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The University of San Francisco

AT THE CROSSROADS OF LEARNING AND CULTURE:
IDENTIFYING A CONSTRUCT FOR EFFECTIVE COMPUTER-ASSISTED
LANGUAGE LEARNING FOR ENGLISH LANGUAGE LEARNERS

A Dissertation
Presented to
The Faculty of the School of Education
International and Multicultural Education Department

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by
Yun Shaw
San Francisco
May 2010

UNIVERSITY OF SAN FRANCISCO
Dissertation Abstract

At the Crossroads of Learning and Culture: Identifying a Construct for Effective
Computer-Assisted Language Learning for English Language Learners

Many of the commercial Computer-Assisted Language Learning (CALL) programs available today typically take a generic approach. This approach standardizes the program so that it can be used to teach any language merely by translating the content from one language to another. These CALL programs rarely consider the cultural background or preferred learning style of the language learner. The assumption is that one size fits all. Although there are a number of instruments to measure the learning styles of learners and a smaller number of instruments to measure cultural dimensions, there is no one instrument that combines both learning styles and cultural characteristics to determine a relationship between these two sets of variables. A measurement device such as this could be used to design CALL programs that better consider the cultural background and learning styles of English language learners. This could reduce the generic nature of existing CALL programs and increase the effectiveness of technology- and internet-based language instruction.

This study sought to determine whether a combination of survey instruments could be used to identify a relationship between cultural dimensions and learning styles; moreover, whether or not this relationship could be used to design a CALL program that addresses the specific learning styles associated with the cultural background of learners. The CALL Design Analysis Survey (CDAS) was administered to two groups of participants, one from Taiwan and the other from the U.S. The CDAS was comprised of

Kolb's Learning Style Inventory (LSI), Reid's Perceptual Learning Style Preference Questionnaire (PLSPQ), and Hofstede's Values Survey Module (VSM). A correlational analysis was performed on the collected data to determine patterns between the learning styles and cultural dimensions variables.

The results of this analysis provided evidence that relationships between cultural dimensions and learning styles exist and that this information can be used to design CALL programs that better consider the cultural background and learning styles of language learners. This discovery was a positive step toward finding a measurement tool that could lead to more effective technology- and internet-based language instruction.

This dissertation, written under the direction of the candidate's dissertation committee and approved by the members of the committee, has been presented to and accepted by the Faculty of the School of Education in partial fulfillment of the requirements for the degree of Doctor of Education. The content and research methodologies presented in this work represent the work of the candidate alone.

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February 18, 2010
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February 18, 2010

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With the completion of this dissertation, I open the doors to a new journey, one that takes me toward the world of academia, for better or for worse.

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CHAPTER I

RESEARCH PROBLEM

Introduction

Technology is a predominant facet of everyday life in the more developed nations of this world and it is the way of the future for nearly every economically developing country. We are reliant on technology as no other generation has been and this trend will continue as existing technologies, such as the Internet, wireless communications, and satellite television, become even more a part of mainstream society (Castells, 2001). There will always be a need for face-to-face contact and live teacher-based instruction, however, as we move into an era that is saturated with technology, we are becoming more reliant on technology and as a result, accepting of what technology can provide.

On a global perspective, since the year 2000, Internet usage has grown 290% and there are currently over 1.4 billion global Internet users (Internet World Stats, 2008). What this means is that more and more people are relying on the Internet for information. Increased public familiarity with the Internet will further embed technology into the lifestyle of coming generations and will lead to the inevitable introduction of new technologically enhanced methods of learning. How we mold the existing and new technology to suit the needs of people from various countries will be extremely important not only for businesses and global companies, but for educators teaching a variety of subjects to students from countries around the world (Beetham & Sharpe, 2007).

