face classes (Durrington, Berryhill, & Swafford, 2006; Maki & Maki, 2002). Strong evidence exists that online discussions are richer and of higher quality than those that occur in face-to-face discussions, but even in these types of areas where online courses provide a potentially superior opportunity, students preferred the interactions in a face-to-face environment (Wang & Woo, 2007). Students take online classes for external factors – convenience, scheduling, or course availability – more so than for learning preference. Moskal et al. (2006) discovered that the overwhelming majority of online students took courses due to convenience and flexibility. Fully 80% of the students surveyed commented that online courses were essential to the students' ability to complete their degree. Dabaj and Basak (2008) found that even though students may have self-selected to take online courses, they preferred the format of traditional courses. The reasons for taking the courses were again due to convenience.

These findings make it difficult to determine if the data in student characteristic studies are a measure of typical attributes that lead to student success in online courses or simply coincidental traits that highly involved, motivated, and busy students possess. Most reports studying these effects are quasi-experimental in nature, which further makes it difficult to conclude causation. An area for future research is to develop more true experimental studies that will allow for a determination if a standard set of traits helps describe successful online students.

Much research has also focused on factors that can be used to predict success in online courses. Reports vary widely about actual percentages of students who complete online courses compared to those who enroll, but it is generally agreed that attrition rates for online courses tend to match those for other distance learning options, which is significantly higher than those of traditional courses (Robyler, 2006; Roblyer & Marshall, 2002). Robyler and Marshall sought to determine if it was possible to predict success in an online course for high school students. Their survey instrument was correlated to student performance in the class, and they were able to predict with 100% accuracy students who passed and with 96% accuracy students who failed or withdrew. Their predictive factors centered on measures of self-esteem, personal organization, responsibility, and technological savvy. The authors expressed concern over the relatively small sample size of their study, and further testing is warranted to determine if their survey is truly as accurate as it initially appears. Smith (2005) conducted a similar study with college-age students and found two primary factors that predicted student success: – self management of learning and comfort with e-learning. Wadsworth, Husman, Duggan, and Pennington (2007) found that college students who demonstrated a strong self-

efficacy and used four specific learning strategies – motivation, concentration, information processing, and self-testing – showed a statistically significant positive correlation with their grade in the class. Bell (2007) assumed initially that the strategies identified by Wadsworth et al. were significant and sought to identify other factors that might affect student success. Correcting for self-efficacy, Bell showed that past academic success (as measured by grade point average) and the student's expectation for learning were significant factors in predicting success in online courses. Morris, Wu, and Finnegan (2005) also noted the correlation between high school grade point average and success in college online courses. In addition, they found correlations between successful completion and the following factors: SAT mathematics score, locus of control, and financial aid. Students who performed better on the SAT mathematics section, who had stronger self-control and who were not on financial aid were more likely to successfully complete online coursework.

Elvers, Polzella, and Graetz (2003) explored the tendency to procrastinate in online courses versus face-to-face courses. They found no significant difference in behavior for students in both groups, but they did observe that procrastination had a significant negative effect on exam scores in the online class compared to its effect in the traditional course. Further, students who procrastinated more expressed a more negative attitude towards the online class than those in the face-to-face class. In other words, students in the online classes were not necessarily different from those in the traditional class, but the negative effect of their behavior was magnified in the online class. Another interesting study explored the relative success of students as measured by course grades in traditional and online introductory psychology classes. Two trials were conducted. In

one, the students self-selected which version of the course they would take. In the other, students were randomly assigned to a particular section. Students in the randomly assigned study showed no significant difference in overall performance. Students in the self-selected group showed a higher tendency to fail the online course (Waschull, 2001). Edmonds (2006) found a similar result. While performance as measured by exam scores between two sections of a college course (one online, the other traditional) were similar, when correcting for high school grade point average and SAT score, the online section performed significantly below that of the traditional group. In other words, the online students were stronger students, based on past performance and aptitude, but they only performed at the same level as their peers in the face-to-face course. Edmonds reasoned that the lower performance may be due to students not investing as much time as the course demanded due to course overloads in their schedule. Bejerano (2008) describes this tendency for students to underperform in online classes more bluntly: "Students who perceive themselves doing poorly in the traditional class may choose instead to take the same course online because they believe it will be easier" (p. 411).

These studies have created a general picture of the typical successful online student. This student tends to have a strong locus of self-control and generally high comfort levels with educational technology tools. This student is more organized than the average student and demonstrates a strong level of personal responsibility. Ironically, this student tends to prefer traditional class structures. Conversely some students who prefer online courses find that they perform worse than if they had taken a face-to-face class. These struggling students tend to procrastinate and generally do not invest as much time into online courses compared to traditional programs. For online programs to reach the

widest range of students, the programs must do two things: develop student support structures to better meet the needs of online students and help students overcome their reticence toward online courses.

Role of Technology in Student Learning

An ongoing debate related to online courses is the quality and effectiveness of class discussions (Fung & Carr, 2000; Inman, Kerwin, & Mayes; 1999). These debates center around asynchronous (also called threaded) discussions in which students post comments to an electronic discussion board, share ideas, ask questions or respond to other students' or the instructor's posts. Roblyer and Wiencke (2003) describe the importance of social and psychological interactions in courses. They show that many studies typically find that the level of interaction in online courses exceeds that of traditional courses, leading to the initially surprising conclusion that online courses can produce a richer level of interaction than normally occurs in a face-to-face environment. Many researchers have examined this claim in recent years, and this conclusion is persistently evident in the literature.

Wang and Woo (2007) compared the quality of interactions in online classes with those in a traditional classroom setting. By measuring the frequency and complexity of discussions, they showed that the online discussions represented a higher quality of discussion. They also showed the ironic problem that while student participation was better, student preference was for the face-to-face environment. The felt need for interaction was a primary factor affecting student satisfaction with online classes. Ouzts (2006) found that students who felt a strong sense of community in their online courses tended to rate the course very highly, while students who felt a low sense of community

viewed the course negatively. These studies have shown that the added reflection time afforded in an online discussion can facilitate a richer dialogue. These types of online conversations are essential to the effectiveness, both real and felt, of the class.

Weller (2000) explored students' preference for real-time interactive instruction and collaboration online versus traveling to a central meeting location. Due to the inconvenience of travel, these students indicated that the online collaborative environment was preferable, and after participating in the course, students rated the opportunity to collaborate with their peers online highly. Thompson and Savenye (2007) examined factors that influenced participation in online class discussions, and found that experience with previous online courses, interest in the course, and the approach of the instructor significantly influenced participation levels. Thompson and Savenye note that participation is strongly tied to success in the class. This observation offers one explanation for the pervasive finding in many studies that prior experience with online courses is correlated with future success in online coursework. If previous experience leads to stronger and richer participation in discussions, it naturally follows this experience will lead to general improvement in course success.

McLoughlin (2002) explored the use of technology to provide scaffolding instructional support for students. Her model incorporates three interlocking supports for students. Social networking tools allow for social support and the building of community. Communication tools allows for collaboration and peer-to-peer support. Online resources provide necessary tools to support the needed tasks for the class. Her conclusion was that online courses can provide highly effective support for students, if planned properly. Supporting McLoughlin's scaffolding construct, Howland and Moore (2002) found that

students who developed their own scaffolding support for online courses experienced a positive attitude toward the course. Students who needed more guidance and support than was available reported a negative attitude. In another study, instant messaging was found to provide strong social support among students in classes as well as some learning support (Contreras-Castillo, Perez-Fragosa, & Favela, 2006). Martens, Bastiaens, and Kirschner (2007) caution however that course developers need to be careful when developing lessons that require scaffolding and other constructivist approaches. They found that students in online courses tended to view problems as far less authentic than was intended by the designers. The authors speculate that the designers focused more on the sophistication and technical aspects of the presentation and did not focus enough on sound teaching practice. The positive benefits of providing scaffolding support through technology were observed by Klecker (2007). One section of a course was given weekly multiple choice tests to provide formative feedback to the students. The other section did not have the weekly tests. While the students in both sections rated the course similarly at the end, the students in the section with the weekly quizzes performed significantly better than those in the other section.

The role of the instructor in online discussions has been examined as well (Dennen & Wieland, 2007; Dennen, Darabi, & Smith, 2007). The instructor performs a critical function in orchestrating a positive and valuable online discussion. By implementing clear expectations and accountability, faculty encourage a free and productive flow of ideas. Equally important for teachers is knowing when to participate and when to allow the conversation to proceed on its own. Dennen et al. found that students participated the most when the teacher both responded quickly and accurately to

direct student questions and was silent when students were working out their thoughts through a threaded discussion. Participation rates fell if the professor interjected into these discussions.

　　While the impact of technology on classroom discussions has been well documented, many researchers caution against the use of technology for technology's sake. Kirkwood and Price (2005) conducted a meta-analysis reviewing studies on approximately 80,000 students in distance learning classes. Their conclusion is echoed by many practitioners in the field. "Teaching and learning in higher education are unlikely to be improved *simply* by the application of a new technology…. It is not technologies, but educational purposes, that must provide the lead" (p. 260). In other words, online instruction still must be mindful of sound pedagogy and student needs. Kirkwood and Price point out that new technologies increase the ways in which teachers can present material and engage students in the learning process, but online classes must continue to follow sound educational theory. This idea is illustrated in the negative by Tunison and Sackney (2004). They explored a case study of a virtual high school that attempted to implement an online experience with minimal technological support and poor teaching strategies. The result was a school with high drop out rates and poor community in its courses. While students appreciated the flexibility, the program was an unfortunate example of the need to place a priority on sound teaching practice.

　　A fascinating collection of thoughts and reflections from pioneers in the area of distance education throughout the 20th century further addresses this issue (Burge, 2008). Burge quotes Perraton, the deputy chair of the Commonwealth Scholarship Commission (England) and a researcher in this field:

> Watch out. Be skeptical. If you look at the literature of how television was going to transform education a generation ago and then look at literature about how e-learning is going to do it, it is the same sort of language. It wasn't true the first time. I doubt it is true the second time. (p. 12)

The tone often reported by Burge was one of excitement toward technology as a tool, but with a clear recognition that the purpose of technology was to enhance sound educational practice only where appropriate and applicable. Claims that placed technology as more valuable or more important than teaching theory were soundly rejected. Many studies have shown that there is no major difference in the learning outcomes for traditional courses versus online courses (Wickersham & McGee, 2008). This result is consistent with the claim that the incorporation of technology in and of itself does not improve learning. Learning outcomes are determined by the quality of instruction far more than by the mode of instruction.

Reasons Students Choose Online Courses

Recent literature shows a growing interest in analyzing the reasons students elect to take online courses. Robinson and Doverspike (2006) found that college-age students who have a strong sense of self-control were more likely to enroll in an online course. Additionally, they found that learners who had high computer anxiety or low computer self-efficacy were less likely to enroll in these types of courses. The level of computer anxiety has been shown to be potentially the biggest predictor for enrollment in online courses for high school students (Tung & Chang, 2007). Artino (2007) determined that another major factor affecting students' intention to enroll in an online course is the perceived task value of the class. In essence, if students felt the course was worth their time and effort, they were willing to enroll. Mupinga, Nora, and Yaw (2006) examined the role that learner personality type played in selecting online courses. They concluded

that the intention to enroll in an online course was independent of personality type, suggesting that online courses have the potential to appeal to a very wide range of students. Not surprisingly, previous experience with online courses correlated well with both intention to enroll in future online courses and success (as measured by grades) in the classes (Thompson & Savenye, 2007; Walker & Kelly, 2007).

A limitation of these studies is that they all focus on scenarios where students had an equal choice between taking a class online or in a traditional format. Research suggests that two far more influential factors are convenience and opportunity (Li & Irby, 2008). Students take online courses because these courses provide an option that fits better with student needs. For adult learners, the motivating factors are often time constraints due to work, childcare concerns, and the inconvenience of travelling to attend class. Beard, Harper, and Riley (2004) confirm these findings. Their study showed that students select online courses primarily due to flexibility in the schedule and as a way to navigate around the stress of other demands in their lives. For high school students, the primary driving forces for taking online courses include access to courses not offered at school, flexibility due to scheduling constraints, and opportunities to supplement learning (Pascopella, 2003). Roblyer (1999) found that the opportunity to control the pace and timing of learning (in essence, flexibility) was the primary reason both high school and community college students choose distance learning coursework. Online education opens many doors for students who would otherwise have a difficult time completing their education due to other opportunities or constraints (Starkman, 2007).

Since external factors are the main drivers, a pertinent question is how a school attracts students to its version of online courses. Several studies show that quality means

far more to students than style (Mash et al., 2006; Norton & Hathaway, 2008). Sole and

Hopkins (2007) examined two different university programs that utilized very different

approaches to online education. The study showed that student satisfaction for the

programs was independent of the style. Again, the driving force for the students was the

perceived quality of the programs and the convenience of taking the courses via distance

rather than face-to-face. The preference for quality and convenience indicates that efforts

to find a single most effective universal mode of delivery may be misguided. Of more

significance is the goal to match local student needs, learning styles, and preferences with

one of many high quality course designs.

Hybrid Courses

Schools incorporate online education in a variety of ways. Of particular note is the

emergence of hybrid courses, in which traditional face-to-face courses include elements

of web-based instruction. Moskal et al. (2006) found that at one traditional face-to-face

university, the use of online technology had become so pervasive that essentially every

course utilized various online educational tools. A popular option was to provide an

online forum for class discussions that facilitates a deeper dialogue than can usually be

achieved during class time in a traditional course. Purnell (2005) discusses how an entire

public school district has adopted an e-learning platform to facilitate collaboration among

staff and to make course material more accessible to students.

