ONLINE LEARNING IN ACCOUNTING EDUCATION: A STUDY OF

COMPENSATORY ADAPTATION

A Dissertation by

VANESSA GARZA

Submitted to Texas A&M International University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY IN INTERNATIONAL BUSINESS ADMINISTRATION

May 2011

Concentration: Management Information Systems

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ABSTRACT

Online Learning In Accounting Education: A Study of Compensatory (May 2011)

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The face of education changed dramatically with the creation of the Internet and the increasing availability of technology. Today thousands of courses are taught online and entire institutions are dedicated to providing online education. A number of communication theories like social presence, task-technology fit, adaptive structuration, channel expansion and media richness can be related to online education and have attempted to explain differences between face-to-face and computer mediated communication. Contradictory results have given rise to the no-significant difference perspective, which holds that online and face-to-face courses have the same results, and the significant difference perspective, which says students taking a course online will have different performance and perceptions regarding a course when compared to students taking a course face-to-face. This study was motivated by the contradictory outcomes found in online education research and the dearth of empirical evidence in the field of accounting regarding this topic. This study uses the Media Naturalness Theory and the compensatory adaptation model which have their bases on evolutionary theory to test the idea that students in online courses experience increased cognitive effort, increased communication ambiguity and decreased excitement. This study consisted of 149 accounting students in the United States and Mexico. Because student perceptions regarding online education are largely determined by evolutionary forces the results in the two countries studied were expected to be the same. Through a Partial Least

Squares regression analysis, support was found in the United States for both the Media Naturalness Theory and the compensatory adaptation view. The Mexican sample differed in the results, most likely because of the short semesters in the Mexican courses. This study also found that cognitive effort and excitement have an effect on student performance at the middle and end of the semester.

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I. INTRODUCTION

"Not only will many traditional business schools not survive, but the role of the... professor will be fundamentally different from what it is today...Schools and professors...will face a competitive market in which all the rules of the game have changed (Moore, 1997, p.77)."

While this statement may now appear as a slight overstatement, it reminds us of the impact that the advent of online education had on society. The face of education changed forever with the creation of the Internet and the increasing availability of technology. Not only are thousands of courses taught online but entire institutions are dedicated to exclusively providing online education. Technological advances have created a society which can remain interconnected regardless of geographic location. The amount of research that has focused on technology and technology mediated communication shows the interest that technology has sparked.

There are a number of theories which can be related to the issue of online education and which have attempted to explain differences between face-to-face and computer mediated communication. Student perceptions and performance in online education have been analyzed by numerous studies. Some believe that online courses offer convenience, flexibility and cost effectiveness. Students are able to take courses even when they live in distant locations (Canessa & Riolo, 2006; Tanner et al., 2009). Proponents of online education believe that online courses are convenient for those who are not able to attend traditional courses and that the quality of the learning outcomes is not affected by the delivery mode. A student taking a course online will have the same outcome as a student taking the same course face-to-face. This perspective has existed for decades, since the first types of distance education came into existence (e.g. correspondence courses). This view has been called the no-significant difference perspective (Russell, 1999). On the other hand, there are others who believe that online courses can have a negative effect on the perceptions and the performance of students when using media that lacks the characteristics of face-to-face communication. This alternative perspective has been called the significant difference perspective and means that a student taking a course online will have different performance and perceptions regarding the course than those taking the course face-to-face.

The existing research does not provide convincing results for either one of these views. Findings in the area of online education remain contradictory. Some have found that there is no significant difference between traditional courses and online or technology mediated courses (Friday et al., 2006; Huh et al., 2010;Mehlenbacher et al., 2000; Russel, 1999). Yet others have found that student perceptions are different in online courses when compared to face-to-face courses (Kock et al., 2007; Shepherd & Martz, Jr., 2006; Terry, 2002).

A number of communication theories have been applied to the area of online education in order to explain the ideas expressed by the significant difference and nosignificant difference perspectives (Kock et al., 2007). Theories such as the social presence, task-technology fit, adaptive structuration, channel expansion and media richness have been used in an attempt to explain the differences between the significant and no-significant difference perspectives. These theories have been used to explain why individuals tend to choose different media for communication and why some media appear to be more effective than others. However these theories have yet to provide a full explanation of technology use. Many of the existing theories hypothesize that different media are used at different times, however they have failed to explain why humans prefer certain media. These theories have focused only on the characteristics of the technology and have failed to recognize that the communicators possess characteristics that may explain the use of electronic media.

While there are numerous studies of online education in different fields, in the field of accounting there appears to be little empirical research studying the effects of online accounting education. The results from other fields of business do not necessarily apply to the field of accounting. Accounting courses possess specific qualities that other business courses do not. They are considered to be model-oriented and abstract, as opposed to other business courses (Bollen et al., 2002). Because of these differences there is a need for further empirical research in order to understand the effects of online education in accounting (Bryant et al., 2005). The increasing number of accounting online courses, the contradictory evidence in the area of online education and the lack of empirical evidence in the field of accounting for this study.

This study attempts to clarify the contradictory outcomes that have been found by online education research and to shed light on the effects of online accounting education on student perceptions by testing the Media Naturalness Theory and the compensatory adaptation model (Kock, 2001). The Media Naturalness Theory explains why humans seem to have a preference for face-to-face communication by focusing on Darwinian evolution. The theory states that the missing element in the existing communication theories is the concept of evolution. According to evolution there are underlying mechanisms found in humans which have been developed over millions of years of evolution. These mechanisms are the reason why we make facial gestures, and constantly change the tone of our voice when we communicate. Humans have perfected and have even developed muscles and brain functions that allow the use of body language, expressions and sounds for communication. Throughout the process of evolution face-to-face communication was the only method of communication we used. It should not be a surprise that humans have an innate preference for communicating face-to-face. According to this theory, when communicating through nonnatural media individuals will experience an increase in perceived cognitive effort, an increase in perceived communication ambiguity and a decrease in physiological arousal or excitement.

Having an innate preference for face-to-face communication does not mean that we are not able to deal with different media. The compensatory adaptation model (Kock, 1998) used in this study, holds that while humans may struggle when using non-natural media we have the ability to compensate and show an improvement. This means that while a student in an online course may struggle due to use of non-natural media, eventually the student will be able to compensate and adapt to the media. In the end, students in an online course and students in a face-to-face course should perceive the same levels of cognitive effort, communication ambiguity and excitement. This study was conducted and the United States and Mexico. Results in both of these countries were expected to be the same because the characteristics that allow us to adapt to non-natural media are evolutionary and do not pertain to cultural differences.

This study involved a total of 149 students (298 survey responses) from four different universities in two countries (United States and Mexico). In the United States students from three different state universities were surveyed. In Mexico, students from a midsized state university in the north of Mexico were surveyed. Because the compensatory adaptation model implies that students are able to change throughout a course a longitudinal study was conducted. The same instrument was used to collect data at the middle and the end of each course. Students attended either an online or a face-to-face accounting course, and both received the same survey instrument. The data was analyzed using Partial Least Squares a type of Structural Equation Modeling, using WarpPLS software. The results for the United States show support for the media naturalness theory and the compensatory adaptation model. However, the Mexico sample had different results, most likely due to the short semesters in the surveyed Mexican courses.

This study has important implications for the area of online education. First, it shows that many contradictory results in the area of online education may be due to the timing of the study. If students in online courses are not allowed enough time to compensate, their perceptions at the end of the course may be different to those of a student in a face-to-face course. These results imply that the length of a course may influence the results of online courses. Using the Media Naturalness Theory and the compensatory adaptation model this study attempts to clarify the contradictory significant and no-significant difference perspectives in online education and to shed light on the particular effects of online accounting education.

II. RESEARCH BACKGROUND AND HYPOTHESES

Communication & Technology

CSCW

In the area of Electronic Collaboration (E-collaboration) there are different research streams. One of these streams is computer-supported cooperative work (CSCW) which can be described as any collaborative activity that can be supported by a computer. The field of CSCW gained popularity through the years, due to advances in technology. Kies et al. (1998) describe a number of factors that must be discussed when designing CSCW. The first factor is communication. In order to have collaboration there is a need for communication. This communication can occur through video, audio or text communications or perhaps a combination of them. Second, there are a number of "socio-technical" factors that are important in the study of CSCW (e.g. synchronicity, usability). Finally, particular tasks have different characteristics (e.g. decision making and problem solving). All of these factors are an important deciding factor in the success of CSCW design (See Figure 2.1).

The research that has been conducted throughout the years has reached a consensus regarding some of the assumptions of the field. Mainly, it is assumed that "human activity is highly flexible, nuanced, and contextualized and that computational entities" must have the same qualities (Ackerman, 2000, p. 179). However, because of the complications of human activity it is nearly impossible to create systems that perfectly imitate these complications. In an effort to imitate real life, a number of systems with computer-mediated communication elements have been created. These elements may allow for communication; however they do not provide full support for society's intricacies (Ackerman, 2000).



Figure 2.1: Factors Influencing Successful CSCW Design (Kies et al., 1998, p. 777).

CMC

Computer mediated communication (CMC) is a research stream closely related to CSCW which has traditionally been described as any type of communication that can occur through the use of a computer technology (Monberg, 2005). While these two fields are very closely related and sometimes it may be difficult to distinguish between them, they can be differentiated: CSCW takes place when technology is used for any type of work while CMC takes place when computers are used for the interaction between humans. In an effort to study and increase the usefulness of CMC researchers have studied a number of different elements in the field. The literature in CMC tends to study theories that focus on the social (e.g. social influence theory) and technical (e.g. media richness theory) aspects of communication (Greenberg et al., 2008-2009). Researchers have also given attention to the study of satisfaction (Lawlor, 2006; Lee & Pitts, 2009; Lowry et al., 2009; Moisey et al., 2008; Pissarra & Jesuino, 2005; Simon, 2006), performance (Canessa & Riolo, 2006; Mennecke et al., 2000; Olaniran, 1994; Simon, 2006; Suh, 1999; Taylor, 2006) and media choice (Carlson & Davis, 1998; Markus, 1994; Webster, 1998) in relation to different CMC technologies. The studies that have been conducted have been both quantitative and qualitative, however because of the inherent simplicity of statistical analysis it is difficult to capture the complexities of CMC (Canessa & Riolo, 2006).

The availability of CMC means that individuals are able to communicate regardless of geographic location. Students are able to take courses even when they live in distant locations and employees are able to communicate with groups located around the world. However, even though individuals have the option to communicate with different people in dispersed locations it does not mean that they will do so. Often, individuals choose to communicate with the same people with whom they communicate face-to-face. This means that CMC can be placed in two different categories. CMC can have a "local use" which results in communication with the same individuals over a period of time and it can have a "broad use" which results in communication with varying individuals (Canessa & Riolo, 2006). Because of the studies that have been conducted throughout the years, a number of basic differences between face-to-face communication and CMC have been agreed upon by authors (Bordia, 1997).

- 1. Groups engaging in CMC will take longer to complete a task. This is simply due to the fact that it takes longer to type ideas than to speak them.
- 2. When time is limited, groups involved in CMC will produce fewer statements or proposals; however if CMC groups are allowed an unlimited amount of time the results are similar to those of face-to-face groups.
- 3. When involved in idea-generation, CMC groups perform better and produce more original ideas.
- 4. CMC groups have greater participation equality because employees are not as worried about social factors. This means that different levels of employees feel more comfortable contributing when the contributions are not face-to-face.
- 5. When there is a time constraint and a task involving little social or emotional interaction CMC groups perform better.
- 6. In CMC groups, social pressure is diminished. In face-to-face groups individuals feel the need to conform to other people's opinions; this effect is decreased when using computers to communicate.
- 7. Those involved in CMC groups do not possess as good an understanding of the other group members or of the final decision made by the group.
- 8. When there are time constraints, individuals participating in CMC tend to give less favorable evaluations of their group.

- 9. Uninhibited behavior is more common when using technology to communicate due to decreased concern of what people might think.
- 10. CMC groups do not seem to be as influenced by others; therefore, they demonstrate fewer changes of opinion (they are not influenced by others to change views).

These differences between CMC and face-to-face communication have been at the heart of many studies conducted throughout the years and are the cause for the limitations present in CMC. Research has indicated that in order for individuals to deal with the limitations of CMC they must find ways to compensate. One way to this is to analyze different characteristics found in electronic communication which may function as substitutes of the characteristics of face-to-face communication. For example, studies of the use of emotion in CMC have found that individuals are able to make up for the missing cues by doing other things, like developing the ability to have higher emotional content in their writing. Expression of emotions though CMC may even yield some benefits. Because typing messages takes longer, individuals usually review their thoughts which usually results in a decrease of impulsive statements or decisions (Derks et al., 2008; Walther & D'Addario, 2001). Because of the lack of non-verbal cues, individuals look for cues that are found in electronic messages and use them as substitutes (Mehra 2010).

It has also been found that individuals who have strong relationships with each other before the use of CMC are better able to maintain a relationship through electronic media. Strong relationships yield more flexibility, meaning individuals are better able to adjust to different communication media. Those who have strong ties are also more willing to use a wider array of electronic media to communicate. (Haythornthwaite, 2001). Individuals with strong ties are better able to deal with CMC. This means that the communication which occurs when individuals are closely tied is richer and therefore produces better results. This implies that the communication medium alone does not determine the effectiveness of the communication. The communicator actively produces meaning when communicating electronically and the way the communicator assigns meaning can be very important for the effectiveness of the communication. Richness can therefore arise, not from the media, but from the interaction occurring between media and communicators (Lee, 1994).

CMC tools have a number of characteristics in common. In CMC, messages may be created by several individuals at one time. In addition, one or more individuals can receive each message simultaneously. This means that the communication can have the form of one-to-many or many-to-many. Communicators also have the ability to participate in more than one communication at the same time. Finally, each message can contain several pieces of information at the same time and the messages can essentially be recorded for an unlimited amount of time. This means that communicators are able to refer back to discussions and review topics that were dealt with (Berry, 2006).

The capacity CMC has of facilitating asynchronous communication yields a number of advantages aside from the ability to go back and review saved conversations. Members are more willing to participate when using CMC because they have the ability to read and respond whenever possible. This allows for more effective time management since meetings do not have to be scheduled throughout the day. Each communicator can simply receive and respond to messages at a convenient time (Orlikowski & Barley, 2001). CMC also makes communication between large groups much simpler. This is because, technically, everyone can comment on messages at the same time with the advantage of reading responses one by one, in essence imitating one-to-one communication. Although there are a number of benefits of CMC that make it worth utilizing, there are also problems that may be encountered by users. Users can often have more negative perceptions, they may take longer to relate to the group in an emotional way and they may encounter higher effort in adapting to the new media (Berry, 2006; Chidambaram, 1996; Walther & Burgoon, 1992). Most of the problems and benefits that are encountered in CSCW and CMC can also be found in the field of electronic collaboration which includes both CSCW and CMC, among other fields of study.

E-Collaboration

E-collaboration encompasses both CMC and CSCW and does not only include the use of computers, it also includes the use of other electronic devices such as telephones and teleconferencing equipment which do not necessarily involve the use of a computer. It has also been suggested that E-collaboration could take place in instances in which there is no communication taking place (Kock, 2005b). For example, a student information record may include information from admissions, financial aid, the office of the registrars, etc. This information is most likely entered through a computer. Although the different departments are not directly communicating with each other, they are all contributing (or collaborating) to form a final product, which is the student's record; hence participating in e-collaboration.

Several definitions for e-collaboration can be found in the literature. The definitions can be categorized by level of collaboration taking place (see Table 2.1). At the individual level one can define e-collaboration as the use of electronic technologies by individuals who are working together to reach a common goal (Kock, 2005b; Kock & D'Arcy, 2002). At the group level e-collaboration has been defined as the collaboration between groups and

organizations in order to fulfill organizational goals (Greenberg, 2007; Rutkowski et al, 2002). Finally, at the organizational level, e-collaboration can be defined as the "intra- and inter-organizational electronic based collaboration to function on a continuous base toward common set goals" (Miri-Lavassani et al., 2010, p. 456).

While e-collaboration is not the same as CSCW or CMC, it can be said to be an "umbrella" that covers these topics. There are certain technologies which do not involve communication through the use of computers but still fall under the definition of e-collaboration. Taking into consideration all of these characteristics of e-collaboration, for simplification purposes, this paper will refer from this point on to any use of electronic technology for the fulfillment of a goal as E-collaboration (including CMC and CSCW).

Level of Collaboration	Definition	Authors
Individual	Collaboration among individuals engaged in a common task using electronic technologies.	Kock, Antunes (2007)
Group	Collaboration among virtual teams and virtual groups of organizations, trading partners and consulting firms.	Greenberg (2007) Rutkowski et al. (2002)
Organization	Intra- and inter-organizational electronic collaboration to function on a continuous base toward common goals.	Miri-Lavassani et al. (2010)

Table 2.1: Definitions of E-Collaboration (Miri-Lavassani et al., 2010, p. 456).

There are a number of factors which are considered to have the ability to influence an instance of e-collaboration (Kock, 2005b). One of these factors is the task itself. Because tasks possess different qualities, different tasks will produce different results when completed

through the use of e-collaboration technologies. Another factor that can influence ecollaboration is the technology. Each technology which is available for collaboration possesses different features which will yield different results in a study. The qualities of the individual who is collaborating electronically are also very important. Factors such as the age, gender and quantity of individuals involved can have an effect on e-collaboration. The individual's knowledge or ability to interpret information is also an important element. Finally the environment, both physical and social, that surrounds the user of the technology will also influence the results of the e-collaboration experience (Kock 2005b).

The study of e-collaboration became widespread with the increase of technological advances. Many of the existing studies of e-collaboration use as theoretical platform one, or a combination, of the electronic communication theories that have emerged throughout the years.

Electronic Communication Theories

Researchers have provided a number of explanations in order to offer a better understanding of the factors influencing the use of technology in communication. These theories have been built and developed based on pre-existing theories often having similar characteristics (Zigurs & Khazanchi, 2008).

Social Presence Theory

Social presence (Short et al., 1976) is the level to which a medium allows individuals to seem like they are present even though they are not. It is the degree to which a medium permits one individual to transmit a sort of psychological presence to another individual in a communication. The theory takes into consideration intimacy and immediacy. Intimacy is determined by a number of cues, while immediacy is the medium's ability to transmit

information. Face-to-face communication has the highest social presence since it is able to communicate both verbal and nonverbal cues (Carlson & Davis, 1998). Those media that are able to transmit less verbal and nonverbal cues are placed lower on the media presence scale. Those media that are able to transmit a higher number of verbal and non verbal cues are considered to have higher media presence (King & Xia, 1997). Face-to-face provides the greatest amount of social presence. Communication media that provide audio and video come after face-to-face communication, then those media providing only audio, and finally, media allowing only text communication, which is the lowest in social presence. Each user may experience a different level of social presence even when using the same medium. Media with varying degrees of social presence are chosen according to the task, since different tasks require different amounts of social presence. Those tasks that require higher involvement will require higher social presence, and using media low on social presence may cause problems like inefficient and ineffective communication (Brown et al., 2010). This theory became somewhat problematic as new electronic media were developed and widely used. Studies showed that the predictions made by the social presence theory were not adequate for the newer media. For example, while social presence theory would predict that an individual would not choose e-mail for messages with "high socio-emotional content" these types of messages are constantly being conveyed through e-mail (Carlson & Davis, 1998 p. 338; Keil & Johnson, 2002).