Every country has a unique culture that identifies its people. Some countries have varying layers and dimensions to this unique country-level culture. Although there are many dimensions of culture within most countries, there is generally a set of overriding

cultural traits that define a particular country (Hofstede, 2001). The educational system and the teaching methodologies used in the schools of a particular country are predominantly defined by the cultural traits of the people of that country. For example, most countries that are defined as collectivistic tend to have authoritarian educational systems and one-way communication in the classrooms, where the teachers speak and the students listen (Iyengar & Lepper, 1999), and countries that are thought to be individualistic generally have educational systems that allow students more opportunities to express themselves and, in some cases, the teacher and students are equally active participants in the classroom (Hofstede, 2005). Computer-Assisted Language Learning (CALL) programs, on the other hand, tend to neglect the cultural traits of learners and the educational methodology that they have experienced in the classroom (Beatty, 2003). Many CALL program designers presume that a single program using a generic teaching methodology and assuming a homogeneous student audience will be effective in teaching language through this technology-based medium, whether the programs are internet-based or stand alone. An example of such a program is Rosetta Stone (2008).

In the English as a Second Language (ESL) classroom, learning style surveys are used to determine the methods by which language learners may learn best. There are three learning style surveys that are commonly used to determine the learning styles of ESL learners (Wintergerst, DeCaua, & Itzen, 2001). They are Reid's (1987) Perceptual Learning Style Preference Questionnaire, O'Brien's (1990) Learning Channel Preference Checklist, and Oxford's (1998) Style Analysis Survey. Educators can use the learning style survey results to select a teaching methodology that will best suit a group of ESL learners who favor a common set of learning styles. Other commonly used learning style

surveys include Kolb's Learning Style Inventory (1984), McCarthy's 4MAT (1992), and the Myers-Briggs Type Indicator (2007). These ipsative instruments have their fair share of proponents and detractors in regard to reliability and validity (Hwang & Henson, 2002). Of these, the Kolb instrument uses a ranking response system whereas the other two use a forced pair format, which makes measuring individual survey items across participants difficult and the reliability of the normalized scores questionable (Baron, 1996).

On the culture side, there are a number of typologies of cultural characteristics. Many of these, however, identify the differences from a qualitative perspective (Hall, 1976; Kitayama & Markus, 1994). There have been attempts to consolidate results of learning style surveys from respondents of the same country of origin (Auyeung & Sands, 1996; Yamazaki & Kayes, 2005). Although there are a few constructs designed to measure cultural typologies, the majority of quantitative research on cultural characteristics has been conducted in corporate organizational settings (Hofstede, 2005; Matsumoto, 2000) and in the area of corporate websites targeted for various cultural regions (Huh & Shin, 2008; Sinkovics, Yamin, & Hossinger, 2007). There is little quantitative research on cultural characteristics and how they can be integrated into the design of CALL programs.

It should be noted that placing cultures into categorizable groups can be misconstrued as stereotyping, which is a process of categorizing individuals and possibly limiting their potential. However, research has shown that employing a teaching approach that does not suit the learning style of students can increase the affective filter (Krashen, 1982), thereby reducing the effectiveness of the lesson being taught. Some

learning style theorists suggest that matching an instructional style with a student's learning style could optimize the learning experience, whether in a classroom or a CALL program (Kolb & Kolb, 2005; Walvoord, 2003).

Statement of the Problem

Many of the commercial CALL programs available today typically take a generic approach. This approach standardizes the program so that it can be used to teach any language merely by translating the content from one language to another. These CALL programs rarely consider the cultural background or preferred learning style of the language learner. The assumption is that one size fits all. Though there are a number of instruments to measure the learning styles of learners and a smaller number of instruments to measure cultural dimensions, there is no one instrument that combines both learning styles and cultural characteristics to determine a relationship between these two sets of variables. If such a measurement device existed, it could be used to design CALL programs that better consider the cultural background and learning styles of English language learners. This could lead to a reduction in the generic nature of existing CALL programs and increase the potential for more effective technology- and internet-based language instruction.

Background and Need for Study

To understand the importance of culture on learning styles and how the combination of these is important when designing Computer-Assisted Language Learning (CALL) programs, a brief account of CALL programs today, a definition of culture, and how the Internet is beginning to lessen the boundaries separating cultures, is necessary. In this section, the background of CALL programs, culture around the world,

cultural integration, and culture and learning are covered to provide the justification and need for this study.

Computer-Assisted Language Learning Programs

Educational technology has typically taken a generic approach of one-size-fits-all. Companies producing technology-based learning programs consider content of the program and the level of technical competence of the user, however, they tend to neglect the cultural background of a learner and how that learner may react to the methods in which lessons are taught in this technology-based medium (Beatty, 2003). Most CALL programs today are designed with the assumption that the target audience will be a homogenous audience and that every member of this audience will benefit equally from these one-size-fits-all programs (Shaughnessy, 2003).