The hybrid approach is gaining momentum. It allows for placing easily self-taught

material in a web-based learning module while reserving class time for addressing more

complicated topics. Brunner (2006) cites several benefits of this approach. Students in

hybrid courses have improved learning outcomes relative to both online and traditional

courses and have higher retention rates than is typical of online courses. He also notes

that teachers in hybrid courses have opportunity to draw from the strengths of both

traditional and online instructional approaches, providing a richer template with which to

develop courses. Of particular interest, he describes the efficacy of student discussions in

both traditional and online courses. While he agrees with the large body of research that

shows that online discussions can actually be richer than face-to-face discussions, he

notes that both formats produce radically different types of interactions, and each has

strengths that the other cannot readily reproduce. He claims that hybrid courses have the

opportunity to produce a richer level of interaction than is available with either traditional

or online approaches alone. Baglione and Nastanski (2007) agree with Brunner that

hybrid courses have the opportunity to combine the best approaches of traditional and

online courses. They show that faculty members who currently teach in both

environments generally prefer teaching in both environments. Relatively few of these

instructors would switch to just one form or the other. Online threaded discussions were

the most commonly used online tool in these hybrid classes.

Sugar, Martindale, and Crawley (2007) examined an entire face-to-face course at

the university level to determine how readily it would transfer to an online environment.

While they found that many aspects would easily translate and would be expected to have

equal quality while offering more flexibility, they also found that some components of

the face-to-face experience do not have a comparable alternative in the online

environment.

> It is apparent that it would be quite difficult to directly translate some
> observed class activities. Theoretically, these activities can be converted to
> an online environment, but this conversion would lose the *essence* of the
> intended face-to-face activity. (p. 382)

Moore (2005) argues as well for the benefits of hybrid or blended learning. In addition to the incorporation of online tools into a face-to-face environment, he discusses ways to incorporate face-to-face interaction in an online environment. He supports the idea of distance education programs having short-term residential requirements. He envisions a time when distance learning will be so pervasive that students will routinely meet in conveniently located regional centers rather than commuting to central campuses for these face-to-face sessions. He notes that open universities in Europe and Asia have a much longer history with online education than American universities, and this type of interaction is emerging in these more mature institutions.

Blake (2000) describes a survey that examines students' satisfaction with a primarily online course that had opportunity for face-to-face conferences with the instructor. Student satisfaction was extremely high, and all students surveyed would recommend such a course to others. Fung and Carr (2000) describe the role that face-to-face tutoring play in otherwise online courses. They found that students sought out the face-to-face interactions and found them to be beneficial to their learning. Another study showed that Taiwanese students strongly prefer to have face-to-face components, even in an otherwise online course. This study suggested that hybrid courses are a much better option than fully online courses for these students (Westbrook, 2006).

Koohang (2004) found that students generally enjoyed the use of an online library as part of a traditional course, although males and those with prior experience with the Internet showed a significantly higher positive perception towards the use of this tool. Interestingly, one university discovered that its traditional classes were making greater use of the online library resources than even its fully online courses (Dempsey, Fisher,

Wright, & Anderton, 2008). Bonds-Raacke (2006) explored students' perceptions towards using a course management system as part of a face-to-face course. Students had no negative comments and were supportive and generally enthusiastic with the incorporation of such technology. Richardson (2005) discusses the excitement and depth of learning that occurred in his classroom following his introduction of a course blog to discuss a literary text. The use of this tool in this otherwise traditional course significantly enhanced the level of discussion of this topic. It also had the unintended positive consequence of opening up the discussion to feedback from people outside the class. Notably, the author of the text added her own comments to the blog, enriching the discussion tremendously for the students.

A fascinating study by Turman and Schrodt (2005) examined the changes in student affect towards the course as the level of instructional technology changed. They explored four levels of use of online tools. One level involved no use of technology. A minimal level of technology incorporation included the use of e-mail communication between the professor and students. A moderate level of technology use involved web-based content as an addition to the face-to-face instruction. The fourth level involved a completely web-based course with no face-to-face interaction other than the initial day of introduction to the class. The results indicated a significant preference for minimal and moderate levels of technology use over no incorporation of online tools and over a completely web-based course. El Mansour and Mupinga (2007) found similar results when comparing student attitudes toward experiences in a hybrid course versus a fully online course. While the general student attitude was positive for both, the hybrid course

received fewer negative responses, as the students commented that the blend of approaches best fit their learning styles.

Ellis (2003) explored the role personality type as measured by the Myers Briggs Type Indicator had on student participation in a mixed delivery course. Students attended a portion of the course in a face-to-face context, and a portion of the course was taken in an asynchronous online environment. Personality type was clearly tied to the nature of interaction for the students. The author concluded that since a hybrid format potentially offers the greatest variety of interaction opportunities, instructors should seek to incorporate synchronous and asynchronous components to every course to allow students of all personality types to use their preferred communication style.

Developing and Validating a Survey

Survey research is pervasive throughout social science studies, and many well-established approaches have been vetted in the literature (Trochim, 2006). For new surveys, Fink and Kosecoff (1998) support the following process:

1) Develop questions that address the topic of interest in the study.

2) Write questions using standard English, avoiding inflammatory or biased language.

3) Construct questions to be short and focused, avoiding double-barreled questions that ask respondents to address two different ideas.

4) If using fixed-response style questions, have questions that address particular topics from both positive and negative approaches.

5) Pilot test the survey with a group of respondents similar to the eventual respondents.

6) Establish reliability and validity using appropriate techniques.

Many researchers use an expert panel in the appropriate field to evaluate the proposed questions for the survey (Dennen, Darabi, & Smith, 2007; Katz, 2002; Koohang, 2004; Roblyer, 1999; Roblyer & Wiencke; 2003). This approach provides a review of items one through four above, as well as providing evidence of face validity for the survey. A pilot administration also provides feedback on items one to four, assisting in modifying the survey for future testing.

Fowler (2002) argues that survey development and validation require attention to three primary areas: sampling, question design and data collection. Sampling ideally should involve techniques to insure a random and representative sample. Questions should be designed to ensure clarity and consistent understanding. Data collection needs to protect against interviewer bias. It also should have systems to insure a sufficient response rate to provide for a representative set of data. These general approaches are echoed by Ary, Jacobs, Razavieh, and Sorenson (2006) and Gall, Gall, and Borg (2005).

Measuring internal consistency with a Cronbach's alpha is perhaps the most common approach to establishing reliability (Berends, 2006). Survey respondents who demonstrated a particular preference or opinion on one question should demonstrate a similar preference or opinion on related questions. A Cronbach's alpha score of one implies a perfect correlation among the survey questions, while a score of 0 implies no correlation. Typically, a score of 0.7 or higher is considered sufficient to establish reliability of the survey (Gall et al., 2005).

To establish the validity for an attitude or preference survey, gathering and examining construct-related evidence is the standard method (Ary et al., 2006). A

construct is an idea that cannot be directly tested but is believed to be responsible for observed behavior. For example, intelligence is a construct that is believed to contribute to success in school (Gall et al., 2005). Ary et al. identify five common strategies for establishing validity with construct-related evidence. Two involve comparisons to already established evidence. The first, related measures studies, requires the existence of a validated test. To examine the validity of the new instrument, both the new and the established instruments are administered to the same set of subjects. If the responses show correlated scores on the targeted constructs, then the validity of the new test is established. Obviously, if no established test exists, then this approach is not viable. The second, labeled the known-groups technique, involves administering the survey to two groups who have known attitudes or preferences about the construct to determine if the survey accurately identifies these known differences. For example, a survey that explores the construct of hostility versus satisfaction could be tested on two groups of people who are identified as having behavior consistent with this construct. The survey should show that people who are more hostile score higher on items that measure hostility and lower on items that measure satisfaction. The opposite should be true for those who are recognized as more satisfied (Fink & Kosecoff, 1998). This approach requires the ability to identify groups with clearly recognized differences on the constructs being examined in the study.

The third approach identified by Ary et al. (2006) involves the ability to conduct a true experimental study along with the test in an intervention study. For example, if a test were designed to measure anxiety, it could be administered to a control group and an experimental group. The experimental group would then be exposed to an anxiety-

producing situation. Both groups would be retested. If the scores change as predicted for the experimental group, then there is evidence for the validity of the test.

The fourth approach is an internal structure study. This approach examines the intercorrelations among items on the test. Items that address the same construct should show a high correlation with each other in the survey responses. Berends (2006) identifies a factor analysis as a strong tool to establish this type of validity. Factors that cluster around the constructs being measured indicate that the instrument measures these constructs. Many studies use this approach to examine validity of an instrument. (Bell, 2007; Beyth-Marom et al., 2005; Katz, 2002; Peng, Tsai, & Wu, 2006; Smith, 2005; Smith, Murphy, & Mahoney, 2003; Wen & Tsai, 2006).

The final approach, studies of response processes, involves examining respondents while they are taking the test (Ary et al., 2006). Respondents are asked to explain their reasoning and thought processes as they answer the items on the instrument. This approach requires intensive monitoring capability and considerable expertise in interpreting verbal and non-verbal cues from respondents.

Future Directions in Online Education

Online education is having a transformative effect on education. The growth rate for online courses is impressive, and it is acquiring a significant place in the educational landscape. However, some researchers are already speculating on the form of the next generation of distance education. Web-based instruction provides a two-dimensional interface, similarly to what viewers experience with television. While it fosters many levels of interaction, it is limited in its ability to draw a user into the actual environment of a topic. Three-dimensional, fully interactive virtual environments are projected to play

a significant role in online education in the future (Jones, Morales, & Knezek, 2005). Jones et al. found that learning outcomes were actually somewhat lower in the three-dimensional environment as opposed to a traditional environment, but they speculate this result is due to the significant amount of time students spent off task in the virtual environment. The novelty of the system was distracting, and students wanted to explore the virtual environment more than they were willing to focus on the instruction. The researchers hope that additional studies with students who are more accustomed to the technology will allow for more positive data towards this learning environment. This hope is justified, as studies have shown that students who view the Internet as more of a leisure tool have stronger self-efficacy and more positive attitudes toward computer use, which is a strong predictor of success in online courses (Peng et al., 2006).

Many online programs have speculated about the possibility of extremely large class sizes as a way of making education more affordable. While online programs remove the physical constraint of space, several studies have concluded that online programs, if they are to be effective and of high quality, should follow guidelines for reasonable class sizes (Association for the Study of Higher Education, 2006). Orellana (2006) found in a study with over 100 online instructors that an optimal class size of approximately 16 students was recommended, due to the intense communication demands of courses of this nature. Schwartzman (2007) also takes exception to the mindset of online education as a vehicle for increasing quantities of students. He recommends attention focus on quality of communication, information management and instructional techniques. An analysis of studies related to online education goes further, noting that some programs offer small class sizes but attempt to hold down costs by staffing them with substandard faculty. This

study concludes that universities need to apply the highest standards to their online courses, including staffing them with full-time faculty (Smith & Mitry, 2008). Conceigao (2007) describes a series of quality indicators for online courses, again emphasizing the need to apply established and rigorous standards of quality to Internet-based education. As a result, online education is trending towards more sections of smaller classes, with an emphasis on quality, rather than focusing mainly on efforts to bring down costs.

Need for This Study

The survey of research literature shows significant gaps in the field of online education, particularly as it relates to secondary education. While a number of studies examine student attitudes and attributes that contribute to success in online courses, the question of student preferences regarding online education has been largely unasked. Even when this topic is explored, studies do not probe deeply, asking only if students want to take an online class in general. This study represents potentially the first example of soliciting secondary students' specific online course structure preferences.

Chapter 3: Methodology

The broad problem statement that guided this study sought to determine the online course structure preferences for high school students. A 21-question survey instrument was developed to determine student preferences. Chapter 3 will explain the overall research design, the detailed research questions, the development of the survey instrument, the administration of the survey including descriptions of the student populations, and the method of data analysis.

Research Design

This exploratory study utilized a non-experimental quantitative cross-sectional sample survey of intangibles. Non-experimental research is common in social sciences, such as education, as many independent variables of interest are often not subject to manipulation (Johnson, 2001). In this study, answers to survey questions cannot be manipulated, so a non-experimental approach is appropriate. While student preferences could be examined using either a qualitative or a quantitative approach, a quantitative approach was selected due to the nature of the survey. As the survey data were collected in a relatively short period of time and from several different samples, this study is cross-sectional by definition. Given that the target population is high school juniors, a census would essentially be impossible, so a sample survey is appropriate. The study focused on exploring the construct of student preferences for online courses, so the survey dealt with intangibles (Ary et al., 2006).

Research Questions

To demonstrate the reliability, validity and usefulness of the survey, the following three research questions were explored:

1. Do the items on the survey demonstrate an appropriate level of internal consistency, as measured by a Cronbach's alpha?

2. Do the targeted constructs of interaction, accountability, and student learning emerge in an exploratory factor analysis?

3. Do the predicted course structure preferences significantly correlate with students' overall average scores on the survey?

Development of the Survey

No appropriate instrument for this study was found in the literature, so the effort was undertaken to develop a reliable and valid survey instrument to measure high school student preferences for a particular online course structure. Constructing clear questions that measure the intended constructs is accepted as an essential task in developing a valid survey (Ary et al., 2006; Fowler, 2002; Gall et al., 2005). Each of these authors provides a list of criteria to consider when developing survey questions. These criteria guided the process used in this study for constructing the survey instrument. The criteria are numbered using the first letter of the lead author's last name to allow for clear referencing later in this section.

Gall et al. (2005) lists four necessary criteria for a survey to be valid:

G1. The instrument must be pretested. A pilot study allows for confusing or inappropriate questions to be identified.

G2. Avoid leading questions. Questions should not telegraph a desired response, nor should they bias the respondents' answers.

G3. Avoid psychologically threatening questions. Items that address issues that might be perceived as threatening to the respondents lead to false answers or non responses.

G4. Ensure that respondents are competent to answer the questions. Respondents should reasonably know enough information to meaningful answer the questions on the survey.