Task-Technology Fit

The task-technology fit theory (Zigurs & Buckland, 1998) posits that outcomes can vary according to the technology being used and the "fit" between a technology and a task. This theory does not place full responsibility for outcomes on technology; it places the focus on the appropriateness of a technology for a task (Dennis et. al., 2001). If there is adequate fit between a task and a technology then performance can increase (see Figure 2.2).



Figure 2.2: Task-Technology Fit Model (Zigurs & Buckland, 1998, p. 325).

There are a number of "fit profiles" that improve performance in groups. These profiles include various levels of tasks: simple tasks, problem tasks, decision tasks, judgment tasks and fuzzy tasks. Simple tasks are those that have one result, only one way to solve the problem, therefore there is no conflict. Problem tasks are those in which there are a number of possible solutions to a problem and individuals must choose the best one. Decision tasks are those that require a solution for several outcomes at one time, this means that the outcomes may conflict with each other. These are considered tasks that "require heavy information processing support" (Zigurs & Buckland, 1998, p. 327). Judgment tasks are those in which conflict and uncertainty are present. There is a need for a solution but there is information uncertainty. Fuzzy tasks are those that are unfocused and difficult to understand. Individuals must take time to understand and give some order to a problem (Cane & McCarthy, 2009). Each of these five tasks is categorized according to the level that the three

dimensions of technology are necessary en each of them (see Table 2.2): support for communication, support for process structuring and support for information processing.

	Communication Support Dimension	Process Structuring Dimension	Information Processing Dimension
Simple Task	High	Low	Low
Problem Tasks	Low	Low	High
Decision Tasks	Low	High	High
Judgment Tasks	High	Low	High
Fuzzy Tasks	High	Medium	High

Table 2.2: Fit profiles of task categories and technology dimensions (Zigurs &Buckland, 1998, p. 326).

Adaptive Structuration Theory

Adaptive Structuration Theory (AST; Poole & DeSanctis, 1990) provides an explanation for what influences a technology. In this theory the technology, social and normative pressures, organizational environments and tasks are reflected through the use of a technology in an organization (Dowling, 2009). AST is derived from Giddens' (1979) structuration theory which holds that "human action...influences and alters institutional arrangements, or structures" (Chin et al., 1997, p. 344). Structuration theory was adapted, some time after its development, to include the use of technology. AST serves as the theoretical midpoint between what can be called an object-centered approach and a social-centered approach of information systems use theories (Bostrom et al., 2009; Gopal et al.,

1992-1993). DeSanctis & Poole (1994) believe there are two schools of thought in the area of information technology regarding the changes it brings about in organizations. One is the decision-making school which holds that technology must "overcome human weaknesses" (p. 122). The focus of this school of thought is mainly on the technology (hence the term object-centered approach). Under this view, when there is positive change in an organization it is due to a technology, and if there is a lack of sought-after change it is also the responsibility of the technology. In these theories what is usually studied are "the effects of technology manipulation on outcomes" (DeSanctis & Poole, 1994, p. 123; Orlikowski & Baroudi, 1991). The other school of thought, the institutional school (or social-centered view), does not see technology as being responsible for changes, positive or negative. Technology is seen as a means to bring about change. Technology alone is not able to yield a certain outcome, people must have an involvement. The focus in this view lies on society. AST is seen as the theory that can intertwine these two schools of thought as it takes into consideration, both the technology and society, as well as the changes that can come about through the interaction of the two.

In AST the individual as well as the technology are important factors. This theory speaks of the process of appropriation which is the level of use and adaptation of a structure (DeSanctis & Poole, 1994). Appropriation represents the structures that are in use and the level to which they are used. Appropriations can be "faithful" as long as they use technology in a way that represents the spirit of the technology (Chin et al., 1997). A structure is defined by the theory as the processes and rules which exist in a group. There are structures available in organizations which are not used (structural potential) and structures which are used (structures in use). Structures are an inherent part of an institution. Therefore these structures

are included in technology. When structures are modified, new structures are created through the use of technology bringing about an "adaptive structuration" which consists of new rules and processes in an organization (DeSanctis & Poole, 1994, p. 142). Structuration represents the use of rules, resources and organizational culture and how they are applied (Chin et al., 1997). In AST the "features of communication media are evolving characteristics rather than constants." Therefore different organizational cultures and other factors can bring about changes in the communication media. (Lancaster et al., 2007, p. 8). This means that "media technology and communication structure continuously transform each other though interaction" (p. 9).

How much a technology influences a group outcome is dependent on a number of factors: the spirit of the technology, the level to which the technology structures are adopted by a group and the structures that may come about as a result (DeSanctis & Poole, 1994). The meaning of the spirit possessed by the technology may be likened to the meaning of the popular phrase: "in the spirit of the law." The spirit of a structure is its reason for being, the original objective of the technology. The theory defines three dimensions along which structures become appropriated: faithfulness, attitudes and consensus. Faithfulness is the level to which a technology is used in agreement with the spirit of the technology. Attitudes are the perceptions individuals have of using a technology. Consensus is the agreement of the group on appropriation of a technology. In order for a technology to work the way it is expected to do so, appropriation of structures must be stable; the word stable having an inherent positive connotation (Gopal et al., 92-93).

Because of problems with finding support for other theories Carlson (1995) developed the Channel Expansion Theory. This theory holds that there are particular experiences which can influence user perception toward a communication medium. Usually experience with that medium is thought of as a factor which leads to the perception of a richer medium (Fulk, 1993). However, when studied, the results are less than conclusive, meaning experience may not always affect perceptions. Channel Expansion Theory holds that while experience using technology may be important it is not the only important factor. The theory proposes that the "nature of this use [as well as] the knowledge bases developed" (p. 154) are the ones that influence perceptions (Carlson, 1995). The theory proposes different types of experience that can influence perception: experience with the channel, the topic, the context and with participants. Having experience in these categories will cause individuals to develop "knowledge bases" which will in turn influence perception toward a medium (Carlson & Zmud, 1999). This means that media have static physical characteristics yet "users' perceptions of a medium depend upon their own characteristics and experiences, which may change over time" (Dennis et al., 2008, p. 578). In addition, if these knowledge bases are developed, individuals will become better communicators. Carlson & Zmud (1999) found support for the theory showing that developing a knowledge base can influence perceptions.

Media Richness Theory

The widely known and studied Media Richness Theory suggests that communication media possess a quality called richness and that the use of electronic media depends on how rich the media is (Daft & Lengel, 1984; 1986; Daft et. al., 1987). The level of richness in a particular medium according to Daft et al. (1987) depends on four factors.

- 1. The ability of individuals to receive feedback.
- 2. The number of cues which are usually related with face-to-face communication, such as tone of voice and body language.
- 3. The different types of language available, like the ability to express concepts using words or using numbers.
- 4. The level to which feelings and emotions of individuals can be conveyed.

Daft & Lengel (1986) originally placed communication media in a "hierarchy of media richness" each medium was placed on the hierarchy based on the level to which these four factors were present in them (see Figure 2.3). This hierarchy was originally created before the age of computer mediated communication; therefore it did not include media such as e-mail or teleconferencing. These were changes or inclusions that were made throughout the years through a myriad of studies. The Media Richness Theory states that the richest possible medium is face-to-face communication and every other type of communication media (such as telephone conversations) are lower on the richness scale and therefore considered a leaner type of media. Face-to-face communication is considered the most effective communication method because it involves the four factors mentioned above (Lee, 1994). Therefore, for communication purposes, leaner media is less effective than richer media (Daft & Lengel, 1986). This means that user behavior or perceptions toward certain collaboration tools may be explained by the level of "richness" of the media as defined by this theory.



Figure 2.3: The Media Richness Hierarchy (Daft & Lengel, 1987, p. 358)

Media Richness Theory also holds that the processing of information in an organization is largely influenced by uncertainty and equivocality. Daft & Lengel (1986) created a framework which explained and combined the concepts of uncertainty and equivocality (see Figure 2.4)

The concept of uncertainty, whose roots lie in psychology, is defined as the lack of information (Garner, 1962). The less available information there is, the higher the uncertainty will be. Equivocality, on the other hand, means that it may not be possible to acquire information because there is confusion regarding the information. In other words, equivocality refers to ambiguous information (Daft & Lengel, 1986). When ambiguity exists individuals are unsure of what questions must be asked and are forced to analyze the situation to find solutions. In order to deal with day-to-day problems individuals must

possess the ability to deal with ambiguity in their environment. Media Richness Theory holds that when selecting communication media, individuals will do so depending on the level of equivocality or ambiguity. Rich media are believed to be appropriate for equivocal situations and lean media appropriate for uncertain situations. Therefore, if rich media are used for equivocal tasks and lean media for non-equivocal tasks, performance is improved (Daft & Lengel 1986; Dennis & Kinney, 1998). Individual media choices were also believed to be influenced by the amount of equivocality and uncertainty present in a task (El-Shinnawy & Markus, 1997).

vocality	High	1. High Equivocality, Low Uncertainty Occasional ambiguous, unclear events, managers define questions, develop common grammar, gather opinions.	2. High Equivocality, High Uncertainty Many ambiguous, unclear events, managers define questions, also seek answers, gather data and exchange opinions.
Equi	Low	3. Low Equivocality, Low Uncertainty Clear, well-defined situation managers need a few answers, gather routine objective data.	4. Low Equivocality, High Uncertainty Many, well-defined problems, managers ask many questions, seek explicit answers, gather new quantitative data.
		Low Und	High

I

Figure 2.4: Uncertainty and Equivocality (Daft and Lengel, 1986, p. 557).

The theory has two main propositions. The first one says that if a knowledgeable and capable manager was presented with a decision, he or she would choose rich media for high equivocality situations and lean media for low equivocality situations. The second proposition is that the use of rich media would lead to improved performance in organizations (Daft et al., 1987).

While the propositions of the Media Richness Theory hold when using traditional media like telephone and letters, they fail to explain why richer media are more effective and they often fail to hold when studying newer media, such as e-mail (Lee, 1994; Kock, 2005; Simon, 2006). A number of studies focus on the media choices of managers and whether these choices agree with the theory's proposition (Daft et al., 1987; El-Shinnawy & Markus, 1992; Trevino et al., 1990). Many of the studies concluded that managers' media choices often contradict the theory. Others have tested whether performance is affected by choosing a richer or leaner media. However, these studies have also been unsuccessful at supporting the theory (Dennis & Kinney 1998; Kinney & Watson 1992, Suh 1999; Valacich et al 1994). Media Richness Theory has been found to have a number of shortcomings. First, the theory does not take into consideration the qualifications of the media user, and focuses only on qualities of the communication media (whether it is rich or lean). The theory does not explain the similar results in knowledge acquisition or the different levels of critical thinking that occur when using different media (Alavi et al., 1995). Finally, it was developed when a large portion of the media being used today was not yet in existence (DeRosa et al., 2004). Because of the theory's shortcomings, Dennis & Kinney (1998) suggested it was "time to move on to new theories that better explain performance effects in the new media rather than attempting to adapt a theory from the old media (p. 270)." A key element missing from the Media Richness theory is the explanation of why we prefer rich media such as face-to-face communication. The element which can provide this explanation is evolution. A more recent theory that attempts to explain some of the things the Media Richness Theory failed to

explain is the Media Naturalness Theory. The Media Naturalness Theory uses the concept of Darwinian evolution in order to explain why people often have problems when using technology to communicate. In order to understand this theory one would first need to understand its basis which are found in the field of evolutionary psychology.

Evolutionary Psychology

Evolutionary psychology came about through an extension of research in evolutionary biology into the field of psychology. This extension is now widely known as evolutionary psychology, a field which has its roots in Darwin's theory of evolution (Darwin 1859, 1998). Although there are different and often disagreeing theories in the field, there appears to be general agreement on a number of premises that lie at the foundation of evolutionary psychology.

- 1. There is a definite need for evolutionary theory in order to understand the inner workings of the human mind.
- 2. Psychological adaptation has come about as a result of the problems that humans have faced over a very long period of time (throughout evolution).
- 3. Humans use these adaptations in order to process information.
- 4. These devices have been instilled in the brains of humans throughout evolution.
- Environmental interactions are important throughout the process of these adaptations (Duntley & Buss, 2008).

Looking at these premises we can see that the field of evolutionary psychology generally agrees that human behavior depends on a number of "underlying psychological mechanisms" and these mechanisms imply the existence of a "human nature" (Buss, 1995, p. 1). It is also believed that the root of these psychological mechanisms lies in the process of evolution. This would imply that all living things are the product of what has occurred during a very long period of evolution (Jones, 1999). By studying the issues that humans faced throughout evolution one can find information about the "complex computational devices the human brain embodies" (Cosmides & Tooby, 2001, p. 328).

The process of natural selection is definitely not a fast one. The changes described by evolutionary theory have taken place throughout millions of years. Natural selection has slowly changed the behavior and lifestyle of humans and many of the psychological and behavioral traits that we possess today can be traced back to ancestral times. For example, although today it would make more sense for individuals to have a fear of automobiles or electrical outlets (which could be potentially life threatening) it is more common for humans to have a fear of snakes and spiders. Although in the present it is uncommon (in many cities) to die of a snake or spider bite we seem to be conditioned by evolution to fear them (Jones, 1999; Seligman, 1971). Another example is the increased spatial-location memory that women have when compared with men. This is believed to be the result of the role women played as gatherers in ancestral times. Men, on the other hand, have superior upper-body strength, a characteristic which would definitely have been useful for their ancient role as hunters (Silverman & Eals, 1992). Our ancestors developed certain behaviors and abilities that allowed them to survive and reproduce; hence, humans possess a number of built in mechanisms which, at some point, were useful for surviving a number of threats, most of which are non-existent today (Buss, 1995).

This means that the world as we know it is relatively new when compared with the millions of years over which the process of evolution has taken place. Most of the adaptive devices now found in humans were developed for a hunting and gathering world that no

longer exists (Cosmides & Tooby, 2001; Jones, 1999, Kock, 2005; Lindahl, 2000). This does not mean that every characteristic possessed by humans depends on some ancestral need to survive. In addition, it does not mean that we possess an out-of-date survival instinct which renders us unable to survive in today's world. It is obvious that humans possess the capability to solve new problems in new ways and have the ability, not only to survive, but to thrive in an environment that is relatively new and different to that in which our ancestors lived (Miele, 2005).

At the heart of evolutionary psychology lies Darwin's theory of evolution (1859). Evolutionary theory holds that all living beings evolved from a common ancestor. This did not happen over night. Evolution occurred over millions of years. While there are many adaptations that one could mention; this study will focus on those elements that are related to communication and which serve as a basis for the theoretical development of the study. Darwin believed that the facial muscles developed by humans were not merely divine intervention (as it was believed in his time), but that they had a very specific use. Humans developed a very complex group of facial muscles most of which serve no other purpose than to communicate emotion. The expression of emotion like happiness or anger has been studied, and proven to be extremely similar in different cultures around the world, which provides support for the idea that we all evolved from one common ancestor. This also means that gestures are not a product of culture or the environment. These facial muscles seem to have been developed primarily for communication purposes since only a few of them are actually used for chewing. This would imply that communication through expressions was an important part of our evolution. In addition, in ancestral times, synchronous communication would have been indispensible since there was no way of participating in
asynchronous communications (cave paintings were not yet in existence during the first portion of our evolution). In addition, some adaptations that were useful for communication even posed a threat to survival. The larynx, for example, was developed along with the necessary brain functions in order to produce variety of sounds; however it also increases the probability of choking on foods or liquids (Kock 2001, 2004). All of these examples provide an idea of how important communication is. For most of our existence we have communicated face-to-face using non verbal cues, facial expressions, and simple sounds that are able to convey emotion. Advanced speech and drawings did not come about until the very late years of our evolution. Figure 2.5 shows the development, throughout evolution, of the modes of communication we know today.



Figure 2.5: The Evolution of Communication (Kock, 2009, p. 407).

As part of evolution we have developed complex facial muscles for nonverbal communication, an advanced and complex larynx for verbal communication, and the ability to communicate through paintings or symbols. All of these adaptations developed throughout millions of years of evolution.

From this information one can derive that humans perfected the use of body language, expressions and sound throughout all those years and therefore one should not be surprised that humans prefer face-to-face communication. We perfected this type of communication throughout evolution and it is what we communicate most comfortably. Knowing that our brains and our bodies were designed for face-to-face communication brings us back to the Media Naturalness Theory which takes the process of evolution and makes it a central part of its propositions (Kock, 2001).

Media Naturalness

While the theories that have been explained in the previous sections have attempted to provide a better understanding of the behavior of individuals towards CMC, none of them have looked at a very important part of the communication process: the communicator. The concept of "human nature" that evolutionary psychologists speak of seems to be missing from most of these theories. The Media Naturalness Theory (Kock 2001) holds that because of the characteristics we have acquired due to evolution, humans are more likely to prefer face-to-face communication. Because of this, whenever we use computer mediated communication we experience an increase in cognitive effort. It is more difficult for us to communicate when we are not communicating face-to-face. The main proposition of the Media Naturalness Theory is that a decrease in the "naturalness" of a communication medium will cause an increase in cognitive effort when the media is used in a collaborative task. Hence, when naturalness is high the cognitive effort required to communicate will be low. The theory has three main propositions: the media naturalness principle, the innate schema similarity principle and the learned schema diversity principle (see Table 2.3 for a summary of these propositions).

The Media Naturalness Principle	Those media which are farther away from
	face-to-face communication will be
	perceived as less natural. The farther away
	the media from face-to-face
	communication the higher the cognitive
	effort of the communicator.
The Innate Schema Similarity Principle	Because our communication schemas are
	built in due to evolution, these schemas
	will be similar in all individuals regardless
	of culture.
The Learned Schema Diversity Principle	While we all have similar schemas we are
	also able to learn and adapt new schemas.
	These learned schemas influence different
	individuals in different ways.

Table 2.3: The Principles of Media Naturalness Theory (Kock, 2001, pp. 12-13).

Media naturalness, the first principle, depends on five elements of face-to-face communication (Kock 2001, 2009):

- 1. The degree to which individuals can be in the same context while seeing and listening to each other.
- 2. The degree of synchronicity.
- 3. The ability to convey facial expressions (emotion).
- 4. The ability to convey non-verbal cues (body language).
- 5. The ability to convey sounds (speech).

Those media that possess these five characteristics will result in higher naturalness. Naturalness, in turn, will result in communicators experiencing lower cognitive effort, lower ambiguity and a lower level of physiological arousal (Kock 2004, 2005). Hence naturalness is considered to have three dependent constructs: cognitive effort, communication ambiguity and physiological arousal. Cognitive effort is the mental effort or activity which can be involved in interactions. The theory holds that a "decrease in media naturalness will generally lead to an increase in cognitive effort" (Kock, 2005, p. 122). Media Naturalness Theory also holds that with the use of less natural media, the level of communication ambiguity will increase. This is due to the probability that individuals may misunderstand information when non-natural media are used. When natural communication elements are suppressed there is a higher probability for incorrect interpretation of cues as well as the probability for the occurrence of gaps in the information received. These pieces of missing information will force students to fill in the gaps, resulting in ambiguity. Finally, the theory states that because humans are created to communicate face-to-face, using CMC will likely reduce the level of physiological arousal experienced in communication (DeRosa et al., 2004; Kock, 2001; Kock, 2009). Physiological arousal is generally seen as an "elevated state of bodily function." Arousal can be derived from different characteristics of a course such as subject, content and information provided (Eysenck, 1976). Due to low naturalness levels, it has been found that computer mediated communication is seen as less exciting or more boring than face-to-face communication (Kesler et al., 1988; Markus, 1994; Walther, 1996).