This concept of one homogenous audience is similar to Chomsky's concepts on linguistic competence, of taking into consideration only a single speech community and how grammatical competence in a language would be viable and applicable to all potential speech events a language learner or speaker may encounter (Chomsky, 1965). Just as Hymes (1972) countered Chomsky's view on linguistic competence in a homogeneous community, and proclaimed that there are heterogeneous speech communities, many varieties of speech, and that every speech event must be taken for its uniqueness, the same course of action must be considered for CALL programs. Many of the existing programs follow the Chomskyian path of a homogenous community where one type of CALL program with a homogeneous method is presumed to be applicable to every learner of a language and in every learning situation.

Many of today's more popular Computer-Assisted Language Learning programs, such as Rosetta Stone, Tell Me More, and Learn English Now! are generally designed using the Behaviorist or Constructivist models. Those programs that are designed according to the Behaviorist model do not consider the background of the learner and are usually just another medium for learners to memorize information. A majority of CALL programs use the Behaviorist model as a foundation (Beatty, 2003).

The programs designed according to the Constructivist model attempt to build upon the existing language skills of the learner (Levy & Stockwell, 2006). In the area of second language acquisition, Krashen (1982) formulated the Input Hypothesis based on the principles of the Constructivist model. The Input Hypothesis stated that language learners acquire language best when a skill being taught is one level beyond the learner's existing level. Krashen defined this formula as $i + 1$, where i represents a learner's current level of language competence and 1 is the new knowledge that is one level higher than i . The progression of lessons in a CALL program built on the Constructivist model usually follows this pattern (Levy & Stockwell, 2006). Neither model, as it is applied to the design of CALL programs, take cultural characteristics of the language learner into consideration.

The design of CALL programs must be approached with the cultural characteristics and learning styles of the audience in mind. The better the understanding of how facets of culture affect the ways in which people are receptive to learning, the more effective efforts to teach through a technology-based medium will be. Many of the CALL programs previously mentioned are produced by corporations based in the United States. Educators in the U.S. commonly approach teaching with an American brand of

culture that has been unconsciously ingrained into its citizens (Matsumoto, 2000). This American identity is infused with individualistic tendencies. Educators in America, as well as other countries, often make the mistake that an educational approach that works well in one country can be transported to any other country in the world (Newby, Stepich, Lehman, & Russell, 2006). This forces one country's educational beliefs and methods on citizens of other nations and these educators expect those methods to have the same positive effects regardless of the country in which it is implemented. In many instances, this one-size-fits-all belief is a misconception. There are countries whose cultures are more collectivistic in nature than others and they must be approached as such. Educators and CALL designers must understand how the nuances of culture and learning styles determine the effectiveness of an effort to teach language across the Internet and through CALL programs.

Although some research exists on cultural effects on learning (Wu & Rubin, 2000) and acceptance of technology in education (Hayward & Tuzi, 2003; Shih & Cifuentes, 2000), there is little research on the change in effectiveness of courses designed specifically to meet the needs of students' with different cultural backgrounds and the learning styles associated with them. As virtual classrooms expand globally, researchers must consider the cultural differences that might affect English language learners' (ELL) motivation to use computer-assisted methods to learn English as a second or foreign language. Researchers must conduct further research on the change in effectiveness of courses designed specifically to meet the needs of different cultural backgrounds and create CALL programs with an understanding of the cultures for which the applications are marketed. This information will be useful for educators teaching in

an online format, businesses creating language applications for learners of English, and ultimately for the students who decide to use a CALL program to learn English or other languages.

The importance of computer-assisted language instruction will increase as global computer and Internet usage increases. There are numerous small companies that produce language learning software, whether for use on a stand alone computer or through the Internet. One of the largest producers of language instruction software is Rosetta Stone, which became a public company as of April 15, 2009. As a result of this new status, Rosetta Stone has revealed that company revenue in 2008 was \$209 million and in 2004, it was \$25.4 million (Gregory, 2009). This is an increase of 723%. Rosetta Stone's revenue total is a small percentage of the estimated \$5 billion U.S. language learning market, and estimated \$83 billion worldwide market in 2007, according to the Nielsen Company (United States Securities and Exchange Commission, 2008).