Ary et al. (2006) gives an expanded list of 11 guidelines for constructing good questions for a survey. The items are consistent with the four criteria outlined by Gall et al. (2005), but Ary et al. provides more practical detail:

A1. Questions should be short, simple and direct. Typically, most questions should be no more than 10 words, and no question should be longer than 20 words.

A2. Questions should be understood by all respondents. Avoid technical terms, unless the respondents are likely to know them. Asking a pilot group of respondents similar to the main study group to evaluate the meaning of questions helps with this step.

A3. Avoid questions that lead to ambiguous answers. When asking for frequency, use specific values (such as daily) as opposed to general terms (such as often).

A4. Avoid bias in the question wording. Certain phrases carry strong connotations, either positively or negatively, and these should be avoided in survey questions.

A5. Avoid questions that assume traits that might not be present in the sample. For example, asking respondents to identify their favorite book read in the past year assumes all respondents can read. If this assumption is not valid, then the question should be restated.

A6. Avoid leading questions. These types of questions imply a desired response.

A7. Avoid psychologically threatening questions. These questions may elicit embarrassment, suspicion or hostility from the respondents, putting them on the defensive.

A8. Avoid double-barreled questions that ask two questions in one. Such questions are difficult, if not impossible, for respondents to answer correctly.

A9. For closed questions, make sure the options are complete. Answer choices should provide all possible responses to a question.

A10. Keep the questionnaire as brief as possible. Respondents are more likely to answer completely and honestly if the survey takes a minimum of time to complete.

A11. Ensure that respondents are appropriately knowledgeable to answer the questions.

Fowler (2002) identifies five criteria about the instrument itself that complement the issues raised by Ary et al. (2006) and Gall et al. (2005). Assuming that the questions meet the preceding guidelines, self-administered surveys should also meet the following conditions:

F1. The questionnaire should be self-explanatory. While instructions should be provided, they should be unnecessary.

F2. The items should mainly involve closed answers. Respondents should only be

required to select one of multiple pre-determined answers to maximize the

usefulness of the data.

F3. Only a few forms of questions should be used. Using multiple question

formats increases the likelihood that respondents will become confused.

F4. The instrument should be visually uncluttered. Questions should have

sufficient space around them to avoid a crowded look to the page.

F5. Where possible, provide redundant cues for respondents to inform them of the

next steps in the survey.

To develop the instrument for this study, appropriate topic domains were first

determined for inclusion in the survey based on a review of the literature. Then questions

were developed to address these domains, factoring in the multiple criteria provided by

Ary et al. (2006), Fowler (2002), and Gall et al. (2005). To assist in establishing the

effectiveness of the survey, the instrument was submitted to a panel of experts (two

experts in the field of online high school education and one expert in the field of teenage

psychology) for evaluation and editing. The survey was modified in response to the

feedback from the panel. A pilot study was then conducted to further refine the survey.

Topic Domains

Several possible domains were examined for this survey, but many areas did not

lend themselves to the constraints of this analysis. For example, access to socialization

activities (such as dances or other school events) was not included as a topic domain,

because a student could be enrolled as a mostly full-time student in a traditional school

environment while taking a single online course. This student would have access to all

the socialization opportunities normally afforded a traditional student, making this topic

an irrelevant area when considering online course structures. A more academic domain

that was not included was lesson presentation. Many studies have shown that a wide

range of presentation styles and approaches are equally received by students (Mash et al.,

2006; Ravert & Evans, 2007). The extreme variation in this topic makes it impractical to

include for analysis.

Three domains emerged as good fits for this study. Each is readily distinguishable

among the six course structures, and each has a narrow enough set of parameters to make

study feasible. The three domains have been recognized in the literature as important

aspects associated with successful courses. The three domains addressed in the survey

instrument are as follows:

Interaction: Dennen et al. (2007) discussed that this domain could be in the form of

student-teacher, student-classmate, or student-other students in the school. Their research

focused specifically on the importance of student-teacher interaction and the impact it

had on students' satisfaction with the course. Wang and Woo (2007) found course

discussions to be an essential factor in students' perception of course quality. El Mansour

and Mupinga (2007) cited the importance of instructor availability on students'

satisfaction. Mash et al. (2006) found significant differences in students' perceptions of

the effectiveness of an online course based on the student-teacher and student-student

interactions.

Accountability: This domain examines the frequency of interaction with an

educational authority (either a teacher or an adult facilitator) or a peer needed to keep a

student on track to complete work and learn necessary topics. Haigh (2007) explored this

topic extensively, finding it to be a significant factor in students' attitudes towards online courses.

Student learning: Students' preferred method of learning new material, while not perfectly tied to course structure, still correlates fairly well. In general, students who prefer to have material explained to them or who prefer a discussion-oriented exploration of material will prefer more synchronous time, typically face-to-face, while those who prefer to learn by studying on their own will prefer more asynchronous time. Some researchers argue that student-content is another form of interaction (Dennen et al., 2007). However, most consider it a separate domain for study (Haigh, 2007). Norton and Hathaway (2008) found that quality of instruction was a major factor in students' decisions to pursue online courses. Thompson and Savenye (2007) explored the impact that students' learning style preferences had on selection of online courses. Wadsworth et al. (2007) found a significant correlation between students' learning strategies and success in the course, as measured by the final grade. Wickersham and McGee (2008) found that students' satisfaction with the learning approach of the course had significant influence on the level of interaction.

Development of Questions

To relate each of the steps below to the criteria given by Ary et al. (2006), Fowler (2002), and Gall et al. (2005), the numbers of the relevant criteria are included. After determining the topic domains for the survey, 20 questions were developed that addressed various aspects of these domains. The number of questions was not pre-determined at the start of development, although the intent was to keep the survey relatively brief (A10). Multiple draft questions (significantly more than 20) were written

and analyzed for overlap and coverage of the topic domains. Some redundant questions were eliminated or combined, and the remaining 20 questions were retained for further analysis to address the reliability and validity for the survey. These residual questions still provided redundancy among the questions to allow for analyses of internal consistency.

Each of the questions was written to be brief and concise, attempting to focus on only one topic (A1, A8). Each question was written with a closed set of responses, asking respondents to select one of four or five options (A9, F2). Seven questions focused on frequency issues (e.g., question 7 reads, "How frequently do I want deadlines to help me stay motivated to complete assigned work?"). For these questions, students had four options to choose from: (a) regularly (2 or more times per week), (b) occasionally (2 to 4 times per month), (c) infrequently (2 to 4 times per course), and (d) rarely (once, or never per course). These terms were defined with explicit values to ensure clarity for the respondents (A3). The other 13 questions asked students for their level of agreement with a statement of preference (e.g., question 6 reads, "I prefer flexibility in the time of day when I work on class work."). Each of these questions used a five part Likert-type response scale with the following choices: strongly agree, agree, no opinion, disagree, or strongly disagree. The questions were restricted to two types with consistent answers within each type to avoid item confusion (F3). This restriction also allowed for the instructions to be readily understood by the respondents (F1).

Each question had an expected response for each type of online course structure preference. Very often, a single response would be consistent with more than one type of course structure preference. However, over the span of the 20 questions, each type of online course structure had a unique combination of expected answers, allowing for

differentiation between student preferences. An additional question (number 21) was added at the end to gather data on the grade level of the respondent, but it is not coded to a particular type of course structure. Appendix A contains the final version of the survey with the coding for the expected answers for each type of course structure.

Panel of Experts

To assist in developing the survey and to establish reliability and validity of the instrument, a panel of experts was employed. The use of a panel of experts is widely documented in survey development (Dennen, Darabi, & Smith, 2007; Katz, 2002; Koohang, 2004; Roblyer, 1999; Roblyer & Wiencke; 2003) and is a form of pretesting the survey (G1). Harvey Klamm is the superintendent of Liberty University Online Academy, an online school for students in grades 3 – 12. Dr. Connie Pearson is the superintendent for Tennessee Temple International Academy, an online school for students in grades 3 – 12. Dr. Eric Evenhuis is a psychologist specializing in teenage issues. He is the founder and director of the Parent Project, a program that provides guidance to the parents of adolescents in addressing difficult teenage behavior. Mr. Klamm and Dr. Pearson were selected for their expertise to provide feedback on the content of the survey. Dr. Evenhuis was selected for his expertise to provide feedback on the wording of the questions, to ensure that they would make sense to high school-age students.

The initial 20-question draft of the survey was submitted to the panel for review. This review examined the wording, ordering, and tone of the questions, as well as appropriateness of the questions, as recommended by Fink and Kosecoff (1998). This approach addressed the four criteria mentioned by Gall et al. (2005) and the 11 criteria set

forth by Ary et al. (2006). Included with the survey was a discussion of the three topic domains examined in the survey and the six course structures being explored. Each of the questions included a prediction of the students' answers if they had a specific course structure preference. The panel agreed that the topic domains were valid, that the six course structures were appropriate, and that the expected answers were reasonable. They made no recommendations for any changes to these issues. Through several iterations, they made suggestions to the ordering and wording of the questions, and these changes are detailed below.

First survey review

The panel agreed that this original draft of the survey was solid and that only minor changes were needed. In particular, they agreed that the questions addressed topics that high school juniors could reasonably be expected understand, that no questions contained any items that were psychologically threatening, and that the questions were free of inappropriate assumptions (G3, G4, A5, A7, A11). The first round of adjustments primarily involved reordering the questions to avoid grouping questions with a positive or negative bias towards certain course structures together. This change was made to minimize the chances of the survey questions influencing the answers (G2, A4, A6). The panel noted that related questions were always grouped together, and each group always began with questions that were worded to make real-time interaction the positive response. For example, the following three questions were grouped in order as questions eight, nine, and ten, in the original survey:

8) I prefer learning new material by having someone explain it to me in real time.

9) I prefer learning new material by discussing it with others in real time.

10) I prefer to learn new material by studying on my own.

Questions eight and nine are phrased to positively express face-to-face interaction, while question ten is phrased to positively express independent work. In the next version of the survey, question ten above was moved up to question four. Questions eight and nine were kept in order, although they were moved to questions eleven and twelve, and this ordering remained throughout the rest of the iterations.

Another example of the reordering adjustments that were made at this step involves questions one through five in the initial draft of the survey, as listed below:

1) How often do you want to interact in real-time with your instructor during a course?

2) How often do you want to interact in real-time with your classmates during class time?

3) How often do you want to interact in real-time with other students at school outside of class time but still part of the school day?

4) How often do you want to interact in real-time with other teachers and staff at the school other than your instructor(s)?

5) How often do you want to communicate with your instructor asynchronously?

The first four questions were all phrased to so that the positive answer would favor real-time interaction. Question five was the first one that had the positive answer favor asynchronous interaction. In the next draft of the survey, question five was moved up to question one. The original questions one and two were moved to questions two and three, while the original questions three and four were moved to questions thirteen and

fourteen. The wording of each of these questions was modified in later versions of the survey, but this new ordering was preserved throughout the rest of the iterations.

Second survey review

In the next iteration of feedback from the panel, four questions were highlighted as having confusing terminology. The panel expressed concern that the term "asynchronously" in question five in the original survey, "How often do you want to communicate with your instructor asynchronously," might be ambiguous, so specific examples of asynchronous communication were inserted parenthetically into the question. Its new wording was: "How often do you want to communicate with your instructor asynchronously (for example, using e-mail or blogs)?" Question seventeen in the original survey, "I am motivated to learn when I use innovative new technology," was considered unclear, as students might not understand the phrase "innovative new technology." This question was simplified to "I am motivated to learn when I use technology." The phrase "social dynamics" was considered to be unclear in the original question nineteen, "I prefer in-person social dynamics to online social dynamics." This question was reworded to read, "I prefer in-person social settings to online social settings." The phrase "creating my own environment" was considered vague in question twenty, "I prefer creating my own environment when learning material for class." To clarify, the question was reworded and a parenthetical explanation was inserted: "I prefer choosing my own environment (location, background music, lighting, etc.) when learning material for class." These adjustments specifically addressed criteria G4, A2, and A11.

Third and fourth survey reviews

Question six in the original version of the survey (now moved to question seven after reordering the questions after the first survey review) was deemed to address two different questions, requiring significant rewording (A8). This question was the only item addressed in these two iterations of the survey development. Its original wording was "In order to stay motivated to complete assigned work and study new material, how often do you need deadlines to turn work in or take a test?" The panel determined that this question was double-barreled, as students could focus on either their need for motivation or their attitude towards deadlines. In response to this concern, the question was originally rewritten as "Frequent deadlines help me to stay motivated to study and complete assigned work." Further review of this question led to the same concerns as before, so the question was rewritten to read "How frequently do you want deadlines to help you stay motivated to complete assigned work?"

Fifth survey review

The survey mixed the use of first and second person in the questions, so the questions were all reworded to be written in first person. For example, question seven in the final version was changed from "How frequently do you want deadlines to help you stay motivated to complete assigned work?" to "How frequently do I want deadlines to help me stay motivated to complete assigned work?" All members of the panel agreed that the survey was clear and targeted the intended areas. They all agreed at this point that the survey would produce reliable and valid results, and they stated that it was ready to administer to students. Appendix B shows the original version of the survey, and appendix C shows samples of correspondence with the panel.

Prior to administering the survey, an additional question was added (number 21), asking students to self-report their grade level. This question was not submitted to the panel of experts for evaluation, as it did not relate to the survey domain topics. The survey was also formatted for ease of readability, spacing the questions out comfortably over two sides of a single sheet of paper. Definitions of two key terms (real-time and asynchronous) were included in the instructions in addition to embedded explanations in the individual survey items to ensure clarity when taking the survey (F4, F5)

Pilot Study

A pilot study is strongly recommended to further establish face validity for the instrument (G1, A3). A pilot study also allows for a final opportunity to refine the survey for clarity prior to the full administration (Fink & Kosecoff, 1998). After completing the review of the survey with the panel of experts, the survey was then administered to a pilot group of 54 students in three sections of a high school advanced math course at a large private sectarian, non-parochial high school on the West Coast. The students in this course were a mix of sophomores and juniors. This particular group was selected in part because the instructor of the class was teaching a unit on survey development and wanted to have a real-world example to use for the students. The students had been trained by the instructor on the need for feedback from a pilot group when developing a survey. The students in this administration of the survey universally found the questions understandable. None felt confused about the intent of the questions, nor did they recommend any rewording (G4, A2, A8, A11, F1). The instructor of the class, an expert in the field of statistics with approximately 20 years teaching experience in the subject, also reviewed the survey, giving feedback that echoed that of the students. Since the

survey was not modified as a result of this pilot study, the results of the students from the pilot study were included in later analysis.