The theory posits that the most natural media, face-to-face communication, lies at the middle of a scale, as opposed to media richness theory which places face-to-face communication at the top of a continuum, with nothing being higher. Media Naturalness

Theory proposes a one-dimensional scale on which face-to-face communication lies in the middle, with less natural media lying to the left, and extremely rich media to the right of face-to-face (see Figure 2.6).

Figure 2.6: The Media Naturalness Scale (Kock, 2004, p. 340)



This means that there is the possibility of dealing with media that are so rich (e.g. virtual reality) that they over-stimulate the user, causing an increase in cognitive effort. The farther away the media is from the center (on either side of the scale) the higher the cognitive effort of the communicator (DeRosa, 2004; Kock, 2009).

Media Naturalness Theory also proposes the innate schema similarity principle which holds that because we have mechanisms that have been built into our brain through evolution, communicators from different cultures should have the same type of behavior (DeRosa, 2004; Kock, 2001). This means that part of our communication behavior is built-in, or human nature, and while culture may have an effect on some elements of communication, our basic behavior will be the same, regardless of where we grew up. The theory's final proposition is that, while we all have similarities, we also have the ability to learn new behavior. Therefore individuals who learn to use a particular medium may learn to see it as more natural as they become more familiar with it. Meaning that human beings have the ability to adapt to their environment, and while our nature is to struggle with non-face-to-face communication we can adapt (Kock, 2001).

Although the Media Naturalness Theory is relatively recent it has been used as a basis for several studies. DeRosa et al. (2004) suggested Media Naturalness Theory could be the integrating framework for virtual team research. Simon (2006) studied satisfaction and performance using the Media Naturalness Theory as a basis and found support for it. Houser et al. (2007) also tested the theory by looking at the effects of instruction through the use of CD-ROM texts. The authors sought to test the effect of a nontraditional instruction method (CD-ROM) on variables which have been proved to motivate students in traditional face-toface courses. The study results supported the Media Naturalness Theory. Kock et al. (2007) conducted a study of introductory management information systems courses and found support for theory. They found that student perceptions in online were different to those in face-to-face courses at the middle of the semester while at the end of the semester those differences disappeared, showing proof of compensatory adaptation. Greenberg et al. (2008-2009) studied virtual negotiations in a face-to-face environment and compared them to negotiations using computer-mediated communication. They used media naturalness as their basis and found that while using virtual media led to an increase in efficiency of negotiations it also decreased their effectiveness.

The type of communication used in today's CMC does not necessarily imitate the natural or evolutionary conditions to which humans have become adapted. Human behavior

may exhibit a certain level of resistance when using computer mediated communication, therefore exhibiting higher levels of cognitive effort. The use of CMC can increase ambiguity and frustration for those who are not capable of overcoming such resistance and could cause a decrease in the excitement experienced by users when communicating (Bordia, 1997; Kock, 2001; Kock, 2009). One could say that humans possess a "computational device" as defined by Cosmides and Tooby (2001) which is not adapted the level of technology used today because they were developed for a variety of problems encountered throughout evolution, most of which are no longer in existence (Kock, 2005). This statement may imply that we will never be able to comfortably use non-natural communication media. However, as the media naturalness theory states, humans have the ability to learn, adapt, and compensate. While we may initially have trouble communicating through certain media, we are able to adapt and exhibit results similar to those using face-to-face communication (Kock ,1998).

Compensatory Adaptation

Although research has shown that there can be differences in performance in traditional and computer-mediated communication, it has also shown that there is the possibility for change. Hollingshead et al. (1993) studied groups of students conducting different tasks, by meeting face-to-face or through a computer mediated system. While those in the face-to-face section performed better at the beginning of the semester, as time went by the differences between the two groups decreased. In other words, the students in the computer-mediated section compensated for the obstacles found when using non-natural media. This is the idea behind compensatory adaptation. It goes hand in hand with the media naturalness assumption that communication media vary in degree of "naturalness". It also

agrees with Media Naturalness Theory in that communication ambiguity, cognitive effort, and excitement are related to media naturalness. The theory holds that individuals using electronic media to communicate may have the same level of performance as those communicating face-to-face even when they may have negative perceptions of the media (Kock, 2001).

Using a communication medium that our bodies were not designed to use causes individuals to engage in higher cognitive effort. In addition, because of the problems caused by using non-natural media, individuals will also experience increased ambiguity when engaging in CMC. Finally, use of CMC will result in a decrease in the level of excitement an individual will experience. The compensatory adaptation model acknowledges that there are task outcome quality effects; however it states that these effects will experience a decrease over time as users become accustomed to a particular communication medium. This means that there is a possibility that the underlying mechanisms of human behavior which have been discussed in previous sections can become adapted to the use of modern communication tools and that users possess the capacity to overcome obstacles encountered when taking part in electronic communication. It is important to note that the communicator is usually unaware that this compensation is taking place, meaning that compensation is involuntary (Kock, 2007).

A study conducted by Kock (2007) extended the original compensatory adaptation model by separating the compensatory effort into that of the encoder and that of the decoder. The study looked at the difference between compensatory encoding effort and compensatory decoding effort, that is, the individual trying to convey information and the individual trying to understand the information received, respectively. The study shows that the compensatory effort is much higher for the individual providing the information.

There are a number of factors that can influence the performance and adequacy of Factors such as typing speed, experience with using other electronic existing tools. technologies, and having sufficient time to become adapted to a technology can increase the effectiveness of e-collaboration tools and allow them to become as effective as face-to-face communication (Kock, 2007). In addition, when using e-collaboration tools, individuals are able to become more task-oriented, reducing the problems faced when using e-collaboration tools (Bordia, 1997). For example, because typing takes more time and effort than face-toface interaction one might compensate for this by typing only task-oriented statements. This can increase the quality of the contributions and it may help individuals overcome difficulties which exist when using communication technologies. In addition, adapting to electronic tools might require a higher degree of effort, both physical and mental. The increase in effort may be so significant that an individual may be capable of achieving more successful collaborations even when using less natural media (Kock, 2005). Kock & DeLuca (2007) found that members of a business process improvement group showed signs of compensatory adaptation when they began creating messages that were more carefully thought and easier to understand before sharing them with the group. In an effort to save time, individuals began to compose well thought out messages which were capable of conveying more information than a wordy message could convey (Kock, 2008).

Compensatory adaptation also holds that there may be better results when users communicate using lean media. This means that users can make a more significant effort to complete a task and end up overcompensating. Kock (2001) tested this theory and found support for it. Those individuals using a lean media saw an increase in knowledge sharing even though their perceptions of the lean media did not improve. The theory says users will continue seeing electronic communication media as less adequate than face-to-face for communication even though they continue performing just as well as those communicating face-to-face.

The existence of compensatory adaptation means that electronic communication can yield positive results for the communicators. Compensatory adaptation can be used to clarify some of the disagreement regarding online education. Studies focusing on the performance of students in online courses often contradict each other, with a portion of the studies claiming online education produces different results from those of traditional education and the rest claiming the results in both conditions are not significantly different. Compensatory adaptation implies that the time at which subjects are surveyed is important for the results of the study and it explains why results in online education research are often contradictory. Online Education

Long before the creation of the Internet, the predecessors of online education were already allowing for distance education. Distance education began decades ago with correspondence courses which later evolved into radio, television, telephone and video distance courses (Bartley & Golek, 2004). Soon, with enormous advances in technology and the creation of the Internet, online learning was born. Online learning, also known as Elearning, allows for instruction through the Internet. When the first elements of online instruction were first introduced "the establishment and successful operation of virtual universities" was considered something in the realm of science fiction (Sangster & Lymer, 1998). Online education soon moved from science fiction to reality when virtual modules of classes began to be used and people began to speculate regarding the future of traditional education, claiming that thirty years later "the big university campuses [would] be relics [and that] universities [would not] survive" (Sangster & Lymer, 1998, p. 1096 on Dolence & Norris, 1995). While this prediction is somewhat exaggerated, as university campuses are still thriving, there has been a big change in traditional education with more and more students enrolling in online courses.

Online learning can come in the form of independent studies in which the schedule and pace depends mostly on the student. It can also take place as asynchronous interactive learning in which users can communicate with the instructor and other students in a timedisconnected manner. Finally, online learning can be synchronous, the most similar to a faceto-face course, where there is a schedule to follow and the learners must meet at a predetermined time (Cappel & Hayen, 2004). These types of online education can be used in organizational as well as in educational settings. Online education, commonly used for employee training in organizations, has allowed companies to reduce travel costs and has allowed for the possibility to offer almost instant training to employees whenever needed (DeRouin et al., 2005). In an educational setting (the focus of this study) online courses offer students the opportunity to study while in remote locations. It also provides non-traditional students who have full-time jobs and families with an opportunity to take courses during a time that is most convenient to them. Online courses are considered to be cost effective while also allowing for a better use of students' time (Brower, 2003). Students enroll in online courses because they feel they have increased control, they can work at their own pace, at any time of day, without having to attend a course with a predetermined time and place (Featherstone, 2006 in Borstrorff & Lowe, 2007). Online courses also allow students to slow

down at points where they feel the need for additional time to understand the material (Kruse 2006). This way they are not forced to follow the pace of a traditional classroom.

Because of the benefits and opportunities offered by online courses, today 90% of AACSB accredited business schools in the United States offer distance courses, and while there are other technologies like DVDs available for distance education, most of these courses use Internet-based technologies (Zhao et al., 2009). The level of growth in online education led to an increase in research focusing on different factors of online education. However, these studies appear to have produced contradictory results (De Rouin et al., 2005). Two perspectives have arisen from these conflicting results: the significant different perspective and the no-significant difference perspective (Kock et al., 2007).

The Significant and No-Significant Difference Perspectives

Those who espouse the no-significant difference perspective (Russell, 1999) believe there is no difference between the results of online courses and face-to-face courses. This perspective has been in existence for decades. It arose from studies focusing on non-Internetbased technologies used for distance education (e.g. correspondence courses). Studies of distance education before the 1990s appeared to have reached a consensus, as most of them showed there was no difference between the distance education technologies available at that time and traditional courses (Russell, 1999). In the 1990s, shortly after the commercialization of the Internet and the World Wide Web the first online courses began to appear. In the beginning it seemed that the no-significant different perspective was adopted by many who believed that, as previous research had shown, different technologies do not affect the quality of courses. This would also mean that online courses are not able to offer any learning benefits additional to those offered by traditional education (Mehlenbacher et al., 2000). Those who support the significant difference perspective believe there is a difference between the results of an online course and a face-to-face course. This difference is usually for the worse, as those who believe there is a difference, believe that online learning produces lower quality results because of its lack of richness and failure to provide the social context and interactivity found in traditional courses (Brower, 2003).

Surprisingly, studies of online education conducted during the 1990s were different than their predecessors. These studies did not appear to have conclusive results regarding the effects of online learning. Once online education became widespread, more and more researchers began studying the effects of online learning. While it appeared that most studies supported the use of online education, studies looking at different aspects of online education failed to provide the conclusive results which had been found in the past (Arbaugh, 2009). Therefore the significant and no-significant difference perspectives have both continued to be supported by different studies, whose results throughout past decade, have remained contradictory.

Online Education Research

As mentioned before online education is one of the possible forms of distance education. Before reviewing the research conducted in the area of online education, it is important to define what makes up distance education. Keegan (1980, 1996, 2002) provides a synthesis of the types of education which can constitute online education. First of all he points out that using technology outside of the classroom during study or for specific programs does not constitute distance education. Distance education is that in which there is a separation between the instructor and the students. There is also the involvement of an educational entity (such as a university) which facilitates the organization and provision of services. In distance education there is use of technology which allows the student and instructor to communicate. In the case of online education, such communication is mostly web-based. Finally, students learn individually, as opposed to traditional students who are part of a course and are able to interact as a group. Because of the differences between traditional and online education, studies of online education are numerous and vary widely.

There are three main categories of studies that can be found in the literature. There are those studies that focus on the students and their attributes as well as their attitudes and performance depending on the type of course delivery. There are also some studies that focus on the technology used to deliver the course. These studies focus on the type of software or media used in course delivery. Finally, there are those studies that focus on the perceptions of faculty and administrators toward online education. The common thread in all of these categories of studies is the continuous disagreement of the significant and no-significant difference perspectives.

The first group of studies found in the literature focuses on the students. These studies have analyzed a wide array of student-related variables such as satisfaction, performance, perceptions, learning effectiveness, learning styles (Kim & Schniederjans, 2004), culture (Lu et al., 2003) and demographic attributes, among others. In a study of student satisfaction and performance Terry (2002) found that, when comparing face-to-face, online and hybrid environments, the online format was the least effective. The grades, retention and course evaluations were lower than the other two formats. On the other hand, Friday et al. (2006) studied scores in different delivery mediums and found no significant difference. Steiner & Hyman (2010) found no performance differences between an online and face-to-face course yet they found that the addition of an online marketing research course produced an increase

in satisfaction among the students. Borstorff & Lowe (2007) also found differences between online and face-to-face courses. In their study, they found younger students and graduate students had less problems in communicating with the instructor in the online courses. In addition, they found that females perceived less clarity and felt that communication with the instructor was more problematic in online courses. Daymont & Blau (2008) studied performance in online and face-to-face courses. They controlled for class, major and GPA and found online students performed the same in the two sections, but not better. They found no gender differences in the grades of students in the two sections. Schultz & Sieland (2010) also found that female and male students performed the same in online courses and that performance in both conditions was the same. In a comparison of online and face-to-face courses Huh et al. (2010) found that test scores of both groups were similar. They also failed to find differences based on gender, GPA and marital status in the online courses however they found gender did affect performance in the face-to-face course. The study also found that online students tend to be older, commute longer distances and work more. A study looking at differences in perceptions throughout time analyzed two groups of students taking online courses (Perreault et al. 2008). One group took the course in 2001 and the other in 2006. The researchers found that there were some differences between the two groups. The perception of online course quality in 2006 was higher than that in 2001. Those in 2006 also felt that online courses are more time consuming than face-to-face courses.

Some studies have found that students in an online course have a higher quantity of failing students than the face-to-face version (Waschull, 2001). Others have found higher scores in distance courses (Allen et al., 2004). Coppel & Hayen (2004) found that e-learners showed positive levels of satisfaction and perceived effectiveness in a self-paced independent

study with no instructor or student interaction. Yet Shepherd & Martz, Jr. (2006) found that in distance learning there are higher levels of anxiety and frustration as well as lower retention rates. They also found that richness affects satisfaction, communication and valuation of the course. It is possible that part of the reason for the different results is that students may have different qualifications (Steiner & Hyman, 2010). This means that some students may be better at online courses than others. For example, online courses may be better for non-native speakers because they are allowed more time to process information (Stewart, 2004).

A group of studies has analyzed factors that improve the learning effectiveness of courses. There are a number of factors, which have been the focus of several online education studies, that have been shown to increase learning effectiveness. Active learning, cooperation and problem solving are thought to aid in student learning. When students are actively involved in a course they are able to create understanding and work with information and therefore experience increased learning. In addition, when learning is treated as a "social process" individuals are also more likely to learn (Alavi et al., 1995, p. 295). The problem is that these are factors that seem to be based on characteristics of face-to-face courses which may be difficult to replicate in an online environment. In addition, factors such as interaction and group dynamic are also important for learning yet they may also be difficult to obtain in online education (Borstorff & Lowe, 2007; Campbell & Swift, 2005).

Mehlenbacher et al. (2000) created a learning environment that attempted to promote the conditions necessary for increased learning. The study specifically tried to imitate the traditional classroom in an online setting. The authors looked at a number of factors like grades, gender and learning styles. Consistent with the no-significant difference perspective, the authors found no significant difference in the grades of the two courses. However, they found other differences. They found that females performed better in the online condition. They also found that the results differed according to learning styles. In the online section they found that reflective learners performed better than active learners. Prior experience, attributes, knowledge, attitudes, perceptions and learning styles all seemed to have an effect on student performance depending on the condition (online or face-to-face). The authors then concluded that the two conditions did have different results even though the online section attempted to imitate the face-to-face section. These results point to possible differences in the interactivity needs of students in the two conditions. In another study of face-to-face and online collaborative learning environments it was also found that there was no difference in learning, however the online group showed an increased level of critical thinking (Alavi et al., 1995). Others studies have shown that factors like confidence in an instructor, which is important for learning, have been shown to be decreased in online courses as opposed to traditional courses. It has also been found that students in traditional courses have higher levels of enjoyment. This reduced enjoyment in online courses could potentially have a negative effect on student performance (Nemanich et al., 2009).

Some researchers have looked at the effects of online courses outside of the classroom. Terry et al. (2009) analyzed the results of online students in the Educational Testing Service (ETS) exam which is used in undergraduate business programs. Those students who had taken several Internet courses had performance that was 6% lower than those who had not, however this difference was not considered to be statistically significant. Others have found that online students had worse performance and lower grades on standardized achievement test scores (Mottarella et al., 2004).

The second group of studies focuses on attributes of the technologies available in online education. Hrastinski (2008) using the media naturalness hypothesis (Kock, 2004) and the cognitive model of media choice (Robert & Dennis, 2005) as theoretical basis, studied two e-learning courses in which the students participated in synchronous and asynchronous discussions. The author found that asynchronous communication affected participation and that synchronous communication can improve online discussions, therefore there was higher student participation in synchronous discussions. This implies that having the necessary technology for holding synchronous discussion in online courses is important and can have a positive effect on students. Multimedia materials in e-learning have also been shown to have positive effects. Multimedia means including text, picture, audio, animation and video all as part of one course. They are useful in increasing the interest and attention of students; however this increase does not always mean an improvement in performance and satisfaction. It has been found that, when there is high uncertainty and equivocality in course content, there is a need for high richness. In courses with low uncertainty and equivocality using rich media does not improve performance (Sun & Cheng, 2007). Others have studied the use of Virtual Learning Environments (VLEs). VLEs use the Internet to provide information to students. The study found that using VLEs was rewarding and that the use of computers aided in learning. The use of VLEs however did not help in interaction. It was merely used as a source of information (Wells et al., 2008). A study of collaborative software showed that the increasing social presence can have a positive effect on the students (Roberts et al., 2006). However, it is possible that if too many components are added to distance courses there may be a negative impact and student satisfaction may actually decrease (Allen et al., 2002). When too many materials are available, students may suffer from information

overload, which in turn may have a negative impact on their learning experience (Brower, 2003).

The last, and least common group of studies, focuses on the perceptions of faculty and administration. Although there are a number of studies saying that performance in online and face-to-face courses is similar, the concern for the quality of online courses seems to remain in existence. A study of the perceptions of students and faculty towards online courses found that both students and faculty agree the greatest benefit of online courses is flexibility. In this study it was found that faculty did not believe that technology used in online courses has a positive effect on the learning experience even though the students believed there is a positive effect (Tanner et al., 2009).

The vast number of studies of online education has not made it any easier to decide whether online education is more effective, less effective or just as effective as traditional education. The research shows results that differ just as much as "the studies themselves differ in many ways from each other" (DeRouin et al., 2005, p. 929). While there are numerous studies of online education conducted in various fields, the field of accounting seems to be lacking in these types of studies. The results from other fields of business are not necessarily applicable to the field of accounting. Accounting courses are considered to have specific qualities that other business courses do not. Accounting courses are seen as modeloriented and abstract, as opposed to other courses (Bollen et al., 2002). Because of these differences there is a need for further empirical research in the field of online accounting education (Bryant et al., 2005). **Online Accounting Education**

In 1968 the American Institute of Certified Public Accountants (AICPA) called for accounting educators to integrate the use of technology into their courses (Marriot et al. 2004). Because it appeared that students were not being sufficiently exposed to technology, in 1998 the AICPA included technological skill as an element of the necessary core competencies needed by accounting students in order to become successful professionals (Albrecht & Sack, 2000; Basile & D'Aquila, 2002). In 1999 the AICPA called for the use of technology which would allow students to "develop technical literacy and master accounting content" (Basile & D'Aquila, 2002, p.137). After technology was declared to be such an important part of accounting education, studies of online education began to appear in the field of accounting. A review of research in online and blended learning conducted by Arbaugh (2009) found there were only 19 articles which focused on accounting at the time of the review. The articles focusing on online learning in the field of accounting can be separated into three main categories: those providing narrative accounts of online courses, those investigating courses conducted face-to-face with some online aspects and those studies conducted on courses taught fully online.