Culture Around the World

Culture is defined as the “integrated pattern of human knowledge, belief, and behavior that depends upon people's capacity for learning and transmitting knowledge to succeeding generations” (Merriam-Webster Online, 2006). Some of the factors that define culture include customs, beliefs, social norms, as well as traits such as, race, religion, or membership in a defined social group that shares a common set of attitudes, values, and goals. Ethnographers and anthropologists have historically tried to identify cultural characteristics of various groups of people. Many of these studies are based on observations and qualitative studies (Bergreen, 2003; Davidson, 1993; Griffin, 1977; Hazen, 2002; Sherzer, 1983), however, in some cases there have been attempts to

quantify cultural characteristics so that they can be measured and compared across various cultures and countries (Hofstede, 2001; Hoppe, 1990). Although countries can have various cultural sub-groups of people, there is usually a predominant set of cultural traits that are associated with people from a particular country (Ferraro, 2001).

Cultural Integration

It has been said that due to the globalization of technology and the worldwide adoption of the Internet, there has been a converging of cultures, of cultural globalization or a creation of a network society (Castells, 2001). A network society is one of people connected through communications technologies such as the Internet. This society encompasses the information found on the Internet and the methods by which the information flows through this society. This world of cyberspace where people interact with one another electronically is a culture unto itself (Castells, 2001).

People around the world who have become accustomed to the Internet and other technological advancements are becoming more and more acculturated in a global sense and are becoming accustomed to the same methods of communication. However, there are deeply rooted cultural differences that have the ability to influence how people learn languages through technologically-enhanced methods.

Although it is possible for a subculture, such as the network society, to seep into and change the characteristics of another culture, the essential foundations of a human born and raised in a particular culture are tied to that culture (Brown, 2007). The ways in which a group of people live life, eat, celebrate, and dress, are rituals that have been performed for many years and generations. These types of cultural traits are deeply

rooted in the psyche of each individual of that particular country or cultural group (Matsumoto, 2000).

Culture and Learning

Learning is a deeply cultural process (Bruner, 1996). The cognitive development of a person, of a child, cannot be separated from the cultural and societal context in which that cognitive development occurs (Vygotsky, 1987). Nativism states that humans are born with certain capabilities and that there is a genetic thread that ties the current generation to past generations and leads into future generations (Ellis, 1985; Plato, trans. 1909). The level of influence innate aspects of culture and society have on how and what humans learn from the day they are born is still open to debate (Brown, 2007).

What cannot be denied is that the initial experiences of a child entering this world are unique to every cultural and societal context. These early experiences, such as the language that is spoken to a child as soon as that child can hear or the symbols visually presented when that child begins to see, help to shape the human being that he or she will become. This conscious and unconscious absorption of societal and cultural surroundings influence the ways in which a person thinks and learns (Matsumoto, 2000; Vygotsky, 1987). These patterns build upon existing patterns and become a foundation for new learning experiences in new social and cultural contexts.

This accumulation of experiences helps to shape the learning style of a person. Learning styles identify the optimal approach for how a person receives and processes information (Sims & Sims, 2006), and culture and society play an important role in this process. In many cases, learning and learning styles are associated with cognitive abilities and cognitive development. How much does culture influence cognitive

development or do all humans, regardless of their cultural background, develop cognitively in an identical way?

There have been studies where a particular learning style measurement tool has been tested on people from various countries. Generally, studies compare a number of studies, for example, one researcher may have given the Kolb Learning Style Inventory (LSI) to people in Japan whereas another may have conducted similar studies with students in Australia. Then, a comparison of learning styles across the two cultures can be made based on the results from the LSI scores from the two studies (Yamazaki, 2005). The same is true of culture. Several researchers have attempted to measure culture quantitatively (Hofstede, 2005; Matsumoto, 2000; Triandis & Gelfand, 1998), however, as a part of measuring culture, rarely are learning styles measured. Though these two areas are not mutually exclusive, they tend to be investigated independently of each other in most studies. If a device could be created to measure cultural characteristics and learning styles and find correlations between these two sets of variables, then this measuring device could be useful for the creation of CALL programs, as well as for the creation of curriculum for many areas of study.