Selection of Samples

Selection of sample groups is critical to establish full validity of the survey (Ary et al., 2006; Fowler, 2002; Gall et al., 2005). Ideally randomized samples that represent the full population are needed. However, in practice, this criterion is exceedingly difficult for individual researchers to achieve. Often, access to fully representative samples is not feasible for practical reasons. Consequently, a review of the literature reveals a satisfactory compromise. Individual researchers often utilize convenience samples when administering surveys, minimizing the generalization of an individual study. However, other researchers then use the same survey with other convenience samples that have different characteristics than the original study. Many surveys have been shown to have widespread generalization through the cumulative efforts of multiple research groups, each using locally available sample groups (Dennen et al., 2005; Kirkwood & Price, 2005; Robyler & Marshall, 2002; Roblyer & Wiencke, 2003; Smith, 2005; Wang & Woo, 2007). For this study, the samples were selected largely due to the fact that these were the only groups that responded to multiple requests for permission to administer the survey. The groups do represent a convenience sample, but as is discussed in chapter five, it is hoped that future researchers will administer this survey with samples to improve the generalization of the results.

Survey Administration

Fowler (2002) provides several recommendations to ensure that the administration of the survey enhances the establishment of valid results. An anonymous

survey that is free from interviewer bias is a highly effective approach. Further, strategies

that promote high response rates should be employed. Typically, administrations in

classroom settings generate nearly 100% response rates. For other settings, strategies to

remind respondents to respond should be utilized.

Permission to administer the survey was obtained through the lead administrator

at each of the participating schools. Since no invasive questions were asked, the terms of

the Internal Review Board approval for this project did not require individual student or

parent permission to conduct the survey. Only the permission of the school administrator

was required. In each administration of the survey, students were asked to participate, but

participation was not mandatory. The survey typically took less than five minutes to

complete (A10). The survey was administered six times, including the pilot study. Four

of the administrations occurred in a traditional classroom setting, including the pilot

study, and the students completed a paper version of the survey. The instructor or the site

administrator monitored the survey administration, ensuring that students were silent and

orderly during the administration, and then returned the surveys to the researcher. All

four of these administrations had a 100% participation rate, were fully anonymous, and

involved no interviewer bias, as the surveys were self-administered. Two of the

administrations occurred with students enrolled in online courses. These surveys were

administered through SurveyMonkey.com. The program directors forwarded links to the

surveys to the students. The first survey had a response rate of 10% (3 out of 30), even

following one additional reminder from the program director to the students to complete

the survey. The second survey had a response rate of 6.3% (91 out of 1435). These

surveys were fully anonymous and involved no interviewer bias, as the surveys were self-

administered. Only the program directors could send out reminders, limiting the ability to elicit a higher response rate.

The primary target population for the survey was high school juniors. In all cases, the survey was administered by the participating schools. In most cases, the survey was administered to students in junior English classes. English was chosen as it is a widely required class and would allow for a more representative sampling of the population. In some cases, students other than juniors took the survey, as even in these primarily junior-level classes, students of different grade levels may be taking the course.

The first administration was the pilot study. Of the 54 respondents, 22 were juniors. Following the feedback from the pilot group, the survey was then administered to all standard college preparatory junior English classes at the same school. Few students overlapped between the different administrations of the survey, as most of the juniors in the advanced math course were also enrolled in the honors junior English course. The few students who did overlap between the administrations were instructed not to take the survey the second time. Of the 108 respondents, 102 were juniors.

The survey was then administered to all students in junior English at a mid-sized private parochial high school on the West Coast. All 127 of the respondents were juniors. Another administration was given to all students in AP® Psychology at a large private parochial high school on the West Coast. These participants were a mix of junior and senior students. For this administration, the superintendent elected to give the survey to these students, although he had originally agreed to administer it to junior English students. Of the 24 respondents, 11 were juniors.

The final two administrations occurred with two online high schools. One administration was with a small private sectarian online high school. The survey was administered to all students in the high school program due to the relatively small population. Of the three respondents, none were juniors. The other administration was with a very large online public high school. The survey was administered to all students between the ages of 15 and 18 who were currently enrolled in junior English. Of the 91 respondents, 35 were juniors. Both schools had an extremely low response rate. This result was not surprising, given the history that the large online public high school has had with surveys. The Head of Data Analysis for the school indicated that in recent history, the school had surveyed students too frequently which resulted in a poor survey response rate. At the time of this study, typically surveys with their students generated only a 6 – 8% response rate (this study had a 6.3% response rate). Due to this issue, the school had significantly reduced the number of external surveys with its students. However, after reviewing the instrument for this study, the school decided the topic was directly relevant to its ongoing programs. Further, the statistical advisory panel for the school had reviewed this survey extensively and was satisfied with its face validity, so the panel agreed to allow the survey to be administered (W. Scott, personal communication, June 19, 2008, see appendix D for sample correspondence).

Data Analysis

Two different types of scores were calculated based on the student responses. To develop an overall score to indicate extent of preference for face-to-face versus online course structures, each item's answer was converted to a 1 – 5 scale. This conversion was straightforward for the 13 questions that involved a five-part Likert-style response. For

questions in which face-to-face style courses was the positive response, a score of five

was given to the answer of "Strongly agree," a score of four was given to the answer of

"Agree," a score of three was given to the answer of "No opinion," a score of two was

given to the answer of "Disagree," and a score of one was given to the answer of

"Strongly disagree." Questions in which preference for online courses was the positive

response were reverse coded. To maintain consistency, the frequency-based questions

which only had four possible responses were also converted to a 1 – 5 scale, with the four

scores spread across equidistant intervals. For questions in which face-to-face style

courses was the positive response, a score of five was given to the answer of "Regularly,"

a score of 3.667 (11/3 was inputted to minimize rounding error) was given to the answer

of "Occasionally," a score of 2.333 (7/3 was inputted to minimize rounding error) was

given to the answer of "Infrequently," and a score of one was given to the answer of

"Rarely." Frequency-based questions in which preference for online courses was the

positive response were reverse coded as well. This allowed for an average overall score

between 1 and 5 to be calculated for each response. A score of five suggests a strong

preference for fully synchronous, face-to-face courses. A score of one suggests a strong

preference for fully asynchronous, online courses.

To provide additional interpretation of student responses, a second set of scores

were calculated. As shown in appendix A, each question had an expected answer based

on particular types of course structure preferences. These answers were converted into a

separate score for each type of online course structure. To determine these scores, two

points were assigned to each course structure when the answer corresponded to its

expected response. Answers that were one level away from the expected response

assigned one point to the course structure. Answers that were two levels or more away assigned zero points to the course structure. For example, an answer of "Agree" for question 11 ("I prefer learning new material by having someone explain it to me in real time") would assign 2 points to the course structures of 100% online, mixed asynchronous and synchronous as well as 2 points to hybrid, with face-to-face instruction. This answer would assign one point to 100% online, fully synchronous as well as to traditional, as these had expected answers that were one level above. Zero points would be assigned to hybrid, with face-to-face facilitation, as this course structure's expected answer was two levels below, and zero points would also be assigned to 100% online, fully asynchronous, as the expected answer for this structure was three levels below. This approach generated a unique score for each course structure, allowing for the overall preferences to be ranked for each student.

The last question on the survey simply asked students to self-report their grade level (freshman, sophomore, junior, senior). This question was only asked to allow separate analysis of the responses from juniors. Since this question did not address any aspects of online course structure preferences, it was not coded into the overall scores or the ranking. It was only used to select which survey responses to include in the analysis.

Due to constraints in sampling, most of the administrations had mixed grade levels of students. Only the data from those that self-reported as juniors was used in the analysis. This restriction eliminated the data from one of the online administrations outright, as none of the three respondents from this school were juniors. Further, since the second online administration had such a low response rate (6.3%), the data from this group is most likely not representative and is expected to be highly skewed. Since only

35 usable responses were collected in this administration, this data was also excluded from further analysis.

Data Processing

The paper versions of the student survey results were transcribed into a Microsoft® Excel spreadsheet. The custom lists feature of Excel was used to restrict the possible entries into each cell, to reduce the likelihood of transcription error. The spreadsheet was designed with formulas to automatically convert the student responses into the appropriate scores to determine the overall average score as well as the ranking for each online course structure. The data from the Excel spreadsheet was then transferred into SPSS® for conducting the statistical analyses.

Reliability

The five-point scaled scores for the 20 questions were averaged to generate an overall score. A Cronbach's alpha was calculated, comparing the consistency of the responses to the 20 questions, after converting each to the five-point scaled score. Since all the scores were coded so that answers indicating a preference for face-to-face environments were high and answers indicating a preference for online environments were low, Cronbach's alpha will indicate if respondents were consistent in their answers. An item-wise deletion analysis was conducted to determine if any questions should be dropped from the analysis. The use of a Cronbach's alpha and a subsequent item-wise deletion analysis is well-recognized in the literature as a standard approach to establishing reliability of an instrument (Berends, 2006).

Validity

Construct-related evidence for validity was examined in two ways. An exploratory factor analysis was conducted to determine if the intended topic domains clustered together as factors (Berends, 2006). This analysis represents an internal structure test to establish construct-related evidence of validity (Ary et al., 2006). A varimax rotation was used, which makes high factor loadings higher and low factor loadings lower, to facilitate the determination of which questions were more correlated with one another (Tabachnick & Fidell, 2007). Additionally, a Pearson product-moment correlation was conducted to explore the relationship between the calculated course structure rankings and the overall average score on the survey. Ary et al. identify this type of analysis as a related-measures study, establishing the validity of the course structure rankings by correlating them to the overall average score. The Pearson product-moment correlation is effective in establishing the level of correlation between any two continuous variables. A value of one implies a perfect correlation, while a value of negative one implies a perfectly negative correlation (Fink & Kosecoff, 1998). The overall average score is a continuous variable, while the course structure rankings are by definition ranks. However, Gall et al. (2005) argue that the Pearson product-moment correlation is a valid test for any combination of ordinal variables.

Summary

This chapter described a standard approach to survey development and analysis. The following chapter will describe the results of this analysis.

Chapter 4: Results

To address the research questions, two sets of scores were calculated from the survey responses. The first involved converting all the item responses to a 1 – 5 scale and calculating an average overall score for the survey. A score of five corresponded to a strong preference for a face-to-face, fully synchronous environment, while a score of one corresponded to a strong preference for a fully online, fully asynchronous environment. The second set of scores compared survey responses to the expected responses for each course structure (see appendix A), calculating a preference ranking for each of the six course structures examined by the survey. Only survey responses of juniors were used. Further, two of the survey administrations had such low response rates (10% or less) that the data from these administrations is suspect. As a result, the responses from these administrations were not included in the analysis. These restrictions yielded a total of 262 responses from juniors in the four administrations with high response rates.

Measures of Central Tendency

Table 1 shows the measures of central tendency for the 20 survey questions on the five-point scale. While all questions had the potential for a minimum value of one and a maximum value of five, question six had no responses that coded to a value of five, so the highest value for this question was only four.

Table 2 shows the measures of central tendency for the overall average score from the survey as well as the predicted course structure rankings. The overall average score could potentially range from a minimum of one to a maximum of five, but in this analysis it had an actual range of 1.67 to 4.83. The possible values for the course structure

Table 1

Measures of Central Tendency for the 20 Survey Questions

Question	N	Min	Max	M	SD
Q01	262	1	5	3.48	1.261
Q02	262	1	5	3.75	1.271
Q03	262	1	5	4.51	1.027
Q04	262	1	5	3.31	1.093
Q05	262	1	5	3.94	.889
Q06	262	1	4	1.95	.693
Q07	262	1	5	3.67	1.213
Q08	262	1	5	3.91	1.157
Q09	262	1	5	3.24	1.118
Q10	262	1	5	3.30	1.045
Q11	262	1	5	4.17	.841
Q12	262	1	5	3.97	.898
Q13	262	1	5	3.94	1.164
Q14	262	1	5	3.15	1.208
Q15	262	1	5	3.69	1.003
Q16	262	1	5	3.48	1.130
Q17	262	1	5	4.13	.846
Q18	262	1	5	2.88	.994
Q19	262	1	5	3.82	.999
Q20	262	1	5	2.25	.864

rankings ranged from one to six, with a rank of one indicating it was the most preferred option and a rank of six indicating it was the least preferred option.

Table 2

Measures of Central Tendency for the Average Overall Score and the Six Course Structure Rankings

	N	Min	Max	M	SD
Average overall score	262	1.67	4.83	3.62	.506
Fully synchronous, fully online	262	1	6	3.87	1.186
Fully asynchronous, fully online	262	1	6	5.69	.935
Mixed asynchronous and synchronous, fully online	262	1	6	3.21	1.124
Hybrid, with face-to-face instruction	262	1	6	1.48	.796
Hybrid, with face-to-face facilitation	262	1	6	3.15	1.072
Traditional	262	1	6	3.06	1.728

These data indicate that the strongest preference is for a hybrid course, with face-to-face instruction.