A few of the existing articles in accounting provide comments on the state of research in online accounting education and provide suggestions for the improvement of online education in the field. McVay et al. (2008) believe that the research available in accounting education "is surprisingly thin" (p. 43). It has been suggested that there is a need for further research since the existing research has not yet discovered the type of format which is best for accounting courses (Briant et al. 2005; Watson et al. 2007). Further knowledge is necessary to understand the value of distance education, the design of effective classes, assessment, training and resources. Some believe online courses must have instructor presence and a sense of community in order to be successful. Merely uploading Power Point slides on a web page may not be sufficient for effective learning. It has also been suggested that instructors should receive training in the design and organization of online courses, instead of on the technologies themselves (Salimi, 2007). The challenge is not just to make online courses the same as traditional education but to take advantage of technology in order to improve the effectiveness of education (Farington & Bronack, 2001). Dunbar (2004) provides a narrative about the process of starting a six week online accounting course that was previously taught solely face-to-face. While the majority of the article is a narrative the author did conduct a survey which indicated that the students were satisfied with the online course. Zabriskie et al. (2007) provide a discussion on the development of courses mixing online and traditional methods. The authors believe that the results of an online course vary depending on the instructor, the students and the degree of technology incorporation into a course.

Other studies have focused on face-to-face courses that have some online element. Potter & Johnston (2006) studied the effects of an online learning system and looked at the effect of specific teaching strategies on performance. This study was conducted for student learning outside of the classroom which occurs in addition to the traditional course. DeLange et al. (2003) studied Virtual Learning Environments and found that their use contributed to increased motivation. Marriot et al. (2004) looked at the use of the Internet in accounting education. The students participated in face-to-face courses and were asked about their willingness to use the Internet for instructional purposes. Students appeared reluctant to consider other uses of the technology. The authors believed this was due to the interaction and socialization which occurs in the classroom and on which students place a high value. Basile & D'Aquila (2002) surveyed accounting students to find out their perspectives on technology use. They found no differences in the attitudes of students in courses with Internet activities.

Within those studies which have looked only at courses offered completely online, there have been studies which have only studied particular elements of online courses. Watters & Robertson (2006) recorded lectures and used Angel and WebCT to provide them to students in an accounting course. The students in the study had access to power point presentations also provided online. The authors looked at perceptions of students in online courses and found that students believed in the effectiveness of the courses. They found 75% of undergraduate students believed the online course was as least as effective as a traditional course. The authors also studied perceived effort of students which is the level to which they felt more responsibility for learning the material than they would in a traditional course. More undergraduates in the study felt they had more responsibility. This means that the level of the course and the degree of responsibility perceived were indirectly related, the lower the course level the higher degree of responsibility perceived. Eom et al. (2006) surveyed students who had completed at least one online course. They found that learning styles and instructor feedback can affect learning outcomes. This means that online courses can be improved when targeting those with specific learning styles and when feedback is provided.

Other studies have compared online and blended courses. Castelijn & Janssen (2006) conducted a study of blended financial accounting courses, where the students had face-to-face meetings, and a distance course. The authors looked at exam scores in the two groups and found they were not significantly different. In the exams the authors included three types

of questions, application questions, in which knowledge must be applied, knowledge questions, in which students must replicate what they have learned and insight questions, in which the students must apply what they know to other areas. They found that the blended learning students performed better on application questions.

Research has also been conducted on the differences and similarities of online and traditional accounting courses. In their assessment of student attitudes Campbell et al. (2002) found no difference in any of their survey questions except for one. Those in the online course felt that the instructor was available for answering questions more strongly than the traditional course. In their performance assessment they divided the study by course topics and the exam questions on each topic. In some of the topics the students in the two conditions had significantly different performance. In those that were significantly different the online students performed better than the face-to-face students. However, the authors do not offer an explanation for this phenomenon. This study has a couple of significant limitations. They only had 14 online students and did not collect demographic information, therefore failing to control for such variables. Vamosi et al. (2004) created a study that is different from previous studies. They had students in a financial accounting course switch between online and traditional delivery methods. The course consisted of 12 chapters. The first six chapters of the course were covered face-to-face, the last six were alternated between video and live lecture. The video could be watched on television or on the computer using Real Player. In order to make this portion of the course match the qualifications of a distance course the students were not allowed to ask for questions in person regarding the materials delivered through video. They found that course satisfaction in the post survey was lower than in the pre-survey. The students had low satisfaction in the distance learning portion, and they found it to be less efficient and effective than the face-to-face portion of the course.

The studies that have been conducted in online accounting education suffer from numerous problems. First, many of these studies have not really looked at online courses. They have studied online tasks, or online modules and studied the reaction of students to them. Of those that have studied online courses several seem to have a number of methodological problems, sample sizes are small, controls are not used and statistical analysis is not adequate. The Institute for higher Education Policy (1999) looked at distance-education research and questioned the quality of the existing publications (Dunbar, 2004).

While this is not a cultural study, it does focus on online accounting education in two countries: Mexico and the United States which have been found to be significantly different in a number of cultural characteristics. Because of this, a review of cultural issues is necessary. A very well known cultural study, although it is not without criticism, is Hofstede's (2001) study of national culture. The following section provides a review of Hofstede's cultural dimensions which will be used as a basis for the data manipulation checks used in this study.

Culture

Culture, the "collective programming of the mind" (Hoftstede, 2001) can be represented by values, symbols and rituals (p. 1). Hofstede's study on culture referred to national culture (as opposed to organizational). Individuals possess mental programs which we can use to make predictions of behavior. Mental programming occurs at three levels: the individual, collective and universal (see Figure 2.7).



Figure 2.7: The Three Levels of Human Mental Programming (Hofstede, 1999, p. 3).

The individual level is unique for everyone since it refers to personality. The collective level is shared with groups of people; culture falls under this level. Finally, the universal level is shared by everyone. This level includes universal behaviors such as laughing and crying. This leads us to the definition of culture as "the collective programming of the mind that distinguishes the members of one group or category of people from another" (p. 9). Hofstede's study included differences in national culture in over 50 countries. He believed there are mechanisms that allow for stability in cultural patterns throughout the years allowing these cultural patterns to persist in different generations of a culture. Therefore, in order to understand cultural differences one must look at the history of these cultures. In history one can find the root of cultural differences (see Figure 2.8).



Figure 2.8: Stabilizing of Culture Patterns (Hofstede, 1999, p. 12).

Hofstede's original study defined four dimensions along which cultures around the world could be classified or rated. These dimensions were power distance, uncertainty avoidance individualism/collectivism and masculinity/femininity. The study was later extended to include one more dimension: long vs. short term orientation.

The power distance dimension refers to accepted inequalities within certain cultures. These inequalities come in the shape of accepted societal differences like supervisoremployee and teacher-student relationships, differences in social status, etc. Power distance refers to the influence between an employee and an employer as perceived by the individual with the least power. It is the level to which the less powerful accept that there are power differences.

Uncertainty avoidance refers to uncertainty regarding the future. It is the level to which individuals feel comfortable, or not, in uncontrollable or unknown situations. This refers to how tolerant an individual is of ambiguity. It is not "risk avoidance" as many believe. Uncertainty does not necessarily imply that there is a risk. Uncertainty avoidance means the individual tries to avoid ambiguity. These individuals would prefer structure.

The individualism/collectivism dimension refers to how much individuals tend to live together. In collectivist societies there is higher "emotional dependence of members" (p. 212). It refers to a level of family integration existent in a culture. Collectivism tends to go along with high power distance in most cultures. In individualistic countries people are expected to take care of themselves. In collective societies, individuals often belong to groups that will likely help them in a time of need. Here the interests of the group are more important than the interests of the individual.

Masculinity/Femininity refers to the idea that women have different goals than men. Women seem to give more importance to social factors like "relationships, helping others, and the physical environment," while men focus on employment and financial goals. This dimension focuses on these female and male characteristics and applies them to culture. Those cultures possessing more of the characteristics that females possess are said to be "feminine" societies and those having characteristics of males are said to be "masculine" societies. This dimension refers to the assertiveness found in males and the nurturing in women.

The last dimension is long versus short term orientation, and was added years after the four original dimensions. This dimension came from the Chinese Value Survey (CVS). This survey reflected eastern characteristics, and was based on the teachings of Confucius. This dimension "refers to the extent to which a culture programs its members to accept delayed gratifications" of their different needs (p. XX). A long term orientation reflects a concern for learning or possessing values such as perseverance, thrift and "having a sense of shame" (p. 354). On the other hand a short term orientation reflects a focus on a different set of values such as stability, "saving face", and "reciprocation of greetings, favors and gifts" (p. 354). Hofstede used each one of the dimensions to score countries according to their characteristics (See Appendix A for the complete index list). These dimensions "reflect basic problems that any society has to cope with but for which solutions differ" (Hofstede, 2001, p. XIX).

In this study, Hofstede's dimensions will be used in order to provide a point of reference for deciding whether the two countries studied consist of two different groups, each being representative of its country.

Research Model

Hypotheses

Using the previous discussion of existing theory and research will serve as a basis for the formation of the hypotheses used in this study. The next section contains an explanation of each of the hypotheses and variables included in the study.

Condition

As described in the previous sections, there have been a number of studies which have looked at the effects of offering courses under different conditions, such as online, blended and face-to-face formats. It has also been demonstrated by a number of studies that while performance is not necessarily affected directly by the format of the course, the perceptions of the students are usually affected by course condition. In this study the condition variable refers to the two formats in which the courses in this study were offered. Courses were offered in a traditional face-to-face format as well as in an online format in which the students did not meet throughout the semester.

Cognitive Effort, Ambiguity and Excitement

The Media Naturalness Theory holds that co-location, synchronicity and ability to convey facial expressions, body language and speech are all elements that make up the naturalness construct. When some of these elements are removed from communication, individuals may be affected in different ways. The theory holds that, other things being equal, a lower level of naturalness will result in an increase in cognitive effort, an increase in communication ambiguity and a decrease in physiological arousal. Cognitive effort is the level of mental or perceptual activity experienced by an individual. Therefore if an individual is presented with a very complex task he or she would experience higher cognitive effort than when completing a simple task. Because we have developed a communication apparatus over millions of years of evolution that is adapted to face-to-face communication, having to communicate through less natural media is likely to cause an increase in cognitive effort. Ambiguity refers to the lack of clarity or the existence of incorrect interpretation of cues in communication. Because humans have evolved a communication apparatus that includes nonverbal cues, such as facial expressions and body language, we are likely to suffer some confusion when these cues are missing. In the absence of these cues we may be forced to fill in the gaps and interpret messages lacking non-verbal cues, which may in turn lead to misinterpretation and ambiguity (Kock, 2005). When elements of face-to-face communication are eliminated there is a probability that communication ambiguity will increase. Therefore in an online course, students would likely experience higher levels of ambiguity than in a face-to-face course.

Media naturalness also holds that physiological arousal can be affected by the use of electronic media. Physiological arousal (excitement) can come about in communicators when they experience all of the elements existent in face-to-face communication. Research has shown that the elements existing in face-to-face communication may cause a level of excitement in individuals. Research also shows that individuals involved in computer mediated communication perceive the communication as less exciting than face to-face communication. This means that in an online course students would perceive a decreased level of excitement. We can expect, from the arguments presented above that the condition under which a course is offered will have an effect on the three media naturalness variables. The following hypotheses reflect the previous arguments.

- H1a: At the middle of the semester, students in the online section of the course will have significantly higher perceived cognitive effort than in the face-to-face section of the course.
- H1b: At the middle of the semester, students in the online section of the course will have significantly higher perceived communication ambiguity than in the face-to-face section of the course.

H1c: At the middle of the semester, students in the online section of the course will have significantly lower perceived excitement than in the face-to-face section of the course.

However, research has also shown that students have the ability to make up for missing elements of face-to-face communication. The compensatory adaptation model agrees with the Media Naturalness Theory that communication media can have different degrees of "naturalness". The compensatory adaptation model also holds that communication ambiguity, cognitive effort, and physiological arousal are related to media naturalness. This model holds that when individuals use electronic media, given enough time, they can overcome (or compensate for) the hurdles encountered in electronic communication (Kock, 2001). This would mean that if student perceptions were to be measured at the middle and end of course, perceptions at the middle of the semester would be different than perceptions at the end of the course. The hypotheses below reflect this idea.

- H2a: At the end of the semester, perceived cognitive effort will not be significantly different in the online section and the face-to-face section of the course.
- H2b: At the end of the semester, perceived ambiguity will not be significantly different in the online section and the face-to-face section of the course.
- H2c: At the end of the semester, perceived excitement will not be significantly different in the online section and the face-to-face section of the course.

Cognitive Effort, Ambiguity, Excitement and Performance

The three variables explained in the previous sections have also been shown by research to have an effect on student learning and performance. Studies have shown that higher cognitive effort can lead to better performance in different tasks (Salomon, 1979; 1981). Berry (1987) conducted a study of older adults in which he found that when students experience higher cognitive effort they have better memory performance (Bandura, 1993).

Tyler et al. (1979) conducted a study of cognitive effort and found that "the amount of effort required by a task" was important in determining the recall capability of the subjects (p. 616). They found that when there was a greater amount of cognitive effort there was also increased recall. Swanson (1984) studied differences in learning with increased cognitive effort in disabled and nondisabled readers and found that nondisabled readers performed better when they experienced higher cognitive effort.

Research has also shown that ambiguous or unclear situations lead to decreased performance. Ambiguity is defined in this study as uncertainty, vagueness or lack of clarity (Kuhn, 1997; Hofstede, 2001). From the definition of ambiguity one can conclude that lack of clarity can be considered synonymous to ambiguity and clarity can be considered the lack of ambiguity. Research related to ambiguity and its effects on performance does not study ambiguity directly. The available research studies the effect of clarity (or lack of clarity) in the classroom and its learning outcomes (Hativa, 1998). Research shows that instructor clarity has an effect on student outcomes. Comadena et al. (2007) studied undergraduate university students and the effect of instructor clarity on their learning and perceptions. They found that clarity has an effect on cognitive learning, motivation and affective learning. This means that in order to have positive outcomes in a course, an instructor' methods must be low in ambiguity. Chesebro (2003) looked at the effects of clarity on student learning. The author found that clarity is important for learning since those who received clear lectures from their instructor had increased learning compared to those being taught by unclear instructors. Chesebro & McCroskey (2001) also studied the effects of clarity on students. They found that clarity influences motivation and course perceptions. In addition they found

that clarity is negatively related to loss of learning. The results of the study indicated that clarity is highly correlated with student outcomes.

Physiological arousal can be considered informative and motivating. While there is some arousal which can prove to be energizing (or positive) other types of arousal may be more negative, causing feelings such as anxiety (Weiner, 1972). For the purpose of this study physiological arousal refers to a positive type of arousal which, in this study, is the level of excitement experienced by a student while in the course.

Intuitively, one may think of excitement as something which could be beneficial in the classroom. However, it is also possible, under the right conditions, that a lack of physiological arousal can have positive effects since it may allow students to focus on the task at hand (Kock, 2005). Studies of arousal have found different results. In some cases arousal has been found to have positive effects and in other cases it has been found to have detrimental effects depending on the variables being studied. Studies focus on two different variables: information processing and memorization. Studies have found that high arousal can disrupt the processing of information especially in the case of a complex task (Berlyne, 1960; Zajonc, 1965). A number of studies have looked at levels of arousal and the effect of conducting two simultaneous tasks. It has been found that secondary tasks suffer from deterioration when arousal is present. In addition when there is high arousal there is the possibility that individuals will be distracted, leaving less processing capacity for cognitive tasks (Easterbrook, 1959). In the case of tasks that require little processing capacity, arousal seems to have little effect. For example when solving a very simple math problem high levels of arousal would not affect the result. However, in the case of more complicated tasks, the task outcome would suffer (Hasher & Zacks, 1979; Humphreys & Revelle, 1984; Shiffrin,

1988).

Studies of memorization, on the other hand, have found arousal has positive effects. When studying words that would elicit low arousal it has been found that students are better able to remember the words in the short term (15-20 minutes). However when dealing with high arousal words studies have shown that students have a better ability to remember the information in the long run (Eysenck, 1976). When dealing with semantic information and free recall, arousal has led to diminished recall. However, when dealing with verbatim ordered recall of information, arousal has been found to have a positive effect on memory (Schwartz, 1975). This goes along with the idea that arousal has a disruptive effect on the processing of information. If one is not able to process information, then semantic, free recall, is likely to be more difficult. In these cases high levels of arousal have been found to have negative results on learning since it tends to weaken student performance (Bandura, 1977). This means that, when dealing with memorization, arousal can have positive effects on performance. Research in accounting education has revealed that accounting students, especially those past their first year of study, are more likely to adopt a surface learning approach (Booth et al., 1999; Davidson, 2002; Eley, 1992; Gow et al., 1994; Hall, 2004). In a surface learning approach students focus more on memorization and reproduction of the material; as opposed to the deep learning approach in which students look for meaning and interpretation of the material. This would mean that accounting students have a tendency to use memorization and reproduction in order to pass a course (Elias, 2005; Hall, 2004). Judging from this research one would expect accounting students' performance to be positively affected by high levels of arousal.

By studying the existing research we can see that cognitive effort, ambiguity and

excitement are all related to student performance. In this study performance refers to student grades in the surveyed courses. Student grades were collected at the middle and at the end of the semester. Therefore it can be estimated that the perceived cognitive effort,

communication ambiguity and excitement at the middle of the semester will have an effect on student performance at the middle of the semester. It can also be assumed that perceived cognitive effort, communication ambiguity and excitement at the end of the semester will have an effect on student performance at the end of the semester. Because the existing research does not differentiate between different points in time throughout the semester, there is no reason to believe that the results of this portion of the study would be different at the middle and end of the semester. Therefore, based on previous research, it is assumed in this study that the effects of the three variables on performance will be similar at the middle and at the end of the semester. The following hypotheses reflect the previous information.

- H3a: At the middle of the semester, perceived cognitive effort will be significantly and positively related to mid semester performance.
- H3b: At the middle of the semester, perceived communication ambiguity will be significantly and negatively related to mid semester performance.
- H3c: At the middle of the semester, perceived excitement will be significantly and positively related to mid semester performance.
- H4a: At the end of the semester, perceived cognitive effort will be significantly and positively related to end semester performance.
- H4b: At the end of the semester, perceived communication ambiguity will be significantly and negatively related to end semester performance.
- H4c: At the end of the semester, perceived excitement will be significantly and positively related to end semester performance.

The following hypothesis reflects the logical influence that midterm performance has

on end semester performance. It also recognizes that the grade a student receives at the

middle of the semester will have a significant impact on a student's grade at the end of the semester.

H5: Student midterm grades will be significantly and positively related to student final grades.