People today are beginning to see, learn, and become a little more culturally alike relative to past generations, when country borders defined social and cultural regions. The Internet has torn down the walls that had heretofore separated cultures and societies. Today, there is a melding of cultural and societal beliefs across countries and regions, however, these patterns of culture and learning are built upon the foundation that has existed for generations. Children's initial learning experiences are through interactions with parents and family, people whose cognitive patterns and social and cultural beliefs

are based on generations before them (Ember, Ember, & Peregrine, 2007). As these children further their education through school and classroom environments, they interact with people who have been, for the most part, immersed in the patterns and symbolisms of that particular culture and society. Although learning through computer technology and the Internet have become a part of their lives, these are learning patterns that develop on top of their existing social and cultural foundations, which defines the way a person thinks, feels, and learns.

If there is a set of learning styles that is predominantly associated with the cultural characteristics of a country or group of people, then a language learning program can be designed specifically for the people of that particular country. A CALL program that addresses the students' specific cultural characteristics and their associated learning styles has a higher probability of achieving its intended goal, and that is effectively teaching English as a second or foreign language.

Purpose of Study

The purpose of this study was to determine whether a combination of tools can be used to identify a relationship between learning styles and cultural dimensions; moreover, whether or not this relationship can be used to design a CALL program that addresses the specific learning styles associated with the cultural background of language learners from the U.S. and Taiwan. To address these questions, a correlational analysis was performed to determine any patterns between the variables in Kolb's Learning Style Inventory (LSI) and Hofstede's Values Survey Module Questionnaire (VSM), and between Reid's Perceptual Learning Style Preference Questionnaire (PLSPQ) and Hofstede's VSM. The three survey instruments were completed by two participant groups. The first group was

born and spent their formative years of education through high school in Taiwan. The second group of participants was either born or spent their formative years in the U.S. The survey results were analyzed within and between groups. As a part of this analysis, the collected data were compared with data from historical studies, which were conducted with participants having similar backgrounds to those in this study. The relationships between the learning styles variables and cultural dimensions variables were determined. The results of this analysis is a construct that CALL designers can evaluate and potentially use to create language-learning programs that better suit the cultural learning habits of English language learners.

Research Questions

This study addressed the following research questions:

1. To what extent is Hofstede's Values Survey Module (VSM) an appropriate tool to measure cultural dimensions for language learners from Taiwan and the United States?
2. To what extent are cultural dimensions and learning styles that are derived from the Experiential Learning theory related?
3. To what extent are cultural dimensions and learning styles that are derived from the Multiple Intelligences theory related?
4. To what extent can the relationships between cultural dimensions and learning styles be used as a construct to design Computer-Assisted Language Learning (CALL) programs?

Theoretical Framework

There are a number of learning style theories that claim to identify the ideal learning style of an individual. Two of the more widely used and tested learning style theories are Kolb's Experiential Learning and Gardner's Multiple Intelligences. Each of these identifies a different set of learning styles variables. There are a large number of theories that claim to measure the cultural differences of groups of people, however, a very small number of these theories have a measurement tool that looks at cultural variables from a quantitative perspective. One of these is Hofstede's Cultural Dimensions model with its accompanying Values Survey Module (VSM). The VSM is one of the most widely used instruments to measure cultural characteristics quantitatively and as a result, a number of validity and reliability tests have been conducted on it (Oyserman, Coon, & Kemmelmeier, 2002). The theoretical framework for this study includes Cultural Dimensions, Multiple Intelligences, Experiential Learning, and Second Language Acquisition.

Cultural Dimensions

The study of culture dates back to the early days of human existence. As humans migrated from one region to another and encountered new civilizations, attempts were made to understand the differences between the existing culture of a region and the conquering culture. Historically, many tended to ignore culture, which is somewhat true to this day, however, there were those few that made attempts to truly understand and document the cultural characteristics of a group of people occupying a country or a territory within this global landscape (Bergreen, 2003). Much of this past research was qualitative (Wardhaugh, 2006), that is, based on the observations of the people being

studied, and generally defined through the biased lenses of the researchers own cultural background. This is the method of research that primarily continues to this day, especially as it relates to cultural anthropology and ethnographic studies conducted by modern day researchers.