Reliability

A Cronbach's alpha was calculated to examine the internal consistency of the survey. For all 20 questions, $\alpha = 0.785$, which is considered an acceptable level for reliability. However, Table 3 shows that question one actually had a negative correlation with the other items in the survey (-.107) and that the Cronbach's alpha would be stronger if this item were omitted. After deleting this item from the analysis, the Cronbach's alpha was recalculated on the remaining 19 questions. For the residual 19 questions, $\alpha = 0.803$, which is an even stronger indicator of reliability. A similar item-

Table 3

Item Deletion Analysis for Cronbach's Alpha ($\alpha = 0.785$) with 20 Survey Items

Question	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q01	67.04	84.022	-.107	.186	.800
Q02	66.77	72.352	.425	.401	.759
Q03	66.01	74.686	.417	.331	.760
Q04	67.21	76.256	.298	.191	.768
Q05	66.58	75.489	.445	.405	.760
Q06	68.57	82.280	.031	.219	.780
Q07	66.85	75.955	.271	.204	.771
Q08	66.62	74.016	.391	.265	.762
Q09	67.28	74.417	.388	.295	.762
Q10	67.22	77.941	.223	.359	.773
Q11	66.35	73.272	.637	.557	.750
Q12	66.56	73.426	.579	.546	.752
Q13	66.58	75.258	.324	.253	.767
Q14	67.37	75.461	.297	.256	.769
Q15	66.83	74.520	.440	.330	.759
Q16	67.04	72.876	.466	.449	.756
Q17	66.40	74.987	.508	.436	.757
Q18	67.64	77.761	.251	.287	.771
Q19	66.70	73.693	.493	.330	.756
Q20	68.27	79.935	.160	.207	.776

Table 4

Item Deletion Analysis for Cronbach's Alpha ($\alpha = 0.803$) with 19 Survey Items

Question	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q02	63.30	72.412	.462	.386	.785
Q03	62.53	75.376	.426	.330	.788
Q04	63.73	77.083	.299	.190	.796
Q05	63.10	76.107	.460	.405	.787
Q06	65.09	83.076	.037	.215	.806
Q07	63.38	76.407	.290	.199	.797
Q08	63.14	74.381	.416	.252	.788
Q09	63.80	75.904	.352	.250	.792
Q10	63.74	79.011	.211	.359	.801
Q11	62.88	73.995	.644	.556	.778
Q12	63.08	73.960	.599	.542	.779
Q13	63.10	76.222	.317	.239	.795
Q14	63.90	75.866	.318	.252	.795
Q15	63.36	75.143	.453	.329	.786
Q16	63.57	73.869	.457	.449	.785
Q17	62.92	75.581	.525	.434	.784
Q18	64.17	78.906	.234	.285	.799
Q19	63.22	74.632	.486	.327	.784
Q20	64.80	80.790	.160	.206	.802

Table 5

Item Deletion Analysis for Cronbach's Alpha (α = 0.814) with 18 Survey Items

Question	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q02	61.34	71.361	.470	.385	.791
Q03	60.58	74.262	.438	.310	.793
Q04	61.78	75.982	.310	.183	.801
Q05	61.15	75.018	.472	.379	.792
Q07	61.42	75.614	.284	.198	.804
Q08	61.18	73.498	.415	.246	.795
Q09	61.84	75.172	.343	.242	.799
Q10	61.79	78.016	.215	.329	.807
Q11	60.92	73.103	.644	.552	.784
Q12	61.12	73.026	.602	.541	.785
Q13	61.15	75.189	.324	.239	.801
Q14	61.94	75.016	.315	.244	.802
Q15	61.40	74.160	.458	.328	.792
Q16	61.61	73.205	.444	.431	.793
Q17	60.96	74.524	.536	.431	.789
Q18	62.21	78.109	.226	.284	.806
Q19	61.27	73.654	.491	.327	.790
Q20	62.84	80.173	.139	.155	.809

wise deletion analysis on the new Cronbach's alpha data revealed that question six also lowered the overall correlation (see Table 4). After deleting this item, the 18-item Cronbach's alpha was $\alpha = 0.814$. An additional item-wise deletion analysis indicated that all remaining questions contributed to the strength of this correlation (see Table 5). As a result, questions one and six were excluded from the subsequent analyses related to validity of the survey.

Exploratory Factor Analysis

An exploratory factor analysis compared the scores for each of the residual 18 items on the survey to the overall average score of those items to determine if the resulting factors were consistent with the three topic domains described in the survey design: interaction, accountability, and student learning. A Varimax rotation was used, and only items that loaded at the 0.40 level or higher were included the factor. Only those factors with eigenvalues greater than one were retained in the analysis. An eigenvalue of one is the contribution to the variance of each individual question (Tabachnick & Fidell, 2007). In this survey, with 18 residual items, each question contributes one-eighteenth of the variance, or 5.56%. So, only those factors which contributed more than 5.56% of the total variance in the overall score were included for further analysis.

Five factors emerged from the analysis. Table 6 shows the summary data for these factors. These five factors account for nearly 57% of the total variance observed in the overall scores for the survey.

Those items that had a factor loading of at least 0.40 are detailed in Table 7. Factor one included questions 2, 3, 5, 11, 12, 15, 17, and 19. These eight questions all cluster around the construct of interaction, and therefore this factor is identified as

Table 6

Eigenvalues for Exploratory Factor Analysis

	Initial Eigenvalues		
Factor	Total	% of Variance	Cumulative %
1	4.709	26.162	26.162
2	2.210	12.280	38.442
3	1.212	6.735	45.177
4	1.101	6.118	51.294
5	1.019	5.661	56.955

the interaction factor. All but one item on the survey that was written to address interaction in the course grouped into this factor. Item 10 specifically addresses student-student interaction in an online environment but was not included in this factor (it loaded onto factor two).

Factor two included questions 9, 10, 16, 18, and 19. These five questions generally cluster around the construct of the role of technology in student learning, and therefore this factor is identified as the student learning factor. Question 19 ("I prefer in-person social settings to online social settings.") loaded onto both the interaction factor and the student learning factor, although its loading is higher on the interaction factor. As it addresses interaction in social settings rather than strictly the classroom, this item does address both issues. For many students, learning is a social event, and the learning environment affects student learning.

Table 7

Factor Loadings for Exploratory Factor Analysis

	Factors				
Question	1	2	3	4	5
Q02	.577				
Q03	.417		.481		
Q04			.477	-.429	
Q05	.675				
Q07				.802	
Q08				.476	
Q09		.650			
Q10		.756			
Q11	.719				
Q12	.752				
Q13			.778		
Q14			.607		
Q15	.624				
Q16		.747			
Q17	.755				
Q18		.665			
Q19	.538	.434			
Q20					.841

Factor three included questions 3, 4, 13, and 14. These four questions generally cluster around the construct of interaction as well, although they focus more on interaction with students and adults outside of the course. Questions three and four also loaded onto other factors and have much weaker loadings on this factor than questions 13 and 14.

Factor four included questions 4, 7, and 8. These questions address the constructs of accountability, interaction, and student learning. Question seven dominates this factor, and it focuses heavily on accountability. Question 15 also addressed accountability, but in the context of interaction, and it loaded onto the interaction factor.

Factor five included only question 20. This item focuses on the learning environment, which is related to student learning.

As is apparent from this analysis, the interaction factor and the student learning factor associate with clear constructs. Factors three, four, and five do not have clear construct themes. Further, the scree test (Tabachnick & Fidell, 2007) recommends only keeping those factors that are in the steep section of the scree plot, as opposed to those that are in the tail. Figure 1 shows the scree plot for this factor analysis, and only the interaction factor and the student learning factor meet the criteria of the scree test.

Course Structure Rankings

The course structure rankings were calculated by comparing student responses on the retained 18 questions to the expected responses for each course structure (see appendix A). A Pearson product-moment correlation compared the overall average score from the retained 18 questions to the calculated rankings. The results are shown in Table 8.

Scree Plot
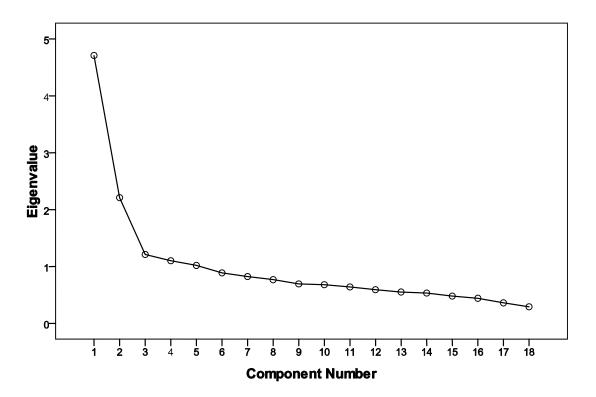
Figure 1: Scree plot for the exploratory factor analysis. Only the first five factors are shown in Table 6.

As is evident from Table 8, all but the category of hybrid, with face-to-face instruction showed a highly significant correlation ($\rho < .001$) with the average overall score from the survey. The course structure rankings were on a scale from one to six, with one designating the highest rank (most preferred) and six designating the lowest rank (least preferred). A negative correlation means that as the average overall score increased, the rank tended towards one. A positive correlation means that as the average overall score increased, the rank tended towards six. According to Ary et al. (2006), a

Table 8

Pearson Product-Moment Correlation Comparing the Overall Average Score from the

Survey to the Six Course Structure Rankings

	Average Overall Score	
Online Course Structure Category	Pearson Correlation	Sig. (two-tailed)
Fully synchronous, fully online	-.231	.000
Fully asynchronous, fully online	.707	.000
Mixed asynch. and synch., fully online	.580	.000
Hybrid, with face-to-face instruction	.072	.243
Hybrid, with face-to-face facilitation	.424	.000
Traditional	-.887	.000

correlation of .50 is a large correlation, .30 is a medium correlation, and .10 is a small

correlation.

The traditional category had the strongest correlation at -.887. The negative value

follows what would be predicted, since the average overall score was established so that a

higher score favored a synchronous, face-to-face environment. The fully asynchronous,

fully online category had the strongest positive correlation at .707. This also follows

prediction, as the lowest average overall scores favor an asynchronous, online

environment. Both of these are clearly very large correlations. The mixed asynchronous

and synchronous, fully online category also had a large correlation of .580. The positive

correlation is also predicted, as this course structure uses a fully online environment with

a significant component of the course occurring asynchronously. The hybrid, with face-

to-face facilitation also shows a positive correlation, with a medium to large correlation of .424. While a portion of this course occurs in a face-to-face environment, allowing for student-student interaction, almost all instruction occurs asynchronously, so this level and direction of correlation is predicted. The fully online, fully synchronous correlation shows a low to medium correlation of -.231. While this course structure is fully online, it is also fully synchronous. Turman and Schrodt (2005) have shown that students view this approach more similarly to a traditional classroom than the other online approaches, so this level and direction of correlation is not surprising.

The low correlation for the hybrid, with face-to-face instruction course structure indicates that this ranking does not track with the overall survey score. This course structure blends face-to-face and online instruction as well as synchronous and asynchronous approaches. Since the method used to calculate the overall average score treated these approaches as opposite scales, it is not surprising this course structure failed to track well with the overall average score. To determine if the ranking for this course structure had validity, a correlation of its ranking with the other five rankings was conducted, using a Pearson product-moment correlation. The results of this analysis are shown in Table 9.

In this analysis, a positive correlation implies that as the ranking for the hybrid, with face-to-face instruction course structure increased, the corresponding ranking of the other category also increased. A negative correlation means that the ranking of the category tended to decrease as the rank of the hybrid, with face-to-face instruction course structure increased.

Table 9

Pearson Product-Moment Correlation Comparing the Ranking of the Hybrid, with Face-to-Face Instruction Course Structure with the Other Five Course Structures

	Hybrid, with face-to-face instruction	
Online Course Structure Category	Pearson Correlation	Sig. (two-tailed)
Fully synchronous, fully online	-.532	.000
Fully asynchronous, fully online	-.363	.000
Mixed asynch. and synch., fully online	.236	.000
Hybrid, with face-to-face facilitation	.461	.000
Traditional	-.292	.000

The hybrid, with face-to-face instruction course structure shows a negative correlation with the three course structures that do not blend learning approaches. This result suggests that students who prefer the hybrid, with face-to-face instruction approach generally prefer a more varied instructional approach. The positive correlation with the two other structures that use blended instructional approaches further supports this conclusion.

Research Questions

The collected data and subsequent analysis allowed each research question to be evaluated.

Research Question One

The first research question asks if the items on the survey demonstrate an appropriate level of internal consistency, as measured by a Cronbach's alpha. Based on

the large value for Cronbach's alpha ($\alpha = .814$) on the reduced 18-item survey, this question was answered positively.

Research Question Two

The second research question asks if the targeted constructs of interaction, accountability, and student learning emerge in an exploratory factor analysis. Interaction and student learning clearly clustered together. Accountability did not emerge as a separate construct. This question was addressed, and was answered partially positively and partially negatively.

Research Question Three

The third research question asks if the predicted course structure preferences significantly correlate with students' overall average scores on the survey. The Pearson product-moment correlation showed a statistically significant ($\rho < .001$) correlation with five of the course structure rankings. Further, the remaining course structure showed a significant correlation to the other five course structures in a second correlation analsyis. This question was answered positively.

<div align="center">*Summary*</div>

A reduced 18-item version of the survey was shown to have a strong reliability ($\alpha = .814$). The exploratory factor analysis showed that two constructs, interaction and student learning, clearly clustered together in the survey. The correlation of the overall average score from the survey demonstrated that five of the course structure rankings varied as expected. The sixth was shown to vary as expected through a correlation with the other five course structure rankings. The concluding chapter will discuss the implications of these results.

Chapter 5: Discussion

In this concluding chapter, the general research problem is restated, this research project is related to previously discussed research, the methodology is reviewed, and the results are summarized. Recommendations for professional practice, limitations of the study, and recommendations for future research conclude this discussion.