The underlying ideas in this study come from the media naturalness view and the compensatory adaptation model (explained in detail in the previous sections). Both of these have their roots in evolutionary psychology, and therefore both posit that certain aspects of human nature have been determined throughout millions of years of evolution. This means that, for this study, the results hypothesized in one country should be the same in any other country because the underlying mechanisms that govern much of our behavior go beyond cultural differences (such as smiling and crying). These mechanisms are evolutionary and are therefore expected to react in similar ways in all human beings regardless of geographic location. The previous hypotheses will be tested in the United States and Mexico and are expected to hold in both countries.

Research Model

The hypotheses that have been presented in this section are depicted by the research model presented in Figure 2.9 for the United States and Figure 2.10 for Mexico.


Figure 2.9 United States Research Model



Figure 2.10: Mexico Research Model

III. METHODOLOGY

Sample

This study involved a total of 149 students from four different universities in two different countries (Mexico and the United States). Because this was a longitudinal study, surveys were collected at the middle and end of the semester totaling 298 surveys collected. About 56% of the surveys were collected in the United States and about 44% were collected in Mexico. Of the total number of participants about 40% took the online version of the course, with about 60% taking the face-to-face version of the course. About 50% of the students surveyed were male (see Table 3.1).

	United	States		Mexico	Total
Participants	84	56%	65	44%	149
Surveys Collected	168	56%	130	44%	298
Online	32	53%	28	47%	60 (40%)
Face-to-face	52	58%	37	42%	89 (60%)
Females	43	51%	32	49%	75 (50%)
Males	41	49%	33	51%	74 (50%)

 Table 3.1: United States and Mexico Sample Demographics.

For the full sample (Mexico and United States) the students' ages ranged from 18 to 50, with a mean age of 24. The students' GPA ranged from 2.0 to 4.0 with a mean of 3.0. The students possessed work experience ranging from 0 to 30 years with a mean of 5 years of

work experience (see Table 3.2).

Mex	kico and United S	tates Demographic	S
	Min	Max	Mean
Age (In years)	18	50	24
GPA	2.0	4.0	3.0
Work Experience	0	30	5
(In years)			

Table 3.2: Full Sample Demographics

In the United States the study involved 84 students from three different state universities. The students' ages ranged from 18 to 50 years of age, with a mean age of about 23. The students had a minimum GPA of 2.1 and a maximum GPA of 4.0, with a mean of 3.0. The students had work experience that ranged from 0 to 27 years, with a mean of approximately 4.4 years (see table 3.3).

 Table 3.3: United States Demographics

	United States D	emographics	
	Min	Max	Mean
Age (In years)	18	50	23
GPA	2.1	4.0	3.0
Work Experience (In years)	0	27	4.4

In Mexico the study involved 65 students from a midsized state university in the north of Mexico. The students' ages ranged from 20 to 46 years with a mean age of about 26. Student GPA ranged from 1.5 to 4.0 with a mean of 3.1. The students possessed work

experience that ranged from 0 to 30 years (see Table 3.4). The number of male students was 33 (51%) and the number of female students was 32 (49%).

	Mexico De	mographics	
	Min	Max	Mean
Age (In years)	20	46	26.4
GPA	1.5	4.0	3.1
Work Experience	0	30	6.1
(In years)			

Table 3.4: Mexico Demographics

In this study the groups were not randomized since the study was conducted in online and face-to-face sections of courses where students self-selected by choosing to take the online or face-to-face versions of the course. While a perfect design would involve groups that are very similar to each other and that are randomized, it is difficult to obtain these conditions. Random samples are "selected by a chance-based method that gives all observations an equal probability of appearing in the sample" however this type of sample is often difficult to obtain (Kline, 2004, p. 24). Therefore, while randomization is preferred there are studies in which it is not possible. The sample in this study falls into the category of *ad hoc* samples. This type of sample is often called an available sample because it may be the only type of sample available to the researcher (Kline, 2004). For this study the sample was *ad hoc* because the courses were offered under the different conditions and students had the ability to choose in which course they wished to enroll. Although this type of sample may have potential problems this type of experiment can still be a "powerful tool" (Kline, 2009, p. 92, Kline, 2004). About 60% of the students surveyed took the course face-to-face; 40% took the course online. Of those students taking the course face-to-face, about 50% were male. The students' age ranged from 18 to 42 with a mean of 25 years of age. The GPA ranged from 2.0 to 4.0 with a mean of 3.0. Years of experience ranged from 0 to 25 with a mean of 5 years. Of those students taking the course online, about 48% were male. The age of the students ranged from 19 to 50 with a mean of 24 years. GPA scores ranged from 2.0 to 4.0 with a mean of 3.9. The students' experience ranged from zero to 30 with a mean of 5 years of experience (see Table 3.5).

		Online	Face-to-Face
Gender	Male	29 (48%)	45 (50%)
	Female	31 (52%)	44 (50%)
Age	Min-Max	19-50	18-42
	Mean	24	25
GPA	Min-Max	2.0-4.0	2.0-4.0
	Mean	3.0	3.0
Experience	Min-Max	0-30 years	0-25 years
	Mean	5 years	5 years

 Table 3.5: Online and Face-to-Face Group Demographics

Procedure

In this study a group of students took an introductory accounting course. Students were able to choose between a traditional face-to-face course and an online course, both taught by the same instructor within each institution. The courses were conducted over an academic semester; no summer sessions were surveyed. However the courses surveyed in Mexico were shorter than the courses in the United States. While in the United States the courses were taught in a long semester, the courses in Mexico, although they were not summer courses, were taught over the course of 9 weeks. This is approximately half the time of the courses in the United States.

This study was conducted in four different universities. The same instructor taught the online and the traditional versions of the course in each of the institutions. This ensured that the online and face-to- face versions of the course were conducted in a similar fashion. The online and face-to-face sections of each course had the same content and used the same textbook and materials. In addition, both sections of each course used a type of courseware suite (e.g. Blackboard, WebCT) to provide students with additional materials. For the face-toface section of the course the students attended regular meetings and were able to participate in discussions and ask questions during class. For those in the online section of the course, there were no course meetings. These students received all materials through a courseware suite. Lecture materials were provided either through written summaries or Power Point presentations. Students were able to participate and ask questions by posting comments on the discussion board and by sending emails to the instructor and to other students. The students also had the option to contact the instructor through telephone calls. All of the online discussions were conducted asynchronously. In exchange for participation students were offered extra points for their course; this served as motivation for the students to complete the surveys. Institutional Review Board (IRB) approval was acquired in each of the universities where students were surveyed in the United States (See Appendix B for IRB documentation filed in the researcher's institution). In order to conduct this study in Mexico, approval was obtained from the university's administration.

According to the media naturalness theory students enrolled in online courses would

experience increased perceived cognitive effort, increased perceived communication ambiguity and decreased perceived excitement. However, these effects disappear over time because the students are capable of compensating for the lack of naturalness in the instructional media (Kock, 2001). Because the compensatory adaptation model holds that the effects of dealing with electronic media have the capacity to decrease over time, this study was designed as a longitudinal study in which data collection was conducted at two different points in time (Creswell, 2002). The students were surveyed twice during the semester, once at the middle of the semester and once at the end of the semester, using the same instrument at both points in time. This longitudinal design is meant to capture the changes in student perceptions over the duration of the course.

Instrument

Data were collected through the use of an instrument that consisted of 36 items. The instrument was designed for another study and has been previously validated (Kock, 2005c; Kock et al., 2006; Kock et al., 2007). Section I of the questionnaire consisted of eight standard demographic questions (e.g. gender and age). Section II, consisted of 11 indicators used for the three latent variables in this study, and two open questions which were not used in this study because of their qualitative nature (this study has a quantitative focus). The 11 indicators in Section II of the survey refer to the latent constructs in this study and make up the indicators used for the three latent constructs. These questions were on a 7-point Likert scale. The remaining items in Section III were part of the data manipulation check which will be explained in a separate section (See Appendix C for the full instrument). Depending on the instructor's choice some classes were able to complete the survey in writing and the rest

completed the survey through SurveyMonkey.com. The two surveys were identical in content.

For its use in Mexico, the instrument was first translated from English to Spanish by the researcher, a native Spanish speaker educated in the United States. In addition to this initial translation, two native Spanish speakers with post graduate degrees from the United States also translated the survey from English to Spanish and the three versions were compared to each other. The differences between the versions were minimal, therefore only a few changes were made to the original translation and a back translation was deemed unnecessary (See Appendix D for the full instrument used in Mexico).

Variables

The research models presented in Figures 2.9 and 2.10 are each composed of one independent variable, six intervening variables and two dependent variables as well as a number of control variables. The independent variable in this study is *Condition*. This is a categorical variable which refers to the conditions under which the students took the course, online or face-to-face. The six intervening variables include the three latent constructs used in this study. Those variables that are abstract and latent are called "constructs" because these types of variables, in a sense, are constructed through the use of various indicators that are thought to measure the underlying variable (Nunnally, 1994). The latent variables in this study are formative, which are variables that have indicators considered to cause the latent variable. With this type of variable the indicators are not expected to load strongly on the constructs. The three latent constructs in this study are *perceived cognitive effort*, *perceived communication ambiguity* and *perceived excitement*. Each one of these constructs was

measured at the middle and end of the semester therefore there are a total of six latent constructs: *mid semester cognitive effort, mid semester ambiguity, mid semester excitement, end semester cognitive effort, end semester ambiguity and end semester excitement.*

Cognitive effort refers to the level of mental activity required by the course, as perceived by the student (Kock, 2005). The survey questions for this construct included questions such as "*Taking this course has required a great deal of mental and perceptual activity (e.g. thinking, deciding, calculating, remembering, looking, searching, etc.)*." Communication ambiguity refers to the lack of clarity or the confusion experienced by the students in the course. The survey included questions such as "*The communication of facts and knowledge has often been vague and confusing*." Perceived excitement refers to the level of positive physiological arousal experienced by the students in the course. The *survey included questions such as "Taking this course has been very exciting*." For the full instrument please refer to Appendix C.

The dependent variables in this study are mid semester performance and end semester performance. Mid semester performance was measured in this study through student midterm grades; and end semester performance was measured through final student grades. These grades were actual grades provided by each of the instructors involved in the data collection.

The final set of variables is that of the demographic variables used as control variables in this study. Initially, eight demographic variables were collected in the United States and seven in Mexico. However because of lack of responses D4 ("*What was your last SAT score*?") was eliminated in the United States survey. This same question was eliminated in the Mexico survey due to its irrelevance. In addition, work experience and classification were eliminated from the analysis due to multicollinearity. Multicollinearity occurs when

correlations between constructs are very high. When multicollinearity is present it means that the variables which are supposed to measure different variables are actually measuring the same variable (Kline, 2009). A multicollinearity check was conducted using WarpPLS by looking at variable correlations. It was found that GPA and experience were significantly correlated with age (at the .001 level) and were therefore eliminated from the final analysis. For the students in the United States the control variables used were gender, age, GPA and instructor. The instructor variable attempts to control for any possible effects caused by the differences between the instructors that taught the surveyed courses. In the Mexico sample only one instructor taught the surveyed courses, therefore this control variable was not relevant.

Data Preparation

In the United States the original data set consisted of a total of 121 surveys for the middle of the semester and a total of 94 surveys for the end of the semester. The difference in these numbers is due to a group of students that failed to complete the survey at the end of the semester. In addition, a number of surveys from the middle of the semester were eliminated because several students withdrew from the course sometime between the middle and end of the semester. For Mexico the original data set consisted of 68 surveys at the middle of the semester and a total of 66 surveys at the end of the semester. This difference was due to two students withdrawing from the class. The surveys were paired up and only surveys of students who completed a survey in the middle and the end of the semester were kept.

After this was done, a check for missing data was conducted. After ensuring that no

more than 10% of the data was missing for any single variable, the missing data was replaced with the column mean. Because the software used automatically standardizes the data, this step was left to be conducted by the software.

Manipulation Check

Because the study was conducted in two different countries it is necessary to ensure that the two groups are representative of their countries and in fact constitute two different groups. The last section of the instrument used (Section III) consisted of 15 questions which were taken from Hofstede's cultural study. While this study has received criticism from various studies it has also been successfully used by others (Hofstede, 2001; Ronen & Shenkar, 1985; Shackleton & Ali, 1990). This survey is very well known and has been used by numerous studies to prove cultural differences or similarities. The questions in this instrument consisted of three indicators for each of the five cultural dimensions: power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance and longvs. short-term orientation. For every country involved in the study Hofstede provided an index and ranking for each different dimension (for the full list of indices see Appendix A). For the power distance dimension Mexico received an index of 81 and the US and index of 40, with a difference of 41. For individualism/collectivism Mexico received a score of 30 while the US received a score of 91, a difference of 61. For masculinity/femininity Mexico received a score of 69 and the US a score of 62, a difference of only 7 points. In the uncertainty avoidance dimension Mexico received a score of 82 while the US received a score of 46, a difference of 36 (see Table 3.6).

Country	Power Distance	Individualism/ Collectivism	Masculinity/ Femininity	Uncertainty Avoidance	Long-/Short-Term Orientation
Mexico	81	30	69	82	N/A
United States	40	91	62	46	29
Difference	41	61	7	36	N/A

Table 3.6 : Hofstede's Cultural Dimensions: Mexico vs. United States.

It is important to note that the last dimension (long-/short-term orientation) was eliminated from the results because Mexico did not receive an index for this dimension, therefore no valid conclusions can be made. However, it should be noted that the analysis showed that the two groups surveyed were significantly different in the long term/short term orientation dimension. Looking at the scores provided by Hofstede one would expect to find significant statistical differences in the power distance, individualism/collectivism and in the uncertainty avoidance dimensions which have the highest index differences. One would not expect to find a significant difference between the two countries in relation to the masculinity/femininity dimension since the two countries are only seven points away in this index (see Figure 3.1).



Figure 3.1: Hofstede's Cultural Dimensions for Mexico and the United States.

The indicators of the uncertainty avoidance construct did not load properly on the construct, therefore this dimension was eliminated from the analysis. For the remaining constructs, any indicators that did not load appropriately were removed from the analysis. The purpose of the analysis was to ensure that the data from Mexico and the United States actually belong to two different groups, and that each one of those groups is also representative of their country. A Mann-Whitney U test (Mann & Whitney, 1947) was conducted (see Table 3.7). This test, also called the ranked sum test, is non-parametric. This means there are no assumptions made regarding a population distribution. It has a "less stringent requirement than normality" for the distribution of the population. This test allows the testing of group differences when distributions are non-normal or when samples are not assumed to have equal variance (Zikmund, 1991, pp. 523-525).

	Z-Value	P-Value
Masculinity/Femininity	-0.670	0.503
Individualism/collectivism	-0.226	0.024**
Power Distance	-2.349	0.019**

Table 3.7: Mann-Whitney U Test Results between Mexico and the US.

Note: ** = significant at the .05 level

The test showed that, as expected, the distribution of the power distance and the individualism/collectivism dimensions is not the same across the two countries. This means that the two groups are statistically different from each other in these two dimensions. In addition, as expected, the masculinity/femininity dimension, where Mexico and the United States are the most similar, has the same distribution across the two countries. This means that the groups are representative of their countries by not being statistically different in the dimension where they are the most similar. Other studies have shown used as little as one dimension to show that subjects from two countries are different and representative of their countries (Tan et al., 1998). In this study expected results were obtained in three of the dimensions, therefore it can be said that the two groups are different and that they each represent their country in accordance with Hofstede's cultural study.

Structural Equation Modeling

Structural Equation Modeling (SEM) is a second generation data analysis technique. This technique allows a researcher to find answers to a set of questions at once by modeling the different relationships at the same time. These relationships can be modeled through several independent and dependent constructs in one same model (Bagozzi & Fornell, 1982; Gefen et al., 2000). SEM techniques can be covariance-based, such as that used by LISREL, or variance-based such as that used in Partial Least Squares (PLS) analysis. The following section includes an explanation of the characteristics of covariance-based SEM and PLS.

Covariance-based SEM has a number of constraints that make it inappropriate for some types of studies. It requires normality, and usually requires large sample sizes. In addition, this type of analysis usually requires reflective variables. Reflective variables are those in which the indicators are believed to be influenced by the latent variable. Formative variables, on the other hand, have indicators that are considered to cause the latent variable. This type of variable can only be used in variance-based SEM. In covariance-based SEM, analyses tend to be confirmatory. This means that in order to conduct appropriate SEM analysis, one must have strong underlying theory and measures that have been thoroughly studied in the past (Chin & Newsted, 1999). Typically, in covariance based SEM the parameter estimates of one part of the model can be influenced by misspecifications on other parts of the model because it is a "full information approach", this rarely occurs because it is a problem that can be countered by strong theory (Chin & Newsted, 1999, p. 311).

Partial Least Squares

PLS is a variance based SEM analysis technique. The PLS algorithms have something in common with both linear regression and covariance-based SEM. In PLS the overall model consists of an inner model and an outer model. The inner model consists of the relationships between the latent variables. The outer model consists of the relationships between the latent variables and their manifest variables. In other words, the outer model refers to how each set of indicators relates to the latent variable. The algorithm works by first estimating the outside model and then the inside model. Only one part of the model is involved at any one time, making it similar to running several multiple regressions. PLS provides coefficients that can be read in a similar fashion as covariance-based SEM. PLS can use either a jackknife or a bootstrap technique to generate t-values for the loadings. It differs from covariance-based SEM in several aspects (see Table 3.8 for a summary of differences between the two methods).

The main objective of PLS is prediction. It is also useful in research that is still at an early stage of theoretical development. Indicators in PLS can be either reflective or formative. Formative variables are those that are not assumed to load strongly on a construct. In this type of variable the paths connecting the construct and the indicators are directed towards the construct. Sample size requirements for PLS are also different than for a covariance based SEM analysis. PLS appears to work well with smaller sample sizes. It can also handle a larger number of indicators. This type of analysis can be conducted when assumptions of normal distribution and independence are not met by the data (Chin & Newsted, 1999 & Gefen et al., 2000). According to Chin & Newsted (1999) the use of PLS is adequate when:

- A researcher looks to make predictions.
- One is researching a relatively recent or changing model.
- The model being analyzed is relatively complex and includes a large number of indicators or latent variables.
- There is a need for formative indicators.
- Data does not meet the usual normality, independence and sample size requirements of other methods.

Table 3.8: Comparison of Partial Least Squares and Covariance-Based StructuralEquation Modeling (adapted from Chin & Newsted, 1999 and Gefen et al., 2000).

Criterion	PLS	Covariance-Based SEM
Objective:	Prediction oriented	Parameter oriented
Approach:	Variance-based	Covariance-based
Assumptions:	Predictor specification (nonparametric) Robust to deviations from a multivariate distribution	Multivariate normal distribution and independent observations (parametric)
Parameter estimates:	Consistent as indicators and sample size increase	Consistent
Latent variable scores:	Explicitly estimated	Indeterminate
Latent variables:	Can be modeled in a formative or reflective mode	Typically can only be modeled with reflective indicators
Implications	Best for prediction accuracy	Best for parameter accuracy
Model complexity:	Large complexity	Small to moderate complexity
Model comparison	Does not provide statistic to compare alternative models	Provides statistic to compare alternative confirmatory factor analysis models
Sample size:	Power analysis based on the portion with the largest number of predictors. Minimal recommendations range from 30 to 100 cases	Ideally based on power analysis of specific model. Minimal recommendations range from 200 to 800
Theory base:	Supports exploratory and confirmatory research	Requires sound theory base. Supports confirmatory research

PLS can be implemented either as a regression model or as a path model. The software used for data analysis in this study is WarpPLS, a SEM software that conducts structural equation modeling using a partial least squares regression algorithm. This software is different from other software in that it is able to identify nonlinear relationships among the

latent variables of the model. The software can conduct a Warp PLS regression, robust path analysis or a standard PLS regression analysis. The most stable method should be used to analyze the data. Significantly different results using a bootstrap and a jackknifing technique can be an indicator of instability (Kock, 2009, December). For this study the most stable results were derived from the PLS regression analysis. A jackknifing resampling technique (Quenouille, 1949; Tukey, 1958) was used for this study. This technique creates resamples using the size of the original sample. In each resample one different data point is removed. The deleted data point is then added back and another one is removed for the next resample. Therefore each resample is the original sample size minus one. This technique is considered an "all-purpose" technique for statistical analysis which deals well with outliers and small sample sizes (Chiquoine & Hjalmarsson, 2009; Osborne, 2008).