There have been some attempts to quantify the measuring of cultural characteristics (Hofstede, 2001; Matsumoto, 2000; Triandis, 1995). There have been the foundations laid down by researchers such as Triandis and Gelfand (1998), with their attempts to measure the differences between individualism and collectivism. One of the more thorough quantitative studies conducted to this day is that of Hofstede (2001). Hofstede's Cultural Dimensions is a method of measuring cultural characteristics and his Values Survey Module (VSM) tends to be the most widely used and most widely tested of the cultural characteristic measurement tools (Oyserman, Coon, & Kemmelmeier, 2002).

Hofstede's (2001) Cultural Dimensions theory originated from his research while working for a large multinational corporation (IBM). In an era when this corporation was expanding globally and setting up offices in numerous countries, Hofstede undertook the task of identifying the cultural differences of this corporation's employees throughout the globe. Out of this study, Hofstede created a model to measure the cultural characteristics of a group of people, generally defined as a country as a whole. Hofstede's measurement device does not measure individual cultural characteristics, instead it measures the cultural characteristics of a country, or what is typically defined as the predominant cultural characteristics of a particular country (Hofstede, 2002). There are varying layers of culture within a country, therefore, the existence of only one culture per country

cannot be assumed, however, most countries can be defined by a predominant set of cultural characteristics for a majority of its population (Hofstede, 2005).

Hofstede's Cultural Dimensions model utilizes the Values Survey Module (VSM) to measure seven cultural dimensions. These are Power Distance Index, Individualism, Masculinity, Uncertainty Avoidance Index, Long-Term Orientation, Indulgence versus Restraint, and Monumentalism (Hofstede, 2008).

The Power Distance Index (PDI) measures the perceived level of inequality that exists within a society. The Individualism (IDV) dimension measures the level of individualism or, on the other side of the spectrum, collectivism of a group of people. The Masculinity (MAS) dimension measures the delineations of gender roles within a given society. The Uncertainty Avoidance Index (UAI) measures a group's level of comfort with change. The Long-Term Orientation (LTO) dimension measures a country's perceived importance on the concept of time. The Indulgence versus Restraint Index (IVR) measures a society's position on the freedom granted to its people to enjoy their lives. The Monumentalism (MON) dimension measures the flexibility of a society to traditions and personal beliefs (Hofstede, 2008).

Hofstede's Cultural Dimensions theory attempts to tackle the monumental task of trying to measure cultural characteristics, at the country level. Although Hofstede's theory defines cultural characteristics, it does not associate these characteristics with the learning styles or learning behaviors of the people within a particular culture or country.

Multiple Intelligences

Multiple Intelligences (MI) is the theory that every individual has varying levels of nine intelligences. According to Gardner (1993), some people have strengths in one or

more intelligences, whereas another person may have strengths in a different set of intelligences. The categories of intelligences in Gardner's MI theory are bodily/kinesthetic, interpersonal, verbal/linguistic, logical/mathematical, naturalistic, intrapersonal, spatial, musical, and other intelligences.

According to Gardner (1993), the bodily/kinesthetic intelligence represents people who prefer activities such as sports and learn best through movement of their bodies. The interpersonal intelligence represents people who have good communication skills, easily interact with others, and tend to be extroverts. The verbal/linguistic intelligence represents people who are generally good at reading and writing, memorizing words and dates, and learning languages. The logical/mathematical intelligence represents people with good logic, reasoning skills, and perform well in mathematics, computer programming, and scientific investigation. The naturalistic intelligence represents people who are well aligned with nature and have an affinity for interacting with and caring for animals. The intrapersonal intelligence represents people who tend to be introverts and whose strengths are in working alone, as opposed to in teams. The spatial intelligence represents people with strong visual memory, good sense of direction, and good hand-eye coordination. The musical intelligence represents people who excel in music and generally learn best aurally. The other intelligences represent people who have strengths in areas such as spiritual intelligence, existential intelligence, or other areas not covered by the prior eight intelligences (Gardner, 1993).