Statement of the Problem

Online education is a rapidly growing field, so much so that research related to Internet-based teaching and learning has lagged behind the needs of practitioners, often forcing educators to make decisions in this field based on anecdotal evidence and professional judgment. Much of the research that is available is based on studies with adult learners, leaving a relative dearth of peer-reviewed research regarding secondary education and online courses. Further, online course development is both an expensive and time-consuming task, requiring schools to plan carefully as they move into this field (Association for the Study of Higher Education, 2006). Many researchers have also speculated that online education is allowing for a consumer mindset related to education. Students can now shop for courses, based on their course structure preferences (Norton & Hathaway, 2008; Phillips & Peters, 1999). This exploratory study was undertaken to partially address these concerns. A survey was constructed to determine high school students' course structure preferences for online courses.

Relationship of Current Study to Previous Research

This study serves to add to the relatively small but growing body of literature regarding online education in a secondary school environment. Most studies that focus on

students related to online courses examined the attributes of students who were successful or who struggled in the courses. Of the smaller set of studies that addressed student attitudes towards online courses, few have differentiated among types of online course designs. Of these few, most examined student attitudes after completion of the courses. Predicting student preferences for online course structures in advance is almost unasked, and no studies have tried to make this prediction among multiple online course structures. This study explored this previously unaddressed question.

Many studies have shown that students initially express a preference for the style of traditional courses over that of online courses prior to exposure to an online course (Durrington et al., 2006; Maki & Maki, 2002; Wang & Woo, 2007). The primary driving force for the growth of online courses has been external factors to the course – convenience and flexibility (Moskal et al., 2006). Turman and Schrodt (2005) explored student attitudes regarding four different versions of a single course, each with differing levels of technology integration. Their findings showed that students who completed the course had the strongest positive attitude towards options that blended face-to-face and online approaches. El Mansour and Mupinga (2007) compared student satisfaction with a hybrid course versus a fully online course and found similar results. The results of this study support El Mansour and Mupinga's as well as Turman and Schrodt's findings. The hybrid, with face-to-face instruction course structure was the most preferred option among the students. The traditional course structure was also preferred over a fully asynchronous, fully online option, consistent with many other findings.

Another observation within this study refers back to Roblyer's (2006) observation that "the quality indicators [for post-secondary online programs] are always nearly

identical to those for K-12 programs." This may indeed be true when analyzing factors that predict student success in online classes, but this study suggests that high school students' motivation for taking online courses may be different. High school students may show a higher interest in interaction and face to face support than college students demonstrate.

Review of Methodology

No suitable instrument was found in the literature, so the primary focus of this exploratory study was to develop a reliable and valid survey to ascertain high school students' online course structure preferences. Survey questions were developed along three domains: interaction, accountability, and student learning. To focus the survey administration and the analysis of the results, the population for the survey was restricted to high school juniors. A panel of experts was employed to examine and give feedback on the survey construction. After the 20-question instrument was approved by the panel, a pilot administration provided feedback on the understandability of the survey.

The survey was then given to students at three mid-size to large traditional private sectarian high schools on the West Coast and to students attending two online high schools. One online high school was a small private sectarian high school and the other was a large public high school. Due to the nature of the sample groups, students of multiple grade levels took the survey. An additional question was added to the instrument to allow students to self-identify their grade level. Only the data from those students who marked they were juniors were included in the analysis. The surveys administered at the traditional high schools were given by teachers or administrators at the school site with a paper version, and the students responses were then returned to the researcher. As a

result, these survey respondents were completely anonymous in this study. The student

answers were then encoded into an Excel® spreadsheet for later SPSS® analysis. The

surveys administered at the online high schools were distributed to the students through

an e-mail sent from an employee of the online school with a link to a SurveyMonkey.com

version of the survey, again insuring anonymity. Students were then given two weeks to

complete the survey online. The paper version of the survey and the online version were

identical in terms of the wording and order of the questions. While the administrations in

traditional classrooms had 100% response rates, the online response rates were

exceedingly low. One yielded no responses from juniors. The other only had a 6.3%

response rate, rendering the representative nature of these responses highly questionable.

As a result, the responses from the online administrations were excluded from the

analysis. This selection process resulted in 262 usable responses for further analysis.

Answers to the items on the survey were converted to a five-point scale, with

negatively worded questions reverse coded. A Cronbach's alpha was calculated,

comparing the responses on the 20 items to establish reliability. An item-deletion analysis

explored if individual questions should be removed from the survey to improve

reliability. In addition to the face validity established by the panel of experts, an

exploratory factor analysis was conducted to generate construct-related evidence of

validity. Specifically, the factors were examined to determine if the targeted constructs of

interaction, accountability, and student learning clustered together on the survey. The

validity of the course structure rankings was evaluated through a Pearson product-

moment correlation, comparing the course structure rankings to the overall average score

for the survey.

Summary of Results

The student results indicated that the most preferred course structure was for a hybrid format with face-to-face instruction. This category had an average ranking of 1.48, on a one to six scale.

The initial Cronbach's alpha for the 20 items on the survey was .785. The item-wise deletion analysis indicated that two questions should be removed. The resulting Cronbach's alpha for the 18 remaining items was .814.

The exploratory factor analysis revealed two primary factors, one for interaction and the other for student learning. Accountability failed to emerge as a clearly defined factor in this analysis.

The Pearson product-moment correlation showed that five of the course structures had strongly significant correlations ($\rho < .001$) to the overall average score. Three of the course structures showed a large correlation with the overall average score on the survey. One showed a medium to large correlation, and one showed a small to medium correlation. The magnitude and direction of the correlation was consistent with predictions, indicating validity for the rankings of these course structures. The hybrid, with face-to-face instruction course structure had a negligible correlation with weak statistical significance, so a separate analysis was conducted for this structure. It was compared with a Pearson product-moment correlation to the five other course structures. It showed a significant correlation ($\rho < .001$) with each, and the magnitude and direction of the correlation was as predicted, indicating validity for the ranking of this course structure as well.

Recommendations for Professional Practice

The results of this study add to the available research and suggest several directions for professional practice. First, educators need to recognize that students will take online courses first and foremost for convenience and increased flexibility with their schedule. Any attempt to develop or offer online courses to students must satisfy this demand if the courses are to have widespread use and appeal. However, studies have shown that simply making a course available will not appeal to students if it does not have demonstrable quality (Artino, 2007). Sound educational theory and pedagogy must be part of any successful online course (Burge, 2008; Kirkwood & Price, 2005). So, the goal for educational practitioners is to develop high quality online courses that use proven teaching techniques in a flexible and convenient format.

This study indicates that students would most prefer to take a course, assuming it meets the necessary criteria for quality and flexibility, that combines both face-to-face and online approaches in a hybrid format. Several studies have shown that students prefer this option after having been exposed to it (Blake, 2000; Bonds-Raacke, 2006; El Mansour & Mupinga, 2007; Fung & Carr, 2000; Turman & Schrodt, 2005; Westbrook, 2006). However, this study is the first to show that students would prefer to take this type of course without prior experience with it. This lack of precedence is most likely due to the restricted nature of previous prediction studies. These other studies have focused on only two course options, fully online versus traditional (Mupinga et al., 2006; Robinson & Doverspike, 2006; Tung & Chang, 2007). This study explored students' preferences across a spectrum of course structure options, revealing that hybrid, with face-to-face instruction was the most preferred course style. On the basis of this study and the

supporting literature, schools should give serious consideration to the use of hybrid courses when exploring online course options for students.

Challenging the Status Quo

Schools that are not looking to offer online alternatives for students should still consider the results of this study. Since hybrid courses offer the potential for the richest range of instructional options and learning opportunities for students (Baglione & Nastanski, 2007; Brunner, 2006), schools may find that hybrid options improve learning results. Given students' preferences for courses of this type, schools could even target this structure to bolster enrollment in specific classes.

If it is indeed true that high school students most prefer hybrid course options over traditional courses, schools that ignore this trend may well find themselves in crisis in coming years. As the popularity and availability of online courses grow, students will migrate to programs that offer the format they prefer.

Schools can use this approach to radically rethink their approach to structuring schedules. Students may no longer need to attend the same set of classes every day. Fewer class sessions open up tremendous flexibility and opportunity for schools and students. Student may be able to complete their required seat time in fewer days per week or fewer hours per day, enabling the scheduling of other significant activities at times that are currently not available. Students who struggle can use this additional time for added instructional support. Co-curricular activities could occur during the day instead of solely before school and after school, reducing the extreme length of days for some students. Flexible scheduling allows for students to explore internship or other enrichment activities that would normally be difficult to pursue.

Fewer class sessions reduces strain on facilities. Overcrowded classrooms can alleviate large class sizes by dividing students among more sections. Conversely, reducing the number of sessions for a particular course frees up space to include new students without adding additional buildings.

These ideas represent only a small sample of the possibilities that emerge if schools move in this direction. As schools begin to explore these options, even more creative and effective ideas will come forward, potentially bringing about a significant revolution in the approach to education at the secondary level.

Limitations of Study

The poor return rate from the online schools resulted in no data from students currently in online programs being included in the analysis. Only data from traditional private sectarian high schools on the West Coast were used in this analysis, limiting generalizations across students in different school settings. Care should be taken to only extend the use of these results with similar schools. The study only focused on high school juniors, limiting the ability to interpret results for a wider age range. Further, the study was dependent on the accuracy of student answers to the questions.

Recommendations for Further Research

A major area of research still needed is to determine the predictive validity of this survey. No data exists yet to determine if students' preferences as expressed by this survey correlates with online course structure choices. To conduct this study, students would need to have access to a wide range of online course structures for a single course. Each option should be of comparable high quality. Students should take this survey prior

to actual course selection, and then their course selections should be compared to their predicted preferences.

Additional survey administrations are needed with more diverse samples to establish a broader generalization of the survey. The survey should be given to students in different grade levels as well as to students in more varied school settings. The validity of the survey should also be examined with college students.

While accountability was a targeted construct for this survey, it failed to emerge as a separate factor. The survey could be rewritten to explore the effect that this construct has on the results. This new survey would need to go through pilot testing and similar analysis as was done in this dissertation to assess its reliability and validity. Alternatively, the survey could be modified to only retain the questions that emerged in the factors. This reduced survey would need to undergo additional analysis to determine if it retains the reliability and validity as demonstrated by the current version. A review of the literature indicates that accountability is not as common a factor as the other two constructs (interaction and student learning) when predicting student success in courses. Given the generally accepted opinion that high school students need more accountability and direction than adult learners, the failure of this construct to emerge was surprising, but it is not inconsistent with the literature. A possible study could be conducted to determine if the conventional wisdom regarding the increased need for accountability for high school students is misguided. High school students might possibly have comparable needs in this area as adult learners.

Conclusions

This exploratory study sought to develop a survey to determine the preferences of high school juniors for various online course structures. In an unprecedented result, this study showed that a hybrid course with face-to-face instruction was not only the most preferred online course structure, it was preferred over a traditional course structure as well. Previous studies have shown a traditional format is preferred over online formats in general. Studies have also shown that a hybrid format with face-to-face instruction is preferred over other types of online courses. This study shows the relative preference of all of these in one analysis.

The implications of this result are far-reaching. High schools can use this information to inform their decisions when implementing online course options for their students. Further, schools should consider incorporating online tools and techniques into their otherwise traditional classrooms. This study indicates that students would prefer a blended approach to all classes. Schools that consider moving in this direction open a wide range of exciting and new opportunities.

This study will hopefully encourage schools to consider introducing more variety into their instructional approaches. Even if a school elects to not embrace creative scheduling opportunities or other potential benefits, the improvements to student learning that result from a hybrid approach justify exploring this option. This study shows that schools can move forward with confidence that students will not only accept a move towards hybrid courses, they will welcome such a change.

References

Artino, A. R., Jr. (2007). Online military training: Using a social cognitive view of

motivation and self-regulation to understand students' satisfaction, perceived

learning, and choice. *The Quarterly Review of Distance Education, 8*(3), 191-202.

Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=31703798&site=ehost-live

Ary, D., Jacobs, L. C., Razavieh, A., & Sorenson, C. (2006). *Introduction to research in*

education (7th ed.). Canada: Thomson Wadsworth.

Association for the Study of Higher Education (2006). Research on the factors of online

learning. *ASHE Higher Education Report, 32*(1), 37-87. Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=22196359&site=ehost-live

Baglione, S. L., & Nastanski, M. (2007). The superiority of online discussion. *Quarterly*

Review of Distance Education, 8(2), 139-150. Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=26266357&site=ehost-live&scope=site

Beard, L. A., Harper, C., & Riley, G. (2004). Online versus on-campus instruction:

Student attitudes & perceptions. *TechTrends: Linking Research & Practice to*

Improve Learning, 48(6), 29-31. Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=aph&AN=15835519&site=ehost-live&scope=site

Bejerano, A. R. (2008). The genesis and evolution of online degree programs: Who are they for and what have we lost along the way? *Communication Education, 57*(3), 408-414. doi:10.1080/03634520801993697

Bell, P. D. (2007). Predictors of college student achievement in undergraduate asynchronous web-based courses. *Education, 127*(4), 523-533. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =a9h&AN=25607627&site=ehost-live

Berends, M. (2006). Survey methods in educational research. In J. L. Green, G. Camilli & P. B. Elmore (Eds.), *Handbook of complementary methods in education research* (pp. 623-640). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Beyth-Marom, R., Saporta, K., & Caspi, A. (2005). Synchronous vs. asynchronous tutorials: Factors affecting students' preferences and choices. *Journal of Research on Technology in Education, 37*(3), 245-262.