IV. MODEL ASSESSMENT

Descriptive Statistics

For the United States, the correlations among the indicators of the latent variables are shown in Table 4.1 (mid semester) and Table 4.2 (end semester) along with the mean and standard deviation for each indicator. The correlations within each construct's indicators seem to be appropriate. However, COGEFF4 appears to have a relative low correlation with the other construct indicators (the removal of this indicator will be discussed in later sections).

For Mexico, the correlations among the indicators of the latent variables are shown in Table 4.3 (mid semester) and Table 4.4 (end semester). Again one can see that Cogeff4 has a relatively low correlation with the other indicators (this indicator was also removed as will be explained in later sections). In addition, Excite1, Excite2, and Excite3 appear to be highly correlated with Cogeff1, Cogeff2, Cogeff3 and Cogeff4 at the middle and end of the semester. Because the two constructs are believed to represent different perceptions and because the correlations are not higher than .85 it was decided that these indicators remain in the analysis (Kline, 2009).

	MCOGEFF1	MCOGEFF2	MCOGEFF3	MCOGEFF4	MAMBIGUI	MAMBIGU2	MAMBIGU3	MAMBIGU4	MEXCITE1	MEXCITE2	MEXCITE3
MCOGEFF1	-										
MCOGEFF2	0.529	-	_								
MCOGEFF3	0.409	0.655	5	_							
MCOGEFF4	0.235	0.428	0.592	-							
MAMBIGUI	-0.068	0.163	0.194	f 0.157	1						
MAMBIGU2	0.045	0.319	0.263	3 0.271	0.683	-					
MAMBIGU3	0.075	0.264	9.265	0.207	0.643	0.742	-				
MAMBIGU4	-0.030	0.036	5 0.145	5 0.204	0.620	0.642	0.725	-			
MEXCITE1	0.086	-0.123	-0.023	3 -0.035	-0.059	9 -0.256	-0.112	-0.106	T		
MEXCITE2	0.122	-0.149	-0.040	-0.068	-0.127	-0.345	-0.272	-0.182	0.592	-	
MEXCITE3	0.068	-0.098	-0.201	-0.182	-0.159	-0.298	-0.292	-0.255	0.559	0.437	1
Mean	5.882	5.228	4.548	4.298	3.786	3.429	3.607	3.552	4.548	4.321	4.591
SD	0.865	1.101	1.405	1.333	1.268	1.442	1.431	1.338	1.196	1.466	1.131

Table 4.1: Indicator Correlation Matrix for the US at Mid Semester.

Table 4.2: Indicator Correlation Matrix for the US at End Semester.

	FCOGEFF1	FCOGEFF2	FCOGEFF3	FCOGEFF4	FAMBIGUI	FAMBIGU2	FAMBIGU3	FAMBIGU4	FEXCITE1	FEXCITE2	FEXCITE3
FCOGEFF1											
FCOGEFF2	0.576		1								
FCOGEFF3	0.34]	1 0.513		1							
FCOGEFF4	0.066	5 0.32	7 0.5	8	1						
FAMBIGUI	-0.04	4 0.172	2 0.40	4 0.56	2	1					
FAMBIGU2	0.025	3 0.12	2 0.34	5 0.32	8 0.639	9	_				
FAMBIGU3	0.021	1 0.22	5 0.45	0 0.45	0.68	4 0.810		_			
FAMBIGU4	-0.12	7 0.17	1 0.37	8 0.38	8 0.67]	1 0.745	5 0.800	5			
FEXCITE1	0.26	7 0.29	3 0.08	5 0.13	7 -0.09	7 -0.295	9 -0.14(-0.272		_	
FEXCITE2	0.19	3 0.26	1 0.10	2 0.22	8 0.00	9 -0.212	2 -0.09	7 -0.075	0.640		1
FEXCITE3	0.241	1 0.13	8 0.03	0 0.04	7 -0.19	3 -0.341	1 -0.16	7 -0.339	0.734	1 0.535	4.810
Mean	5.744	1 5.369	9 4.72	6 4.45	2 4.119	9 3.452	3.679	3.738	4.512	219.4.619	4.810
SD	0.955	5 1.05(0 1.37.	4 1.57	9 1.55	5 1.508	8 1.53(1.553	1.53	3 1.485	1.331

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	MCOGEFF1	MCOGEFE	2 MCOGEFF3	MCOGEF	4 MAMBIGUI	MAMBIGU2	<b>MAMBIGU3</b>	MAMBIGU4	MEXCITE1	MEXCITE2 N	<b>EXCITE3</b>
MCOGEFF1	-										
MCOGEFF2	0.637		1								
MCOGEFF3	0.435	0.58	8	_							
MCOGEFF4	0.410	0.48	1 0.621		1						
MAMBIGUI	-0.014	1 0.20	12 0.181	0.23	8 1						
MAMBIGU2	0.057	7 0.28	4 0.315	0.22	2 0.784	1					
<b>MAMBIGU3</b>	-0.016	5 0.31	2 0.242	0.12	9 0.498	0.631	1				
MAMBIGU4	0.047	7 0.31	8 0.315	0.11	5 0.512	0.626	0.901	1			
MEXCITE1	0.243	3 0.14	12 0.206	0.27	7 -0.102	-0.25	-0.141	-0.19	1		
MEXCITE2	0.353	3 0.21	7 0.151	0.10	8 -0.116	-0.182	-0.144	-0.176	0.360	1	
<b>MEXCITE3</b>	0.458	3 0.24	0 0.235	0.30	7 -0.288	-0.253	-0.247	-0.283	0.585	0.677	1
Mean	5.521	1 5.07	1 4.765		5 3.569	3.231	3.169	3.077	4.908	4.815	4.954
SD	1.259	1.01	4 1.247	1.39	2 1.695	1.569	1.474	1.461	1.497	1.767	1.351

# Table 4.4: Indicator Correlation Matrix for Mexico at End Semester.

	FCOGEFF1	FCOGEFF2	FCOGEFF3	FCOGEFF4	FAMBIGUI	FAMBIGU2	FAMBIGU3	FAMBIGU4	FEXCITE	FEXCITE2	<b>FEXCITE3</b>
FCOGEFF1											
FCOGEFF2	0.771	-									
FCOGEFF3	0.543	0.753	. 1								
FCOGEFF4	0.245	0.321	1 0.284	1							
FAMBIGUI	-0.147	0.013	3 0.02	0.063	1						
FAMBIGU2	-0.145	-0.022	2 0.023	0.034	0.837	1	_				
FAMBIGU3	-0.275	-0.128	0	0.029	0.512	0.698	1				
FAMBIGU4	-0.302	-0.138	3 0.073	-0.014	0.618	0.763	0.775	1			
FEXCITE1	0.406	0.275	9 0.217	0.093	-0.21	-0.254	1 -0.414	-0.441	-	_	
FEXCITE2	0.496	0.418	3 0.326	0.183	-0.418	-0.43	-0.518	-0.517	0.635	1	
FEXCITE3	0.561	0.463	3 0.319	0.12	-0.3	-0.387	-0.556	-0.494	0.767	0.759	1
Mean	5.146	4.822	2 4.369	4.677	3.308	3.123	3.292	2.815	4.793	3 4.8	5.092
SD	1.486	1.212	2 1.306	1.336	1.57	1.576	1.656	1.54	1.46	5 1.716	1.455

## Validity

Score validity refers to how sound the score inferences are. This means that scores in the analysis measure what they are supposed to measure and they do not measure what they should not measure. Construct validity entails most forms of score validity. Construct validity is "the correct assessment of variables one wishes to study and it means that the scores measure the construct that they are supposed to measure" (Kline, 2005, 2009, p. 62). Convergent validity is used for constructs that are expected to measure the same phenomenon. Discriminant validity is used to differentiate between constructs that are expected to measure different phenomena. Having appropriate discriminant validity in a study says that the constructs are, in fact, measuring different things (Kline, 2009).

When looking at the factor loadings, these should have two characteristics. First, the loadings of those indicators measuring the same phenomenon should have high loadings. Hair et al. (1987) suggest that the loadings should exceed 0.5 in order to have convergent validity. The second characteristic of the loadings should be that the correlations between the different constructs are not too high; this would imply discriminant validity (Kline, 2005). United States

In the initial analysis of the factor loadings the fourth indicator for cognitive effort (MCogeff4 and FCogeff4) did not load adequately. This implies that the question did not measure the construct as expected. This indicator was removed from the analysis. The factor loadings of the remaining indicators in the United States data exceed the 0.5 threshold, therefore it can be said that the model has adequate convergent validity. When looking at the loadings between constructs one can also see that none of these loadings are high, implying that this study has appropriate discriminant validity (see Table 4.5).

	MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE
MCOGEFF1	0.760	-0.120	0.300	0.173	-0.020	-0.286
MCOGEFF2	0.889	-0.039	-0.122	0.005	0.091	0.070
MCOGEFF4	0.836	0.151	-0.143	-0.163	-0.078	0.185
MAMBIGU1	-0.163	0.843	0.202	0.144	-0.018	-0.234
MAMBIGU2	-0.002	0.883	-0.263	0.057	0.086	0.127
MAMBIGU3	0.152	0.896	-0.004	-0.109	-0.006	0.103
MAMBIGU4	0.004	0.857	0.076	-0.086	-0.065	-0.009
MEXCITE1	0.144	0.140	0.874	-0.147	-0.042	0.257
MEXCITE2	-0.016	-0.028	0.815	0.070	-0.093	-0.037
MEXCITE3	-0.141	-0.126	0.796	0.091	0.141	-0.245
FCOGEFF1	-0.143	0.106	-0.147	0.792	-0.352	0.099
FCOGEFF2	0.091	-0.131	-0.088	0.877	0.076	0.090
FCOGEFF3	0.044	0.042	0.258	0.750	0.282	-0.210
FAMBIGU1	-0.196	0.075	0.320	0.157	0.833	-0.240
FAMBIGU2	-0.006	-0.075	-0.329	0.011	0.898	0.119
FAMBIGU3	0.084	-0.031	-0.125	-0.014	0.929	0.188
FAMBIGU4	0.100	0.037	0.160	-0.141	0.906	-0.090
FEXCITE1	-0.036	-0.084	-0.020	0.050	0.008	0.916
FEXCITE2	0.248	0.102	0.117	-0.207	0.095	0.826
FEXCITE3	-0.197	-0.008	-0.090	0.143	-0.099	0.870

**Table 4.5: Combined Factor Loadings for the United States** 

Average variances extracted (AVEs) are also a measure of discriminant validity in a study (Fornell & Larker, 1981). The square root of the individual AVEs (shown diagonally) should be higher than any of the correlations shown below it. As it can be seen in Table 4.6, the individual square roots of the AVEs are higher than any of the correlations shown below

them. Therefore it can be said that these constructs exhibit discriminant validity.

	MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE
MCOGEFF	(0.830)					
MAMBIGU	0.202	(0.870)				
MEXCITE	-0.065	-0.283	(0.829)			
FCOGEFF	0.577	0.125	0.129	(0.808)		
FAMBIGU	0.129	0.569	-0.239	0.242	(0.892)	
FEXCITE	-0.083	-0.26	0.609	0.266	-0.242	(0.872)

	<b>Table 4.6:</b>	<b>United States</b>	Latent V	Variable	Correlations
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Note: Square roots of average variances extracted (AVEs) shown on diagonal.

# Mexico

As it was explained in the United States portion of the analysis, the fourth cognitive effort indicator (MCogeff4 and FCogeff4) did not load for the Mexico data; therefore this indicator was removed from the Mexico analysis. The loadings of the remaining indicators can be seen in Table 4.7. All of the loadings within the constructs are well above the 0.5 threshold and none of the loadings between the constructs are too high. This means that the data has appropriate convergent and discriminant validity.

	MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE
MCOGEFF	0.824	-0.224	-0.071	-0.034	-0.108	-0.202
MCOGEFF	0.894	0.022	-0.100	0.005	0.037	0.194
MCOGEFF	0.796	0.207	0.186	0.029	0.070	-0.008
MAMBIGU	-0.155	0.800	0.252	0.208	-0.097	-0.344
MAMBIGU	0.014	0.879	-0.068	0.027	-0.101	-0.218
MAMBIGU	0.008	0.885	-0.029	-0.176	0.082	0.306
MAMBIGU	0.118	0.887	-0.131	-0.039	0.106	0.221
MEXCITE	-0.172	0.252	0.761	0.219	-0.102	-0.208
MEXCITE	0.049	-0.036	0.820	-0.164	0.059	0.045
MEXCITE	0.099	-0.177	0.916	-0.035	0.032	0.132
FCOGEFF	0.025	0.009	-0.248	0.866	-0.198	0.118
FCOGEFF	-0.041	-0.042	0.075	0.949	0.021	-0.085
FCOGEFF	0.020	0.038	0.167	0.857	0.177	-0.025
FAMBIGU	-0.037	0.097	0.072	0.043	0.841	0.154
FAMBIGU	0.006	0.010	0.044	0.088	0.939	0.117
FAMBIGU	0.030	-0.072	-0.110	-0.044	0.845	-0.217
FAMBIGU	0.001	-0.033	-0.010	-0.090	0.897	-0.062
FEXCITE	0.073	0.097	-0.011	-0.086	0.111	0.887
FEXCITE	-0.153	-0.007	0.052	0.025	-0.162	0.883
FEXCITE	0.075	-0.086	-0.039	0.058	0.048	0.936

**Table 4.7: Combined Factor Loadings for Mexico.** 

Table 4.8 shows the latent variable correlations for the Mexico data. The square roots of the AVEs are shown diagonally in parentheses. From this table we can see that the AVEs are higher than the correlations shown below them, meaning these constructs have adequate discriminant validity.

	MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE
MCOGEFF	(0.839)					
MAMBIGU	0.262	(0.863)				
MEXCITE	0.359	-0.279	(0.835)			
FCOGEFF	0.270	0.308	0.131	(0.891)		
FAMBIGU	-0.161	0.285	-0.276	-0.108	(0.881)	
FEXCITE	0.212	0.103	0.364	0.483	-0.517	(0.902)

**Table 4.8: Mexico Latent Variable Correlations.** 

Note: Square roots of average variances extracted (AVEs) shown on diagonal.

## Reliability

Reliability "concerns the degree to which the scores are free from random measurement error" (Kline, 2005, p. 58). Reliability coefficients are typically considered excellent at .90, very good at .80 and adequate at .70 (Nunnally, 1978). The minimum reliability for most studies is .70. The higher the reliability coefficients are; the less variance present due to random error. Negative reliability coefficients are taken as zero coefficients, however when they are present they may imply problems with the variables (Kline 2005, 2009). In this study two measures of reliability are provided: composite reliability and Cronbach's alpha coefficients. The latter is the measure of reliability most commonly used in studies (Nunnally, 1994). These coefficients are a measure of internal consistency of an instrument and measure the quality of the instrument.

## United States

Table 4.9 shows the composite reliability and Cronbach's alpha coefficients for the United States sample. Both of these coefficients are above the 0.7 recommended threshold, meaning the instrument used has adequate reliability (Nunnally, 1978).

	Comp	osite Reliab	oility Coeffic	ients			
MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE		
0.869	0.926	0.868	0.849	0.940	0.905		
Cronbach's Alpha Coefficients							
MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE		
0.773	0.893	0.771	0.732	0.914	0.841		

# Table 4.9: Reliability Coefficients for the United States.

Mexico

Table 4.10 shows the composite reliability and Cronbach's alpha coefficients for the

Mexico sample. Both of these coefficients are above the 0.7 recommended threshold for each

one of the latent constructs, meaning the instrument used has adequate reliability.

# Table 4.10: Reliability Coefficients for Mexico.

	Compo	site Reliab	ility Coeffi	cients				
MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE			
0.877	0.921	0.873	0.920	0.933	0.929			
	Cronbach's Alpha Coefficients							
MCOGEFF	MAMBIGU	MEXCITE	FCOGEFF	FAMBIGU	FEXCITE			
0.788	0.885	0.779	0.869	0.903	0.885			

## V. RESULTS

# Significance

There is an ongoing argument in the behavioral sciences regarding two aspects of published studies. The first argument is that studies rely too much on statistical tests and do not take into consideration effect sizes. The second is the argument that significance tests are not explained correctly in most studies. In order to address the first argument the following section will provide a brief explanation of the suggested meaning for the significance tests presented in this study, effect sizes will be discussed later in this paper (Carver, 1993; Kline 2004, 2009).

WarpPLS (the software used in this analysis) estimates p values for the path coefficients in the model. These p values are necessary to interpret the results of the study. If  $p < \alpha$ , then the null hypothesis is rejected at that level of statistical significance. This means that the probability of getting the data given the null hypothesis is < .05. In other words, if the null hypothesis were true and the study was to be repeated a number of times, then less than 5% of the studies would be more inconsistent with the null hypothesis than the achieved results (Kline 2004, 2009).

# Model

The models in Figures 5.1 and 5.2 present all the variables as well as the links representing the hypothesized effects of this study. The latent variables in this analysis are represented by ovals. Each link between two variables represents a hypothesized effect. Those links that were found to be non-significant in the analysis are represented by dotted arrows. Those links that were found to be significant are represented by solid arrows. The hypotheses which were supported by the study are shown in bold writing (e.g. **H1a).** For those relationships that were found to be significant, the  $\beta$  path coefficients are shown. Those relationships that were found to be non-significant are represented by the letters "(NS)."



Figure 5.1: United States Results Model



Figure 5.2: Mexico Results Model

## **Results overview**

The results of the structural equation modeling analysis can be seen in Figures 5.1 for the United States and Figure 5.2 for Mexico.

## United States

The first six hypotheses concerned the effects of the condition of the course and its effect on the three latent variables used in the study, both at the middle and the end of the semester (see Figure 5.1). For the United States the path from condition to mid semester cognitive effort was found to be positive and significant at the .10 level of significance. Supporting the hypotheses that students who were in the online course would experience increased cognitive effort during the middle of the course (H1a). The path from condition to mid semester ambiguity was found to be positive and significant at the .01 level. Hence, students in the online course experienced increased ambiguity during the middle of the semester. The hypothesized effect was supported (H1b). The path from condition to mid semester excitement was found to be non-significant. This means that the students in the online course did not experience less excitement, this hypotheses was not supported (H1c). The path from condition to end semester cognitive effort was found to be non-significant. This means that at the end of the semester the students in the online course and the face-toface course perceived similar levels of cognitive effort. This hypothesis was supported (H2a). The path from condition to end semester ambiguity was found to be non-significant, meaning that students in the online and face-to-face course experienced similar levels of ambiguity at the end of the semester. These results support the hypothesized effect (H2c).