Gardner did not design a learning styles inventory to measure the intelligences of his MI theory. A learning style inventory that attempts to capture five of the nine MI theory intelligences is Reid's Perceptual Learning Style Preference Questionnaire

(PLSPQ). The PLSPQ measures perceptual learning styles that are similar to the learning style types typically associated with Gardner's Multiple Intelligence theory. The learning style variables in Reid's PLSPQ are Auditory, Visual, Tactile, Kinesthetic, Group, and Individual. The Kolb LSI does not directly measure these variable types.

Reid conducted a study of perceptual learning styles and identified major, minor, and negative learning style preferences among students with nine unique native languages (Reid, 1987). Although comparisons were made across the countries that were represented in the study by the nine languages, the PLSPQ tool itself does not measure the cultural characteristics of the learners. Reid merely associated learning styles with people speaking different native languages and the concept of cultural dimensions was not directly addressed as part of her studies, nor is it addressed in the PLSPQ survey instrument.

Experiential Learning

Experiential Learning gets its foundation in the works of John Dewey, Kurt Lewelling, Jean Piaget, William James, Carl Jung, and Paolo Freire (Kolb & Kolb, 2005). According to Kolb and Kolb (2005), learning is a holistic process and should not be viewed as the outcome of the process. Identifying and aligning the process that works best with a particular person's learning style leads to the most effective learning experience and thereby produces the most optimal outcome.

Experiential learning further maintains that how a person learns is dictated by how that person's past experiences are transformed (Kolb, 1984). According to Vygotsky (1987), a person experiences life within the context of culture and society. These experiences shape a person's thought processes and dictate how he or she learns

best. Therefore, learning is not just a cognitive process, but it is closely tied to how a person thinks, feels, perceives, and behaves. Much of this is dictated by what defines a person and the definition of a person is usually the sum total of his or her upbringing and surroundings, both cultural and social (Kolb & Kolb, 2005).

Kolb's learning model represents a circular process that progresses through four learning modes, beginning with Concrete Experience (CE), moving to Reflective Observation (RO), then Abstract Conceptualization (AC), and finally to Active Experimentation (AE). This cyclical process is defined as follows: CE is Experiencing, RO is Reflecting, AC is Thinking, and AE is Doing. This is a cycle that repeats itself continuously for each person, or learner. The method in which a learner progresses through this cycle and the modes that represent strengths define a person's learning style (Kolb & Kolb, 2005).

There are four learning style types in Kolb's model. They are Diverging, Assimilating, Converging, and Accommodating. Most people's learning style focuses on a certain combination of the four learning modes (CE, RO, AC, and AE) and is identified as a particular learning style type (Kolb & Kolb, 2005).

The Diverging learning style type combines the Concrete Experience (CE) and Reflective Observation (RO) learning modes. The Assimilating learning style type combines the Abstract Conceptualization (AC) and Reflective Observation (RO) learning modes. The Converging learning style type combines the Abstract Conceptualization (AC) and Active Experimentation (AE) learning modes. The Accommodating learning style type combines the Concrete Experience (CE) and Active Experimentation (AE) learning modes (Kolb & Kolb, 2005).

The measurement tool used to determine a person's position in the Experiential Learning model is the Kolb Learning Style Inventory (LSI). The LSI is based on the foundations that Kolb presented in his concept of Experiential Learning. Kolb's LSI is widely used throughout academia and corporate organization environments to effectively measure learning styles of people and how best to utilize the students' classroom environment or employees' working environment (Kolb & Kolb, 2005). Although the Kolb LSI has been administered and conducted in various countries and some researchers have attempted to measure the differences in the LSI results across people in various countries (Yamazaki, 2005), the LSI, in and of itself, does *not* measure cultural traits nor does it align the learning styles with the cultural background or characteristics of an individual learner or a particular group of learners.

Second Language Acquisition

Second language acquisition (SLA) is an area of study with a relatively brief history. There are several predominant theories and approaches used in the profession and according to Richards & Rogers (2001), the SLA theories were initially associated with first language acquisition and later adapted to second language acquisition. The following is a brief summary of the predominant theories of language acquisition:

Behaviorist, Nativist, Neuro-psychological/Cognitive, and Socio-interactionist.