Blake, K. R. (2000). Using the world wide web to teach news writing online. *Journalism & Mass Communication Educator, 55*(1), 4-13. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =aph&AN=3107435&site=ehost-live&scope=site

Bonds-Raacke, J. M. (2006). Students' attitudes toward the introduction of a course website. *Journal of Instructional Psychology, 33*(4), 251-255. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =aph&AN=23508196&site=ehost-live&scope=site

Brunner, D. L. (2006). The potential of the hybrid course vis-a-vis online and traditional courses. *Teaching Theology and Religion, 9*(4), 229-235. doi:10.1111/j.1467-9647.2006.00288.x

Burge, L. (2008). 'Crafting the future': Pioneer lessons and concerns for today. *Distance Education, 29*(1), 5-17. doi:10.1080/01587910802004811

Cavanagh, S. (2006). To tailor schedules, students log in to online classes. *Education Week, 26*(9), 1, 24.

Christensen, E. W., Anakwe, U. P., & Kessler, E. H. (2001). Receptivity to distance learning: the effect of technology, reputation, constraints, and learning preferences. *Journal of Research on Computing in Education, 33*(3), 263-279. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=aph&AN=4417401&site=ehost-live&scope=site

Conceigao, S. C. O. (2007). Understanding the environment for online teaching. In *New Directions for Adult & Continuing Education* (pp. 5-11). doi:10.1002/ace.242

Contreras-Castillo, J., Perez-Fragosa, C., & Favela, J. (2006). Assessing the use of instant messaging in online learning environments. *Interactive Learning Environments, 14*(3), 205-218. doi:10.1080/10494820600853876

Dabaj, F., & Basak, H. (2008). The role of gender and age on students' perceptions towards online education case study: Sakarya University, Vocational High School. *Preceedings of World Academy of Science: Engineering & Technology, 28,* 441-444. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=31847948&site=ehost-live&scope=site

Dempsey, J. V., Fisher, S. F., Wright, D. E., & Anderton, E. K. (2008). Training and support, obstacles, and library impacts on elearning activities. *College Student Journal, 42*(2), 630-636. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=32544899&site=ehost-live&scope=site

Dennen, V. P., & Wieland, K. (2007). From interaction to intersubjectivity: Facilitating online group discourse processes. *Distance Education, 28*(3), 281-297. doi:10.1080/01587910701611328

Dennen, V. P., Darabi, A. A., & Smith, L. J. (2007). Instructor-learner interaction in online courses: The relative perceived importance of particular instructor actions on performance and satisfaction. *Distance Education, 28*(1), 65-79. doi:10.1080/01587910701305319

Drennan, J., Kennedy, J., & Pisarski, A. (2005). Factors affecting student attitudes toward flexible online learning in management education. *Journal of Educational Research, 98*(6), 331-338.

Durrington, V. A., Berryhill, A., & Swafford, J. (2006). Strategies for enhancing student interactivity in an online environment. *College Teaching, 54*(1), 190-193.

Edmonds, C. L. (2006). The inequivalence of an online and classroom based general

   psychology course. *Journal of Instructional Psychology, 33*(1), 15-19. Retrieved

   from

   http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

   =aph&AN=20335483&site=ehost-live&scope=site

El Mansour, B., & Mupinga, D. M. (2007). Students' positive and negative experiences in

   hybrid and online classes. *College Student Journal, 41*(1), 242-248. Retrieved

   from

   http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

   =a9h&AN=24628953&site=ehost-live&scope=site

Ellis, A. E. (2003). Personality type and participation in networked learning

   environments. *Educational Media International, 40*(1/2), 101-114. Retrieved

   from

   http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

   =aph&AN=10306017&site=ehost-live&scope=site

Elvers, G. C., Polzella, D. J., & Graetz, K. (2003). Procrastination in online courses:

   Performance and attiudinal differences. *Teaching of Psychology, 30*(2), 159-162.

   Retrieved from

   http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

   =aph&AN=9552194&site=ehost-live&scope=site

Fink, A., & Kosecoff, J. (1998). *How to conduct surveys: A step-by-step guide* (2nd ed.).

   Thousand Oaks, CA: SAGE Publications.

Florida Virtual School. (2008). *FLVS Facts*. Retrieved July 13, 2008, from Florida

Virtual School Web Site: http://www.flvs.net/educators/fact_sheet.php

Fowler, Jr., F. J. (2002). *Survey research methods* (3rd ed.). Thousand Oaks, CA: Sage

Publications.

Fox, C. (2006). Going virtual. *T H E Journal, 33*(12), 6-8. Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=23967967&site=ehost-live

Fung, Y., & Carr, R. (2000). Face-to-face tutorials in a distance learning system: Meeting

student needs. *Open Learning, 15*(1), 35-46.

Gall, J. P., Gall, M. D., & Borg, W. R. (2005). *Applying educational research: A*

practical guide (5th ed.). Boston: Allyn and Bacon.

Haigh, M. (2007). Divided by a common degree program? Profiling online and face-to-

face information science students. *Education for Information, 25*(2), 93-110.

Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=25797966&site=ehost-live

Howland, J. L., & Moore, J. L. (2002). Student perceptions as distance learners in

Internet-based courses. *Distance Education, 23*(2), 183-195.

Inman, E., Kerwin, M., & Mayes, L. (1999). Instructor and student attitudes toward

distance learning. *Community College Journal of Research & Practice, 23*(6),

581-591.

Johnson, B. (2001). Toward a new classification of nonexperimental quantitative

research. *Educational Researcher, 30*(2), 3-13.

Jones, J. G., Morales, C., & Knezek, G. A. (2005). 3-Dimensional online learning

    environments: Examining attitudes toward information technology between

    students in Internet-based 3-dimensional and face-to-face classroom instruction.

    Educational Media International, 42(3), 219-236.

    doi:10.1080/09523980500161254

Kachel, D. E., Henry, N. L., & Keller, C. A. (2005). Making it real online: Distance

    learning for high school students. *Knowledge Quest, 34*(1), 14-17.

Katz, Y. J. (2002). Attitudes affecting college students' preferences for distance learning.

    Journal of Computer Assisted Learning, 18(1), 2-9.

Kirkwood, A., & Price, L. (2005). Learners and learning in the twenty-first century: what

    do we know about students' attitudes towards and experiences of information and

    communication technologies that will help us design courses? *Studies in Higher*

    Education, 30(3), 257-274.

Klecker, B. M. (2007). The impact of formative feedback on student learning in an onlne

    classroom. *Journal of Instructional Psychology, 34*(3), 161-165. Retrieved from

    http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

    =a9h&AN=27106216&site=ehost-live&scope=site

Koohang, A. (2004). Students' perceptions toward the use of the digital library in weekly

    web-based distance learning assignments portion of a hybrid programme. *British*

    Journal of Educational Technology, 35(5), 617-626. doi:10.1111/j.0007-

    1013.2004.00418.x

Lake, D. (2006). Interview with Julie Young. *American Journal of Distance Education,*

    20(4), 245-248. doi:10.1207/s15389286ajde2004_5

Li, C., & Irby, B. (2008). An overview of online education: Attractiveness, benefits, challenges, concerns and recommendations. *College Student Journal, 42*(2), 449-458. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =a9h&AN=32544879&site=ehost-live

Maki, W. S., & Maki, R. H. (2002). Multimedia comprehension skill predicts differential outcomes of web-based and lecture courses. *Journal of Experimental Psychology: Applied, 8*(2), 85-98.

Martens, R., Bastiaens, T., & Kirschner, P. A. (2007). New learning design in distance education: the impact on student perception and motivation. *Distance Education, 28*(1), 81-93. doi:10.1080/01587910701305327

Mash, B., Marais, D., Van Der Walt, S., Van Deventer, I., Steyn, M., & Labadarios, D. (2006). Assessment of the quality of interaction in distance learning programmes utilizing the Internet or interactive television: Perceptions of students and lecturers. *Medical Teacher, 28*(1), e1-e9. doi:10.1080/01421590600568439

McLoughlin, C. (2002). Learner support in distance and networked learning environments: Ten dimensions for successful design. *Distance Education, 23*(2), 149-162. doi:10.1080/0158791022000009178

Moore, M. G. (2005). Editorial: Blended learning. *American Journal of Distance Education, 19*(3), 129-132. doi:10.1207/s15389286ajde1903_1

Morris, L. V., Wu, S., & Finnegan, C. L. (2005). Predicting retention in online general education courses. *American Journal of Distance Education, 19*(1), 23-36.

Moskal, P., Dziuban, C., Upchurch, R., Hartman, J., & Truman, B. (2006). Assessing online learning: What one university learned about student success, persistence, and satisfaction. *Peer Review, 8*(4), 26-29.

Mupinga, D. M. (2005). Distance education in high schools. *Clearing House, 78*(3), 105-108.

National Center for Education Statistics. (n.d.). *Distance education courses for public elementary and secondary school students: 2002-2003: Table 6*. Retrieved February 21, 2007, from National Center for Education Statistics Web Site: http://nces.ed.gov/surveys/frss/inc/displaytables_inc.asp

Norton, P., & Hathaway, D. (2008). Exploring two teacher education online learning designs: A classroom of one or many? *Journal of Research on Technology in Education, 40*(4), 475-495. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=32589314&site=ehost-live

Orellana, A. (2006). Class size and interaction in online courses. *Quarterly Review of Distance Education, 7*(3), 229-248. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=22941927&site=ehost-live&scope=site

Orellana, A. (2006). Class size and interaction in online courses. *Quarterly Review of Distance Education, 7*(3), 229-248.

Ouzts, K. (2006). Sense of community in online courses. *The Quarterly Review of Distance Education, 7*(3), 285-296. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=22941930&site=ehost-live

Pape, L. (2005). High school on the web. *American School Board Journal, 192*(7), 12-16.

Pascopella, A. (2003). Distance learning grows up. *District Administration, 39*(9), 36-40.

Peng, H., Tsai, C., & Wu, Y. (2006). University students' self-efficacy and their attitudes toward the Internet: the role of students' perceptions on the Internet. *Educational Studies, 32*(1), 73-86. doi:10.1080/03055690500416025

Phillips, M. R., & Peters, M. J. (1999). Targeting rural students with distance learning courses: A comparative study of determinants. *Journal of Education for Business, 74*(6), 351-356.

Podoll, S., & Randle, D. (2005). Building a virtual high school...click by click. *T H E Journal, 33*(2), 14-19.

Purnell, J. (2005). E-learning & virtual schools: Giving teachers and students an edge. *Media & Methods, 42*(1), 28-29.

Ravert, R. D., & Evans, M. A. (2007). College student preferences for absolute knowledge and perspective in instruction: Implications for traditional and online learning environments. *The Quarterly Review of Distance Education, 8*(4), 321-328. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=31737334&site=ehost-live

Richardson, J. T. E., Long, G. L., & Woodley, A. (2003). Academic engagement and perceptions of quality in distance education. *Open Learning, 18*(3), 223-244. doi:10.1080/0268051032000131008

Richardson, W. (2005). New Jersey high school learns the ABCs of blogging. *T H E Journal, 32*(11), 40. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =aph&AN=17402661&site=ehost-live&scope=site

Robinson, R. P., & Doverspike, D. (2006). Factors predicting the choice of an online versus a traditional course. *Teaching of Psychology, 33*(1), 64-68.

Roblyer, M. D. (1999). Is choice important in distance learning? A study of student motivesfor taking Internet-based coursesat the high school and community college levels. *Journal of Research on Computing in Education, 32*(1), 157-171. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =aph&AN=2780724&site=ehost-live

Roblyer, M. D., & Wiencke, W. R. (2003). Design and use of a rubric to assess and encourage interactive qualities in distance courses. *American Journal of Distance Education, 17*(2), 77-98.

Robyler, M. D. (2006). Online high-school programs that work. *Education Digest, 72*(3), 55-63.

Robyler, M. D., & Marshall, J. C. (2002). Predicting success of virtual high school students: Preliminary results from an educational success prediction instrument. *Journal of Research on Technology in Education, 35*(2), 241-255.

Schwartzman, R. (2007). Electronifying oral communication: Refining the conceptual

framework for online instruction. *College Student Journal, 41*(1), 37-49.

Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=24628934&site=ehost-live&scope=site

Smith, D. E., & Mitry, D. J. (2008). Investigation of higher education: the real costs and

quality of online programs. *Journal of Education for Business, 83*(3), 147-152.

Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=31185889&site=ehost-live&scope=site

Smith, P. J. (2005). Learning preferences and readiness for online learning. *Educational

Psychology, 25*(1), 3-12.

Smith, P. J., Murphy, K. L., & Mahoney, S. E. (2003). Towards identifying factors

underlying readiness for online learning: An exploratory study. *Distance

Education, 24*(1), 57-67. Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=aph&AN=10182235&site=ehost-live

Sole, C. R., & Hopkins, J. (2007). Contrasting two approaches to distance language

learning. *Distance Education, 28*(3), 351-370. doi:10.1080/01587910701611369

Starkman, N. (2007). Going the distance. *T H E Journal, 34*(2), 18-24. Retrieved from

http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

=a9h&AN=24417363&site=ehost-live

Sugar, W., Martindale, T., & Crawley, F. (2007). One professor's face-to-face teaching strategies while becoming an online instructor. *Quarterly Review of Distance Education, 8*(4), 365-385. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =a9h&AN=31737338&site=ehost-live&scope=site

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson.

Thompson, E. W., & Savenye, W. C. (2007). Adult learner participation in an online degree program: A program-level study of voluntary computer-mediated communication. *Distance Education, 28*(3), 299-312. doi:10.1080/01587910701611336

Thompson, L., & Heng-Yu, K. (2005). Chinese graduate students' experiences and attitudes towards online learning. *Educational Media International, 421,* 33-47.

Trochim, W. M. (2006). *The research methods knowledge base* (2nd ed.). Available from http://www.socialresearchmethods.net/kb

Tung, F., & Chang, S. (2007). Exploring adolescents' intentions regarding the online learning courses in Taiwan. *CyberPsychology & Behavior, 10*(5), 729-730. doi:10.1089/cpb.2007.9960

Tunison, S. D., & Sackney, L. (2004). On-line secondary school conditions and practices. *International Studies in Educational Administration, 32*(1), 32-49. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db =aph&AN=15109226&site=ehost-live&scope=site

Turman, P. D., & Schrodt, P. (2005). The influence of instructional technology use on

   students' affect: Do course designs and biological sex make a difference?