The next set of hypotheses dealt with the effect of each of the latent variables on student performance both at the middle and at the end of the semester. Because the existing theory does not imply differences at different points in the semester, the effects were hypothesized to be the same at the middle and end of the semester. The path from mid semester cognitive effort to mid semester performance was found to be significant and negative. This means that an increase in perceived cognitive effort caused a decrease in performance at the middle of the semester. These results do not provide support for the hypothesis (H3a) since the hypothesized effect was positive. The path from mid semester ambiguity to mid semester performance was found to be non-significant. This means that different levels of perceived ambiguity did not affect student performance. This hypothesis was not supported (H3b). The path from mid semester excitement to mid semester performance was found to be positive and significant at the .05 level. This shows that an increased level of perceived excitement in the course resulted in increased performance. This hypothesis was supported (H3c). The path from end semester cognitive effort to end semester performance was found to be negative and significant at the .05 level. This means that at the end of the semester an increase in cognitive effort caused a decrease in end semester performance. The hypothesized effect was a positive relationship, therefore this hypothesis is not supported (H4a). The path from end semester ambiguity to end semester performance was expected to be negative and significant however this relationship was found to be nonsignificant. This hypothesis was not supported (H4b). The path from end semester excitement to end semester performance was found to be positive and significant at the .05 level. This means that an increase in the perceived excitement at the end of the semester resulted in increased student performance at the end of the semester. This hypothesis was supported (H4c). Finally mid semester performance, as expected, had a positive significant effect (at the .01 level) on end semester performance. This means that the higher the student grades at

the middle of the semester the higher the final grades will be. This is an intuitive finding. Mexico

In this model (see Model 5.2) the path from condition to mid semester cognitive effort was found to be negative and significant at the .01 level. This means that students in the face-to-face section of the course perceived a higher level of cognitive effort at the middle of the semester. This hypothesis is not supported since the hypothesized effect was that the students in the online course would experience higher cognitive effort (H1a). The path from condition to mid semester ambiguity was found to be non-significant. This means that the students perceived similar levels of ambiguity at the middle of the semester regardless of the condition of the course. This hypothesis was not supported (H1b). The path from condition to mid semester excitement was found to be negatively and significantly related (at the .01 level). This means that those in the online condition experienced less excitement than students in the face-to-face condition. This hypothesis was supported (H1c). The path from condition to end semester cognitive effort was found to be significantly and negatively related to end semester cognitive effort (at the .01 level). This means that at the end of the semester students in the face-to-face course were experiencing increased levels of cognitive effort. This hypothesis was not supported (H2a). The path from condition to end semester ambiguity was found to be positive and significant related (at the .05 level). This means that students in the online condition experienced an increase level of ambiguity at the end of the semester. This hypothesis was not supported (H2b). The path from condition to end semester excitement was found to be significantly (at the .05 level) and negatively correlated. This means that at the end of the semester the students in the online course experienced significantly less excitement than the students taking the course face-to-face.

This hypothesis was not supported (H2c).

The second set of hypotheses in this model refers to the effect of the three latent constructs on student performance. The path from mid semester cognitive effort to mid semester performance was found to be negative and significant at the .10 level. This result is similar to that found in the United States and means that at the middle of the semester an increased level of cognitive effort resulted in a decrease in mid semester performance. This hypothesis was not supported since it was significant but not positive (H3a). The path from mid semester ambiguity to mid semester performance was found to be non-significant. This means that ambiguity did not have an effect on student performance at the middle of the semester. This hypothesis was not supported (H3b). The path from mid semester excitement to mid semester performance was found to be positive and significant at the .10 level. This means that an increased level of excitement at the middle of the semester resulted in increased student performance. This hypothesis was supported (H3c). The path from end semester cognitive effort to end semester performance was not significant, meaning that cognitive effort at the middle of the semester did not have an effect on the students' performance at the end of the semester. This hypothesis was not supported (H4a). The path from end semester ambiguity was not significantly related to end semester performance. This means that ambiguity did not affect student performance at the end of the semester. This hypothesis was not supported. The path from end semester excitement to end semester performance was found to be non-significant. This means that levels of excitement in students did not have an effect on their performance. This hypothesis was not supported (H4c). Finally, the path from mid semester performance to end semester performance is positive and significant at the .01 level. This means that midterm grades have an effect on the final grades of a student. This hypothesis was confirmed (H5). A summary of all the

hypotheses can be found in Table 5.1.

# Table 5.1: Summary of Results

	Suppor Supp	ted/Not orted
Hypotheses	US	Mexico
H1a: At the middle of the semester, students in the online section of the course will have significantly higher perceived cognitive effort than in the face-to-face section of the course.	Supported	Significant But not Supported
H1b: At the middle of the semester, students in the online section of the course will have significantly higher perceived communication ambiguity than in the face-to-face section of the course.	Supported	Not Supported
H1c: At the middle of the semester, students in the online section of the course will have significantly lower perceived excitement than in the face-to-face section of the course.	Not Supported	Supported
H2a: At the end of the semester, perceived cognitive effort will not be significantly different in the online section and the face-to-face section of the course.	Supported	Not Supported
H2b: At the end of the semester, perceived ambiguity will not be significantly different in the online section and the face-to-face section of the course.	Supported	Not Supported
H2c: At the end of the semester, perceived excitement will not be significantly different in the online section and the face-to-face section of the course.	Supported	Not Supported
H3a: At the middle of the semester, perceived cognitive effort will be significantly and positively related to mid semester grade.	Significant But not Supported	Significant But not Supported
H3b: At the middle of the semester, perceived communication ambiguity will be significantly and negatively related to mid semester grade.	Not Supported	Not Supported
H3c: At the middle of the semester, perceived excitement will be significantly and positively related to midterm grade.	Supported	Supported
H4a: At the end of the semester, perceived cognitive effort will be significantly and positively related to midterm grade.	Significant But not Supported	Not Supported
H4b: At the end of the semester, perceived communication ambiguity will be significantly and negatively related to midterm grade.	Not Supported	Not Supported
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H4c: At the end of the semester, perceived excitement will be significantly and positively related to midterm grade.	Supported	Not Supported
H5: Student midterm grades will be significantly and positively related to student final grades.	Supported	Supported

#### **Effect Size and Sample Size**

The Publication Manual of the American Psychological Association (APA 2005) mentioned that effect sizes are rarely reported in studies, which constitutes a "defect" as described by Kline (2009, pp. 154). The APA also suggested that future studies include effect size information. Effect size is "the magnitude of the impact of the independent variable on the dependent variable" (Kline, 2009, p. 153). As mentioned before, in PLS only one part of the model is involved at any one time. Therefore the recommended method for determining effect size is to look at the model portion that requires the largest multiple regression. In order to find adequate sample size one can find the largest of the following:

- 1. The block with the highest number of formative indicators
- 2. The dependent latent variable with the largest number of independent latent variables affecting it (this would be the equivalent of the largest structural equation).

One takes the largest of the two options and multiplies that times ten. This would give us some guidance to adequate sample size. However if one wants a more accurate estimate of the appropriate sample size one can specify the effect size and use Cohen's (1988) or Green's (1991) power tables. For this study effect size was calculated for the two dependent variables, Midterm Performance and End Semester Performance, since other studies have calculated effect size for all dependent variables and not only for the largest regression in a model (Klein & Rai, 2009). In order to calculate effect size one must look at the R² of the dependent variables. Although Cohen mentions that different fields have different effect size values he proposes that that the definition for small, medium and large effect be R²s of .02, .13, and .26 respectively. Looking at Table 5.3 one can see that in the United States sample the R² for Mid Semester Performance was 0.27 and for End Semester Performance it was 0.66. Both of these correspond to a large effect size according to Cohen. Looking at Table 5.3 for the Mexico sample one can see that the R² for Mid Semester Performance it was 0.74. Both of these also constitute large effect sizes in accordance with Cohen's guidelines. In order to determine appropriate sample size, the number of predictors for each one of these variables was determined and matched to Green's condensed version of Cohen's tables (see table 5.2).

In this table, the sample size provided is the one required to test the hypothesis achieving power of .80. In order to use this table one must determine the number of predictors for each of the dependent variables. In both the Mexico and United States models Mid Semester Performance has three predictors and therefore requires a sample size of 35, End Semester Performance consists of four predictors and requires a sample size of 39 in order to achieve a power of .80. A summary of sample size requirements for the dependent variables in this study can be found in Table 5.3.

Sample Sizes Based on Power Analysis								
Number of		Effect Size						
Predictors								
	Small	Medium	Large					
1	390	53	24					
2	481	66	30					
3	547	76	35					
4	599	84	39					
5	645	91	42					
6	686	97	46					
7	726	102	48					
8	757	108	51					
9	788	113	54					
10	844	117	56					

Table 5.2: Sample Size required to test the hypotheses with a power of .80 (Adaptedfrom Green, 1991).

Table 5.3: Summary of sample sizes Required for this study.

Sample Size Required to lest Hypotheses with a Power of .80										
	Mexico	Sample	US Sample							
	Mid	End	Mid	End						
	Semester	Semester	Semester	Semester						
	Performance	Performance	Performance	Performance						
R ²	0.33	0.77	0.27	0.66						
Predictors	3	4	3	4						
Effect Size	Large	Large	Large	Large						
Sample	35	39	35	39						
Size										

Sample Size Required to Test Hypotheses with a Power of .80

#### VI. DISCUSSION

#### **Overview of Findings**

In the United States sample the analysis supported several of the hypothesized effects. The Media Naturalness Theory and the compensatory adaptation model were both supported by the results. In the middle of the semester, students in online courses experienced an increased amount of cognitive effort. This result is consistent with the idea that using media that are less natural than face-to-face communication increases the learning burden of the student. Using non-natural media caused the online students to perceive higher mental activity than those students taking the course face-to-face. Communication ambiguity was also hypothesized to be higher in the online group. When dealing with non-natural media students are more likely to perceive gaps in the information received, feeling like there is a lack of clarity in the course. The results from the study show that the online students did perceive significantly higher ambiguity than the face-to-face students. The third latent variable, excitement, was hypothesized to be lower in online students. The Media Naturalness Theory holds that taking part in face-to-face communication will yield a higher level of excitement in individuals due to the different gestures and non-verbal cues that can be perceived by a communicator. This hypothesis was not supported by the study. In addition, the relationship was positive, meaning that online students actually perceived higher levels of excitement; however this effect was not significant. This means that students in the online and face-to-face courses perceived similar levels of excitement.

By the end of the semester the differences that existed in the middle of the semester between the online and the face-to-face courses had disappeared. This means that compensatory adaptation took place and the online students no longer felt like they had increased cognitive effort or high levels of ambiguity. This proves that while we may have some problems with non-natural media, given enough time, we are able to compensate for these problems.

Previous research indicates that when students are faced with increased cognitive effort they also exhibit increased memorization capabilities and improved performance (Berry, 1987; Swanson, 1984; Tyler et al. 1979). However, in this study the outcomes did not support this research. Cognitive effort at the middle and at the end of the semester was negatively correlated with performance. This means that students who perceived an increased amount of cognitive effort actually had lower grades. Perhaps the reason is that previous studies looked at different types of courses (as opposed to accounting courses). More research would have to be conducted in order to determine if this is a phenomenon that occurs only in certain types of courses. Previous research also indicates that an increase in ambiguity causes decreased performance. However, these hypotheses were not supported. Ambiguity did not have an effect on the performance of the students during the middle of the semester or the end of this semester. This means that although students may feel like there is lack of clarity in the course they are still able to perform as well as the rest of the students. It was also hypothesized that excitement would be positively related with performance. This would imply that when a student perceives a higher level of excitement in the course, performance increases. This occurred both at the middle and the end of the semester. This result has important implications for accounting courses. It is often believed that having high levels of excitement may cause distraction and may have a negative effect in student learning. However, in those courses in which students tend to use a surface approach to

learning, an increase in excitement actually improves recall, allowing students to remember more information.

In the Mexico sample, results were different than those of the United States. At the middle of the semester students in the face-to-face course experienced higher levels of cognitive effort than the online students. This could mean that the type of student in the online and face-to-face courses was different, the face-to-face course was composed of students with a wide range of backgrounds; while in the online course a large portion of the students were from an accounting background. In addition, both of the courses were nine week courses, which is close to half the time of the semester courses surveyed in the United States. The shorter time span most likely has an effect on these results. At the middle of the semester both groups had similar levels of ambiguity. Also, at the middle of the semester the students in the face-to-face course experienced a higher level of excitement. This result is consistent with the Media Naturalness Theory which hypothesizes that students communicating face-to-face will experience a higher level of excitement. At the end of the semester, once again the students in the face-to-face section of the course experienced a higher level of cognitive effort than the online section. In addition, the online course at the end of the semester perceived higher levels of ambiguity than the face-to-face course. This result is similar to that found at the middle of the semester in the United States data analysis and is consistent with the effects hypothesized for the middle of the semester. At the end of the semester the students in the face-to-face courses again experienced higher levels of excitement than the online students. This result is also similar to that found at the middle of the semester in the United States data analysis and consistent with the effects hypothesized for the middle of the semester.

Cognitive effort at the middle and end of the semester had a negative correlation with performance (only the effect at the middle of the semester was significant). This means that, similar to the United States sample, a higher perceived cognitive effort caused a reduction in the grade. Ambiguity did not have a significant effect on performance at the middle or end of the semester, this result was not as hypothesized, however it was consistent with the results in the analysis for the United States. Finally, excitement at the middle of the semester was significantly and positively related to mid semester performance. This result is also consistent with the United States sample and means that a higher level of excitement in the course can result in better student performance. The relationship for excitement and performance at the end of the semester was positive but was found to be non-significant. The results from this study have several implications for accounting education.

#### Implications

There are a number of implications for the United States sample. First, the contradicting results found in previous research of online classes may be due to the timing of the study. If one was to survey a course at different points during this semester one could find contradictory results, such as the ones in the existing literature. This study provides support for the idea that students in online courses have different perceptions than students in face-to-face courses, however it also supports the idea that individuals are able to compensate for the obstacles.

Another implication has to do with the belief that increased cognitive effort yields better grades. In this study, an increase in cognitive effort resulted in a reduction of grades. While there is no explanation for this phenomenon, it is possible that accounting courses have different characteristics than other courses (Bollen et al., 2002). Another important finding of this study is that an increase in excitement results in improved performance. This means that instructors may be able to improve the quality of the learning experience by including activities that promote positive physiological arousal. These results go against the idea that a lack of excitement may allow students to become more focused and therefore have improved performance (Kock, 2005). In addition, it may explain performance differences between online and face-to-face courses during the middle of the course (online students tend to be less excited at the middle of the semester potentially causing a decrease in performance).

One important difference in the Mexico sample, as mentioned before, is the shorter time span. The courses were equivalent (time wise) to half of a semester of the courses surveyed in the United States. This could mean various things. First, it could mean that the face-to-face course experienced higher levels of cognitive effort than the United States sample due to the burden of having a compressed course. In addition, the face-to-face course was using Blackboard for the first time. While all of the lectures were delivered face-to-face Blackboard was used for the submission of assignments and to distribute readings or solutions to the students. Using this learning platform for the first time may have increased the mental burden of the students, causing them to experience higher levels of cognitive effort than the online students.

The results found at the end of the semester were very similar to the results hypothesized for the middle of the semester. It could be that, because of the shorter time span, the students in the online course did not have enough time to adapt. Therefore the results at the middle of the semester would be equivalent to the results during the middle of the semester in a regular semester. There have been some studies of short courses compared to long courses. A number of studies have found that summer courses have different results than courses taught during the regular semester. Caskey (1994) studied algebra and accounting courses in short and traditional formats and found that there was no difference between the two formats. The researcher did not have any control variables in the study. Ewer et al. (2002) looked at introductory accounting courses and found that those with high SAT/ACT scores performed better in a short format. This would mean that short courses only provide a benefit to those who have increased academic capacity. Studies of semester length tend to look at performance differences, not perceptions like the ones measured in this study. In addition, the existing studies seem to have a large number of limitations like extremely small samples, lack of control variables, and weak statistical analysis. A conclusive answer as to what caused the differences in the Mexico sample cannot be provided. However, it is a definite possibility that the students did not have time to adapt because of the shorter semester.

#### VIII. CONCLUSION

#### Summary

While vast numbers of studies have been conducted in online education, there still seems to be something missing, especially in the field of accounting. Many of the studies that have been conducted to date lack a solid theoretical basis. Other times, theoretical frameworks have been offered yet they do not seem to ever get tested (Arbaugh, 2009). There have been plenty of simple comparisons of online and face-to-face courses looking at differences in performance. However in the past few years studies of online education have changed and have started to look at the course experience (Kock et al, 2007). This study analyzes the course experience and performance of the students at the middle and end of the semester. This study also attempts to clarify the contradictory outcomes that have been found by online education research throughout the years and to provide a theoretically and methodologically sound study of online accounting education. This study tested the Media Naturalness Theory (Kock, 2001) as well as the compensatory adaptation model and found support for both.

#### Limitations

This study has a number of limitations. First of all, as mentioned before, this study was not randomized. A convenience sample was used due to the difficulty of randomly assigning students to online and face-to-face courses. In these types of studies the subjects self-select by choosing the course mode of delivery. Another limitation of this sample is the sample size. Although the analysis of effect size showed that sample size was adequate, the study could benefit from a larger sample. One benefit of having a larger sample is having larger variability in the types of courses and the types of students surveyed. The study conducted in Mexico proved to be very different from that in the United States mainly because the courses were condensed. A larger sample size containing condensed and long courses in the samples from both countries is likely to yield interesting results. Another limitation of this study is the fact that each course was taught at the discretion of the instructor. Although the effect of the different instructors was controlled for, there could be some differences in the teaching methods that had an effect on the variables studied.

#### **Future Research**

This study could be built upon by adding to the existing sample. Collecting data in both short and long courses would clarify the effects found in this study. Collecting additional data in long courses in Mexico would also help identify the cause of the different results found in this study. While it is probable that the length of the course had a significant influence in the results, it is also possible that there are some cultural factors at play. In addition, this study leaves out the effect of the instructor. Arbaugh (2009) recommends that research begin to also focus on faculty, in order to find which instructor characteristics are best suited for online education (Schniederjans & Kim, 2005). Future instruments could include a measure of teaching styles, in order to find which if any teaching styles are beneficial for online education. While students want higher control of their courses they do not always make good use of it. Some students do not have the ability to self-manage, which can result in decreased performance in online courses. There are characteristics of students that may prove beneficial for online education. Proserpio & Gioia (2007) believe learning styles should be analyzed in the context of online education in order to discover if changes have come about due to the increase in online education. There is also a need for theories that guide the design, delivery and implementation of e-learning (Gaytan, 2009). E-learning seems to be guided more by the "bells and whistles" provided by technology than by research and theory (Mungai et al., 2002). With additional research we may be able not just to make online learning as interesting, as exciting or as clear as face-to-face communication, we may be able to find ways to make online education better than traditional education.