   Communication Studies, 56(2), 109-129. doi:10.1080/00089570500078726

Vrasidas, C., Zembylas, M., & Chamberlain, R. (2003). Complexities in the evaluation of

   distance education and virtual schooling. *Educational Media International, 40*(3),

   201-218.

Wadsworth, L. M., Husman, J., Duggan, M. A., & Pennington, M. N. (2007). Online

   mathematics achievement: Effects of learning strategy and self-efficacy. *Journal

   of Developmental Education, 30*(3), 6-14. Retrieved from

   http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

   =a9h&AN=25122569&site=ehost-live

Walker, C. E., & Kelly, E. (2007). Online instruction: Student satisfaction, kudos, and pet

   peeves. *The Quarterly Review of Distance Education, 8*(4), 309-319. Retrieved

   from

   http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db

   =a9h&AN=31737333&site=ehost-live

Wang, Q., & Woo, H. L. (2007). Comparing asynchronous online discussions and face-

   to-face discussions in a classroom setting. *British Journal of Educational

   Technology, 38*(2), 272-286. doi:10.1111/j.1467-8535.2006.00621.x

Waschull, S. B. (2001). The online delivery of psychology courses: attrition, performance, and evaluation. *Teaching of Psychology, 28*(2), 143-147. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=aph&AN=4758405&site=ehost-live&scope=site

Weller, M. (2000). Implementing a CMC tutor group for an existing distance education course. *Journal of Computer Assisted Learning, 16*(3), 178-183. doi:10.1046/j.1365-2729.2000.00129.x

Wen, M. L., & Tsai, C. (2006). University students' perceptions of and attitudes toward (online) peer assessment. *Higher Education, 51*(1), 27-44. doi:10.1007/s10734-004-6375-8

Westbrook, V. (2006). The virtual learning future. *Teaching in Higher Education, 11*(4), 471-482. doi:10.1080/13562510600874276

Wickersham, L. E., & McGee, P. (2008). Perceptions of satisfaction and deeper learning in an online course. *Quarterly Review of Distance Education, 9*(1), 73-83. Retrieved from http://search.ebscohost.com.ezproxy.liberty.edu:2048/login.aspx?direct=true&db=a9h&AN=32203573&site=ehost-live&scope=site

Appendix A: Final Version of the Survey Instrument

The five course structures being examined are:

1. 100% synchronous, fully online

2. 100% asynchronous, fully online

3. Mixed synchronous and asynchronous, fully online

4. Hybrid, with an on-site instructor

5. Hybrid, with an on-site facilitator

Each of the following questions has a key to indicate the expected result for each type of course structure. For a point of comparison, a 6th course structure, face-to-face, is also included.

Under each question or statement, the listed numbers correspond to the above course structures (with 6 = face to face).

This survey uses the following definitions for these terms:

Real-time: Anything that happens instantaneously.

A real-time conversation can occur when people are talking face to face, on the phone or online, but the key idea is that the conversation is being heard or read at the time it is occurring.

Asynchronous: Anything that happens with significant time delays. Communication through e-mail and blogs are examples of asynchronous discussions.

1) How often do I want to communicate with my instructor asynchronously (for example, using e-mail or blogs)?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
	2	3, 4	1, 5, 6

2) How often do I want to interact in real-time with my instructor during a course?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4		2, 5

3) How often do I want to interact in real-time with my classmates during class time?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4, 5		2

4) I prefer to learn new material by studying on my own.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
2	3, 4, 5		1	6

5) Interacting with my teacher in real time is important to me.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4			2, 5

6) I prefer flexibility in the time of day when I work on class work.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
2	3, 4, 5		1	6

7) How frequently do I want deadlines to help me stay motivated to complete assigned work?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4, 5		2

8) How often do I want a class to meet (whether in person or online), assuming a class length between 45 minutes and 90 minutes?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4, 5		2

9) I prefer to submit my work via the Internet than in person.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3				4, 5, 6

10) I prefer interacting with classmates in an online or digital environment.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

11) I prefer learning new material by having someone explain it to me in real time.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4		5	2

12) I prefer learning new material by discussing it with others in real time.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4, 5			2

13) How often do I want to interact in real-time with other students at school outside of class time but still part of the school day?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
6	3, 4, 5		1, 2

14) How often do I want to interact in real-time with other teachers and staff at the school other than my instructor(s)?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
6	4, 5		1, 2, 3

15) I am more likely to do my work for a class if I interact in person with a teacher or adult aide.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
6	4, 5			1, 2, 3

16) I would prefer to attend class online than in person.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

17) I prefer to have a direct conversation (either in person or online) with a teacher if I have a question about a topic.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4		2	5

18) I am motivated to learn when I use technology.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

19) I prefer in-person social settings to online social settings.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
6	4, 5			1, 2, 3

20) I prefer choosing my own environment (location, background music, lighting, etc.) when learning material for class.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

21) What is your grade level in high school?

Freshman	Sophomore	Junior	Senior

Appendix B: Original Version of the Survey Instrument

The five course structures being examined are:

1. 100% synchronous, fully online

2. 100% asynchronous, fully online

3. Mixed synchronous and asynchronous, fully online

4. Hybrid, with an on-site instructor

5. Hybrid, with an on-site facilitator

Each of the following questions has a key to indicate the expected result for each type of course structure. For a point of comparison, a 6th course structure, face-to-face, is also included.

Under each question or statement, the listed numbers correspond to the above course structures (with 6 = face to face).

This survey uses the following definitions for these terms:

Real-time: Anything that happens instantaneously.

A real-time conversation can occur when people are talking face to face, on the phone or online, but the key idea is that the conversation is being heard or read at the time it is occurring.

Asynchronous: Anything that happens with significant time delays. Communication through e-mail and blogs are examples of asynchronous discussions.

1) How often do you want to interact in real-time with your instructor during a course?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4		2, 5

2) How often do you want to interact in real-time with your classmates during class time?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4, 5		2

3) How often do you want to interact in real-time with other students at school outside of class time but still part of the school day?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
6	3, 4, 5		1, 2

4) How often do you want to interact in real-time with other teachers and staff at the school other than your instructor(s)?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	4, 5		2, 3

5) How often do you want to communicate with your instructor asynchronously?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
	2	3, 4	1, 5, 6

6) In order to stay motivated to complete assigned work and study new material, how often do you need deadlines to turn work in or take a test?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4, 5	2	

7) How often do you want a class to meet (whether in person or online), assuming a class length between 45 minutes and 90 minutes?

Regularly (2 or more times per week)	Occasionally (2 to 4 times per month)	Infrequently (2 to 4 times per course)	Rarely (Once or never per course)
1, 6	3, 4, 5		2

For the following questions, please rate your preferences.

8) I prefer learning new material by having someone explain it to me in real time.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4		5	2

9) I prefer learning new material by discussing it with others in real time.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4, 5			2

10) I prefer to learn new material by studying on my own.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
2	3, 4, 5		1	6

11) I am more likely to do my work for a class if I interact in person with a teacher or adult aide.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
6	4, 5			1, 2, 3

12) Interacting with my teacher in real time is important to me.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4			2, 5

13) I prefer flexibility in the time of day when I work on class work.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
2	3, 4, 5		1	6

14) I prefer to submit my work via the Internet than in person.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3				4, 5, 6

15) I prefer interacting with classmates in an online or digital environment.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

16) I would prefer to attend class online than in person.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

17) I am motivated to learn when I use innovative new technology.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

18) I prefer to have a direct conversation (either in person or online) with a teacher if I have a question about a topic.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 6	3, 4		6	5

19) I prefer in-person social dynamics to online social dynamics.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
6	4, 5			1, 2, 3

20) I prefer creating my own environment when learning material for class.

Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1, 2, 3	4, 5			6

Appendix C: Sample Correspondence with the Panel of Experts

Good to go Jonathan! This has come a long ways. I really like the result. Thanks for the opportunity to be a part of your work. It has been fun.

Harvey

-----Original Message-----
From: Burton, Jonathan
Sent: Sun 3/16/2008 4:56 PM
To: Burton, Jonathan; Klamm, Harvey L; Pearson, Constance
Cc: dreric@ix.netcom.com; Holland, Clarence "Chick"
Subject: RE: Draft Survey

Howdy,

Thank you so much. I have heard back from all of you, and you have given me the green light to move forward. Harvey had a comment about question 7, and I tweaked it a little bit more in response. I also realized that I had mixed 1st and 2nd person in my questions, so I have switched them all to a 1st person form. Since I made a few changes since the last feedback, could you all please send me one final e-mail approving of the survey? I will then send it on for final IRB approval and then onto my pilot groups. I do sincerely appreciate your help in this.

Sincerely,
Jonathan Burton

From: Burton, Jonathan
Sent: Sat 3/15/2008 10:45 PM
To: Burton, Jonathan; Klamm, Harvey L; Pearson, Constance
Cc: dreric@ix.netcom.com
Subject: RE: Draft Survey

Howdy Folks,

Question 7 still needed some work (see Harvey's comments below), so I have attached an updated survey with adjustments to that question. Harvey, I elected to just focus the question on motivation to complete assigned work. I already have a question focusing on studying (#4), and the info I am seekng with this question is related to motivation to turn in assignments. I appreciate your comments. You are right - the question was still hitting on two topics.

I again would appreciate a response as soon as is possible, so that I can move this survey onto the student groups. Thank you again for all your help!

Sincerely,

Jonathan Burton

John:

I hate to say it, but this one could still be considered double barreled. The issue is that motivation can be potentially split in the mind of the reader when it comes to these two applications. I can be motivated to study but studying does not help me get my work in on time. I might be motivated about timeliness and turn in work without studying. How would these kids answer this question?   Would it be wrong to split this into two questions?

Harvey

From: Burton, Jonathan
Sent: Fri 3/14/2008 1:47 PM
To: Burton, Jonathan; Klamm, Harvey L; Pearson, Constance
Cc: dreric@ix.netcom.com
Subject: RE: Draft Survey

Howdy,

I have heard back from one of you, so I have attached a revised version of this survey
(the changes were to question 7). If you could please take some time and review this and
get back to me, I would greatly appreciate it. I really need to move this forward to my
pilot groups as soon as possible, and I cannot do that until I hear back from you. I
understand and am sympathetic to the busyness each of you faces, as I have a similar
schedule. Thank you in advance!

Sincerely,
Jonathan Burton

From: Burton, Jonathan
Sent: Sun 3/9/2008 12:46 AM
To: Burton, Jonathan; Klamm, Harvey L; Pearson, Constance
Cc: dreric@ix.netcom.com
Subject: Draft Survey

Howdy,

I have attached a revised survey based on the inputs I have received so far. I am fortunate
to have received provisional IRB approval, but final approval will not be granted until I
submit to them the final version of the survey after your inputs. I know you are all
incredibly busy, but I am willing to shamefully beg and plead for as fast a response as is
possible. After I move beyond this step, I still have two pilot groups of students I have to
administer the survey to, and I cannot begin those studies until I have the final IRB
approval. I need to realistically wrap those up by the end of April, so time is running
short. I again appreciate your willingness to help with this project. If for some reason you
do not think you will have time to review this updated survey, please let me know.

Thank you very much!

Sincerely,
Jonathan Burton

Appendix D: Correspondence with Wendy Scott, Head Data Analyst for Florida Virtual

School

(Received November 6, 2008 11:41 AM)
Hi there! It's good to hear from you!

Please allow me to clarify a few things in your dissertation quote (see **bold** text for additions and strikethroughs for deletions). I'm sorry to hear that your response rate wasn't better! If there's anything else I can do to help, please let me know.

Regards,
Wendy

Quote from dissertation:
The Head of Data Analysis for the school indicated that **in recent history, the school had surveyed students too frequently which resulted in a poor survey response rate. At the time of this study,** typically surveys with their students generated only a 6 – 8% response rate (this study had a 6.3% response rate). Due to this, the school had **significantly reduced the number of** ~~largely ended conducting any~~ external surveys with its students. However, after reviewing the instrument for this study, the school decided the topic was directly relevant to its ongoing programs. Further, the statistical advisory panel for the school had reviewed this survey extensively and was satisfied with its face validity, so the panel agreed to allow the survey to be administered (W. Scott, personal communication, June 19, 2008).

From: Jonathan Burton [mailto:jburton@vcs.net]
Sent: Wednesday, November 5, 2008 8:01 PM
To: WScott@flvs.net
Subject: Re: Survey Info

Howdy Wendy,

I don't know if you remember our conversations from this past spring, so I have attached a sample thread of our conversations. My survey analysis is almost complete, and I am trying to wrap up my dissertation. I unfortunately had a low response rate from the FLVS sample, but I was able to generate a sufficient response rate from other administrations to move forward. I will send you a copy of the report once I have it completed.

I am including in my dissertation some information we had discussed over the phone, but I would like to be able to include a written reference to the information. I have copied the information from the conversation in the paragraph below, and I was hoping you could confirm that this information is accurate. I will include your e-mail confirmation as an appendix in my dissertation, so if you could please respond to this e-mail and leave the thread as part of the discussion, I would appreciate it! Thanks!

Quote from dissertation:
The Head of Data Analysis for the school indicated that typically surveys with their students generated only a 6 – 8% response rate (this study had a 6.3% response rate). Due to this, the school had largely ended conducting any external surveys with its students. However, after reviewing the instrument for this study, the school decided the topic was directly relevant to its ongoing programs. Further, the statistical advisory panel for the school had reviewed this survey extensively and was satisfied with its face validity, so the panel agreed to allow the survey to be administered (W. Scott, personal communication, June 19, 2008).

Sincerely,
Jonathan Burton
Principal of Academics
Valley Christian High School