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Country	Power Distance	Individualism/ Collectivism	Masculinity/ Femininity	Uncertainty Avoidance	Long-/Short- Term Orientation
Arab World	80	38	52	68	
Argentina	49	46	56	86	
Australia	36	90	61	51	31
Austria	11	55	79	70	
Austria	11	55	79	70	
Bangladesh	80	20	55	60	40
Belgium	65	75	54	94	
Brazil	69	38	49	76	65
Bulgaria	70	30	40	85	
Canada	39	80	52	48	23
Chile	63	23	28	86	
China	80	20	66	30	118
Colombia	67	13	64	80	
Costa Rica	35	15	21	86	
Czech Republic	57	58	57	74	13
Denmark	18	74	16	23	
East Africa	64	27	41	52	25
Ecuador	78	8	63	67	
El Salvador	66	19	40	94	
Estonia	40	60	30	60	
Finland	33	63	26	59	
France	68	71	43	86	
Germany	35	67	66	65	31
Greece	60	35	57	112	
Guatemala	95	6	37	101	
Hong Kong	68	25	57	29	96
Hungary	46	80	88	82	50
India	77	48	56	40	61
Indonesia	78	14	46	48	
Iran	58	41	43	59	
Ireland	28	70	68	35	
Israel	13	54	47	81	
Italy	50	76	70	75	
Jamaica	45	39	68	13	
Japan	54	46	95	92	80

Appendix A-Hofstede's Cultural Dimensions (Hofstede, n.d)

Luxembourg	40	60	50	70	
Malaysia	104	26	50	36	
Malta	56	59	47	96	
Mexico	81	30	69	82	
Morocco	70	46	53	68	
Netherlands	38	80	14	53	44
New Zealand	22	79	58	49	30
Norway	31	69	8	50	20
Pakistan	55	14	50	70	0
Panama	95	11	44	86	
Peru	64	16	42	87	
Philippines	94	32	64	44	19
Poland	68	60	64	93	32
Portugal	63	27	31	104	
Romania	90	30	42	90	
Russia	93	39	36	95	
Singapore	74	20	48	8	48
Slovakia	104	52	110	51	38
South Africa	49	65	63	49	
South Korea	60	18	39	85	75
Spain	57	51	42	86	
Surinam	85	47	37	92	
Sweden	31	71	5	29	33
Switzerland	34	68	70	58	
Taiwan	58	17	45	69	87
Thailand	64	20	34	64	56
Trinidad	47	16	58	55	
Turkey	66	37	45	85	
United Kingdom	35	89	66	35	25
United States	40	91	62	46	29
Uruguay	61	36	38	100	
Venezuela	81	12	73	76	
Vietnam	70	20	40	30	80
	77	20	16	54	16

#### Appendix B IRB Documentation

#### **Consent Form**

Study Title: Compensatory Adaptation and Online Learning in Accounting Education

#### **Investigator**: Ms. Vanessa Garza

Ms. Garza is a Ph. D. student in International Business and Management Information Systems investigating, as part of her dissertation, compensatory adaptation in online learning in accounting education as opposed to learning in traditional face-to-face courses. Although the study will not benefit you directly, it will provide information that might help in the development of online education.

The appropriate people and review boards (IRB) at Texas A&M International University have approved the study and its procedures. The study procedures involve no foreseeable risks or harm to you. The procedure includes, responding to a questionnaire about your perceptions of this course.

Participating in this study will take approximately 25 minutes. You are free to ask any questions about the study or about being a subject, and you may contact Ms. Garza at 956-326-2552 or vanessa.garza@tamiu.edu if you have further questions. Also, these questions may be directed to Dr. David Beck (English) at (956) 326-2587 or Dr. Roberto Heredia (English/Spanish) at (956) 326-2637 at Texas A&M International University, Institutional Review Board for the Protection of Human Subjects.

Your participation in the study is voluntary and you are under no obligation to participate. You have the right to withdraw at any time, during the period of study. All study data will be compiled by the researcher and stored in a secure place. The data will not be shared with any other person without your permission. In addition, your identity will not be revealed while the study is being conducted or when the study is reported or published.

I have read this consent form and voluntarily consent to participate in this study.

Subject's Name

Subject's Signature

Date

I have explained this study to the above subject and have sought his/her understanding for informed consent.

Investigator's signature

### Appendix C

### **Compensatory Adaptation and Online Learning Survey**

I am interested in sincere answers. Do not worry about providing answers that are critical or negative. Those are quite useful in the continuous improvement of the course. Your answers to the questions below, whatever they are, will have absolutely no impact on your grade.

**Section I.** These are standard demographics questions. Please feel free not to answer some or all of these questions if you do not feel comfortable doing so. With the exception of the "demographics" questions below, all the other questions must be carefully answered.

D1.	What is your sex?	
D2.	What is your age?	
D3.	What is your GPA?	
D4.	What was your last SAT score?	
D5.	How many years of work experience do you	
	have?	
D6.	What is your major?	
D7.	What is your classification (Jr., Sr.	
	Graduate, etc)?	
D8.	What is your ethnicity?	

**Section II.** The following questions refer to the course, as you perceive it so far. Please ignore the codes COGEFF1, COGEFF2 ... at the beginning of the questions.

Scale for answers:

- 7 Very strongly agree
- 6 Strongly agree
- 5 Agree
- 4 Neither agree nor disagree
- 3 Disagree
- 2 Strongly disagree
- 1 Very strongly disagree

**COGEFF1**: Taking this course has required a great deal of mental and perceptual activity (e.g., thinking, deciding, calculating, remembering, looking, searching, etc.).

	1	2	3	4	5	6	7
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**COGEFF2:** Taking this course has been a demanding and complex task.

1	2	3	Λ	5	6	7
1	2	5	-	5	0	/

**COGEFF3:** Taking this course has required a lot of time pressure due to the pace at which the course progressed.

1	2	3	4	5	6	7

**COGEFF4:** This course has moved forward in a rapid and frantic pace.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**AMBIGU1:** The communication of facts and knowledge has often been ambiguous (unclear).

$1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7$		•	2		_	~	_
	1	2	3	4	5	6	7

**AMBIGU2**: The communication of facts and knowledge has often been vague and confusing.

1	2	3	4	5	6	7

**AMBIGU3:** I have often been unclear as to what was meant.

	_
$1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7$	

AMBIGU4: I often could not understand what was being conveyed (communicated).

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**EXCITE1**: Taking this course has been very exciting.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**EXCITE2:** I haven't felt bored at all while taking this course.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

**EXCITE3:** I feel that taking this course has been very stimulating.

1 2 3 4 5 6 7
---------------

**POSITIVE:** What are the positive aspects of this course so far?

**NEGATIVE:** What are the negative aspects of this course so far?

### Section III.

# In the following sections, try to think of those factors which would be important to you <u>in an ideal job</u>; please disregard the extent to which they are contained in your present job.

# How important is it to you to:

		Of outmost	Very	Of	Of little	Of very
		importance to	important	moderate	importance	little of no
		me		importance		importance
MF1	Have a good working relationship	1	2	3	4	5
	with your manager?					
MF2	Have an opportunity for high	1	2	3	4	5
	earning?					
MF3	Work with people who cooperate	1	2	3	4	5
	well with one another?					
IC1	Have a job which leaves you	1	2	3	4	5
	enough time for your personal or					
	family life?					
IC2	Have good physical working	1	2	3	4	5
	conditions (good ventilation and					
	lighting, adequate work space,					
	etc.)?					
IC3	Have training opportunities (to	1	2	3	4	5
	improve your skills or to learn new					
	skills)?					

# Please indicate the extent to which you personally agree or disagree with each of the following statements:

		Strongly	Agree	Undecided	Disagree	Strongly
		agree				disagree
PD1	Having an interesting work to do	1	2	3	4	5
	is just as important to most people					
	as having high earnings					
PD2	A corporation should have a major	1	2	3	4	5
	responsibility for the health and					
	welfare of its employees and their					
	immediate families					
UA1	Company rules should not be	1	2	3	4	5
	broken, even when the employee					
	thinks it is in the company's best					
	interests					

# How frequently, in your experience, do the following problems occur?

		Very	Frequently	Sometim	Seldom	Very
		frequently		es		seldom
PD3	Employees being afraid to express	1	2	3	4	5
	disagreement with their managers					

# In the following section think of your <u>current job</u>, please disregard your ideal job. If you are not currently employed please answer thinking of your last job. If you have never been employed please disregard these questions.

## **Regarding your current job:**

		I always feel this way	Usually	Sometimes	Seldom	I never feel this way
UA2	How often do you feel nervous or tense at work?	1	2	3	4	5

		Two years at the most	From two to five years	More than five years (but I probably will leave before I retire)	Until I retire
UA3	How long do you think you will continue working for that company?	1	2	3	4

# Please indicate how important to you is each one of the following items:

		Of outmost	Very	Of	Of little	Of very
		importance	important	moderate	importance	little of no
		to me		importance		importance
LT1	Persistence (perseverance)	1	2	3	4	5
LT2	Thrift (ability to carefully manage	1	2	3	4	5
	material resources)					
LT3	Patience	1	2	3	4	5

# Appendix D

# Encuesta de Adaptación Compensatoria y Aprendizaje en Línea

Estoy interesada en obtener respuestas sinceras. No se preocupe de dar respuestas críticas o negativas. Este tipo de respuesta es muy útil en la mejora continua de los cursos. Sus respuestas a las preguntas siguientes, cualesquiera que estas sean, no tendrán impacto alguno en su calificación en este curso.

**Sección 1.** Estas son preguntas demográficas comunes. Por favor, siéntase libre de no responder a algunas de estas preguntas si usted no se siente cómodo respondiéndolas. Con la excepción de las preguntas demográficas a continuación, todas las preguntas deben ser cuidadosamente respondidas.

D1.	¿Cual es su sexo?	
D2.	¿Cual es su edad?	
D3.	¿Cual es su promedio de calificaciones?	
D4.	¿Cuantos años de experiencia laboral	
	posee?	
D5.	¿Cual es su carrera (especialización)?	
D6.	¿Que semestre cursa?	
D7.	¿Cual es su nacionalidad?	

**Sección 2.** Las siguientes preguntas se refieren al curso (clase), como ustedes lo perciben hasta ahora. Por favor, ignore los códigos COGEFF1, COGEFF2... al principio de las preguntas.

Escala de respuestas:

- 7 Estoy absolutamente de acuerdo.
- 6 Estoy muy de acuerdo
- 5 Estoy de acuerdo
- 4 No estoy ni de acuerdo ni en desacuerdo
- 3 Estoy en desacuerdo
- 2 Estoy muy en desacuerdo
- 1 Estoy en desacuerdo absoluto

**COGEFF1**: Tomar este curso ha requerido un alto nivel de actividad mental y perceptiva (por ejemplo: pensar, decidir, calcular, recordar, mirar, buscar, etc.)

1 2 3 4 5 6 7
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**COGEFF2:** Tomar este curso ha sido una tarea llena de exigencias y muy compleja.

	1	2	3	4	5	6	7
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**COGEFF3:** Tomar este curso ha requerido de mucho tiempo y me he sentido presionado debido al paso en el que ha progresado este curso.

1	2	3	4	5	6	7

COGEFF4: Este curso ha avanzado a un paso rápido y frenético.

1	2	3	4	5	6	7

**AMBIGU1:** La comunicación de los hechos (información) y del conocimiento a menudo ha sido ambigua (poco clara).

1 2 3 4 5 6 7
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**AMBIGU2**: La comunicación de los hechos (información) y del conocimiento a menudo ha sido vaga y confusa. .

1 2 3	4	5	6	7
-------	---	---	---	---

AMBIGU3: A menudo no estoy seguro del significado de las cosas (del curso).

1	2	3	4	5	6	7

AMBIGU4: A menudo no entiendo lo que se me esta comunicando en este curso.

1	2	3	4	5	6	7

**EXCITE1**: Tomar este curso ha sido muy emocionante.

1	2	3	4	5	6	7
---	---	---	---	---	---	---

EXCITE2: En ningún momento me he sentido aburrido durante este curso.

1 2	3	4	5	6	7
-----	---	---	---	---	---

**EXCITE3:** Siento que tomar este curso ha sido muy estimulante.

1 2 3 4 5 6
-------------

**POSITIVO:** ¿Cuales son los aspectos positivos de este curso hasta ahora?

**NEGATIVO:** ¿Cuales son los aspectos negativos de este curso hasta ahora?

#### Sección 3.

## En las siguientes secciones, sin tomar en cuenta su empleo actual, trate de pensar en que tan importantes serian estos factores para usted en un empleo <u>ideal</u>. Que tan importante es para usted:

		Extremadament	Muy	De	De poca	De muy poca
		e importante	Importante	importan	importancia	o ninguna
				cia		importancia
				moderada		
MF1	¿Tener una buena relación de	1	2	3	4	5
	trabajo con su jefe?					
MF2	¿Tener la oportunidad de recibir	1	2	3	4	5
	un sueldo alto?					
MF3	¿Trabajar con personas que	1	2	3	4	5
	sepan colaborar con los demás?					
IC1	¿Tener un trabajo que le permita	1	2	3	4	5
	tener suficiente tiempo para su					
	vida personal o familiar?					
IC2	¿Tener buenas condiciones de	1	2	3	4	5
	trabajo (Buena ventilación,					
	iluminación, espacio de trabajo					
	adecuado, etc.)?					
IC3	¿Tener oportunidades de	1	2	3	4	5
	capacitación (para mejorar sus					
	habilidades o aprender nuevas					
	habilidades)?					

# Por favor indique el grado en que usted, en lo personal, esta de acuerdo o en desacuerdo con cada una de las siguientes afirmaciones:

		Totalmente	De	Indeciso	En	Totalmente
		de acuerdo	acuerdo		desacuerdo	en
						desacuerdo
PD1	Tener un trabajo interesante es	1	2	3	4	5
	tan importante como tener un					
	buen sueldo.					
PD2	La empresa debe tener una	1	2	3	4	5
	responsabilidad importante en					
	la salud y el bienestar de los					
	empleados y de sus familiares					
	directos.					
UA1	Las normas de la empresa no	1	2	3	4	5
	deben ser quebrantadas, aun					
	cuando el trabajador piense					
	que seria benéfico para la					
	empresa.					

### $\delta$ De acuerdo a sus experiencias, con que frecuencia ocurren los siguientes problemas?

		Con mucha frecuencia	Frecuentem ente	A veces	Rara vez	Muy rara vez
PD3	Los trabajadores tienen miedo de	1	2	3	4	5
	expresar su desacuerdo con sus					
	gerentes o supervisores.					

En la próxima sección piense en su empleo <u>actual</u>, sin tomar en cuenta su empleo ideal. Si usted se encuentra sin empleo en este momento por favor conteste pensando en su empleo previo. Si usted nunca ha tenido un empleo puede dejar estas preguntas sin respuesta.

#### En cuanto a su trabajo actual:

		Siempre	Por lo	A veces	Rara vez	Yo
		me siento	general			nunca
		de esta				me
		manera				siento de
						esta
						manera
UA2	¿Con que frecuencia se siente	1	2	3	4	5
	usted nervioso o tenso en el					
	trabajo?					

Dos años	De dos a	Mas de cinco años	Hasta
como	cinco	(pero probablemente	que me
máximo	años	me iré antes de	jubile

				jubilarme)	
UA3	¿Por cuanto tiempo cree usted que seguirá trabajando para esa empresa?	1	2	3	4

# Por favor indique que tan importante es para usted cada una de las siguientes características:

		De suma	Muy	De	De poca	De muy poca o
		importancia	importante	importancia	importancia	ninguna
				moderada		importancia
LT1	La persistencia (perseverancia)	1	2	3	4	5
LT2	La frugalidad o el ahorro (tener	1	2	3	4	5
	la capacidad de manejar con					
	cuidado los recursos materiales)					
LT3	La paciencia	1	2	3	4	5
# Vanessa Garza

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## **Education**

August 2005-	Texas A&M International University-Laredo, TX
Present	Ph.D. Candidate
	PhD in International Business Administration
	Management Information Systems Concentration
	Expect to defend dissertation May 2011
	<b>Dissertation Topic:</b> Online Learning in Accounting Education: A Study of
	Compensatory Adaptation.
May 2004	Texas A&M International University-Laredo, TX
	Master of Professional Accountancy
May 2002	St. Mary's University-San Antonio, TX
	Bachelor of Business Administration
	Accounting and Management Information Systems (two majors)

# **Academic Experience**

#### **Courses Taught**

ACC 2302 Introduction to Managerial Accounting ACC 3350 Federal Taxation ACC 3370 Introduction to Accounting Systems ACC (Master's level) Managerial and Financial Accounting (In Spanish) BA 3320 International Business DS 2310 Business Statistics MIS 1305 Introduction to Computer Applications MIS 3330 Database Design & Implementation MIS 3340 Data Communication & Networking

#### **Graduate Teaching Assistant**

MIS 5390 Project Design and Management (Master's level)

#### August 2005-Present Lamar Bruni Vergara Research Assistantship

Research Assistant for the Division of International Business and Technology Studies. Conduct research, literature reviews, collect data, analyze data. Texas A&M International University-Laredo, TX

## **Professional Experience**

## 1998-2005 Blair & Blair, P.C. (CPA firm)-Laredo, TX

QuickBooks software training for clients, payroll processing and reporting, preparation of federal income tax returns, consulting.

#### 2002 Groves Rojas Emerson (advertising agency) - San Antonio, Texas

Assist in print advertisement design utilizing various computer programs. Provide translation services from English to Spanish. Aid in maintaining office computers working in optimum conditions.

# **Publications**

#### **Refereed Journal Article**

Kock, N. & Garza, V. (Forthcoming). Media Naturalness Reduction and Compensatory Channel Expansion: A Study of Online and Face-to-face Sections of the Same Course, *International Journal of Distance Education Technologies*. Hershey, PA: Idea Group Publishing.

Kock, N., Verville, J. and Garza, V. (2007). Media Naturalness and Online Learning: Findings Supporting both the Significant- and No-Significant-Difference Perspectives, *Decision Sciences Journal of Innovative Education*, V. 5, No. 2, pp. 333-356. Atlanta, GA: Decision Sciences Institute.

#### **Book Chapters**

Garza, V. (2008). An Overview of Behavior Toward E-Collaboration and Its Relationship to Evolutionary Factors. In N. Kock (Ed.). *Encyclopedia of E-Collaboration*. Hershey, PA: Idea Group Publishing.

Kock, N. & Garza, V. (2007). The Ape that Used Email: An Evolutionary Perspective on Ecommunication Behavior. In N. Kock (Ed.). *E-Collaboration in Modern Organizations*. Hershey, PA: Idea Group Publishing.

#### **Book Review**

Garza, V. and Kock, N. (2007). Designing the User Interface: Strategies for Effective Human-Computer Interaction (by Ben Shneiderman and Catherine Plaisant), *International* 

*Journal of e-Collaboration*, V. 3, No. 2, pp. 53-58. Hershey, PA: Idea Group Publishing.

## **Conference Presentations/Proceedings**

Kock, N., Garza, V. and Rangel, M. (2009). Media Naturalness Reduction and Compensatory Channel Expansion: A Study of Online and Face-to-face Sections of the Same Course, *Proceedings of the 2009 Conference on Information Resources Management*. [Dubai, United Arab Emirates, May 21-23, 2009]

Prieto, L., Sagafi-nejad, T., Janamanchi, B., Garza, V. and Nguyen, D. (2008). Acculturation and Financial Behavior of Hispanics, *Proceedings of the 13th Western Hemispheric Trade Conference*, [Laredo, Texas, April 2-4, 2008]

Chatelain-Jardon, R., Carmona, J., Kock, N., Cavazos-Garza, A., and Garza, V. (2007). The Effect of Gender on Performance in a Web-based Knowledge Communication Task, *Proceedings of the 18th Information Resources Management International Conference*, 19 Khosrowpour, M. (Ed), IGI Publishing, Hershey, PA, pp. 1132-1134. [Vancouver, Canada, May 19-23, 2007]

# **Computer Skills**

Microsoft Excel Microsoft Access PLS Graph QuickBooks SPSS SQL R Warp PLS

## Languages

Fluent in Spanish