The Behaviorist theory states that language is a set of definable structural patterns and verbal behavior that are learned through imitation of behaviors and patterns through a series of practice and exercises (Gass & Selinker, 2001). The behaviorist theory proposes that humans are born with no preconceived notions about language and children are nurtured in the language learning process (Brown, 2007). By using methods to break out

a series of tasks into manageable micro-events and providing positive reinforcement by rewarding the language learner for each successive and proper completion of a task, learning is reinforced. Therefore, according to Behaviorists, language is learned through imitation and is strictly an external factor that learners acquire through input (Ellis, 1985). Behaviorists believe that the mind is a clean slate (Brown, 2007), a blank canvas, when an individual is born. The objective of the teacher is to paint the words and patterns of language onto the receptive learner.

The Nativist theory is based on the foundation that knowledge is rooted within the psyche and that language is innate. The theory further proposes that all children of normal intellectual capacity have the ability to learn language. Language acquisition is a matter of allowing the child to learn by activating the Language Acquisition Device (LAD), which is the innate language component that humans already possess at birth (Lenneberg, 1967).

The first language (L1) is said to be genetically triggered (Chomsky, 1965), that is, the LAD must be turned on or triggered and exposed. Unlike the Behaviorist theory where the role of input plays a predominant role in language learning, the Nativist theory minimizes the role of input and focuses primarily on the innate ability. Input is seen as a trigger that activates the internal mechanisms (Ellis, 1985). This ability to acquire language exists within each individual but there is an expiration period, which is referred to as the critical period. The critical period is generally believed to be the prepubescent years of a child's life. If the LAD is not activated during this time, some Nativists believe that the innate ability to acquire language disappears (Johnson & Newport, 1995).

One of the most widely praised and equally criticized SLA models is Krashen's (1982) Monitor Model, which was founded on the principles of the Nativist theory. Krashen's Monitor Model essentially states that second languages can be either learned or acquired; there is a natural order in the acquisition of grammatical structures of a second language; the input of the language lesson must be at a level that is one level greater than a learner's current level to productively contribute to the acquisition process; and a learner's ability to acquire comprehensible input is dependent on whether or not the Affective Filter is up or down, or somewhere in between. The Affective Filter can be a variable such as, motivation, self-confidence, or anxiety, which can impede the input from reaching the language acquisition device.

The Neuro-psychological model, which is sometimes referred to as the Cognitive model as well as the Information Processing model, is an extension of the Nativist model. To the Cognitivist, what is innate is not language itself but rather the ability to learn language. Language learning is viewed as the acquisition of a complex cognitive skill, thus language is considered to be a skill. Learning a second language is equivalent to learning a skill (Gass & Selinker, 2001).

According to McLaughlin's (1990) concept of automaticity, the primary component of the Cognitive model is the working memory, which is made up of the processing function and the short-term storage. The processing function receives the input from one or more of the sensory preceptors, that is, sight, sound, taste, and so on and this processed information is placed in the short-term storage in "chunks." Once the processed information, or task, becomes familiar, the contents of several chunks will be consolidated into a single chunk. This is the process of automatizing and moves the

information from the working memory to the long-term memory. The Cognitive model focuses on the mechanism responsible for the processing of information (Johnson, 2004), that is, the brain. In the Cognitive model, mental processes are rule governed, similar to the ways in which a computer operates.

The Social-interactionist theory views language learning as acquiring input from social factors and identifies social interaction as the primary factor for language learning. Humans have a tendency to socialize and possess an inherent need to interact with other people. It has been said that humans are social creatures and the development of the individual self grows through interaction with others (Cooley, 1922).

The Social-interactionist theory has its foundation in the cultural-historical psychology of Vygotsky (1962), which states that learning is influenced by culture and society and occurs through interaction, communication, and collaboration with those in the learner's social and cultural environment. These social experiences are internalized and shape the psychology of an individual. Once these social and cultural patterns and processes are internalized, they are then reflected in the actions of the individual.

Unlike the Nativists, Social-interactionists believe that intellect alone does not impact language acquisition (Gass & Selinker, 2001). The acquisition of language is the result of an interaction between the learner's mental abilities (internal) and the linguistic environment (external) (Ellis, 1985). According to Social-interactionists the most effective means in learning how to communicate is by communicating and the most important aspect of the Social-interactionist theory is comprehension (Gass & Selinker 2001).

Contrary to the Behaviorist theory, the Social-interactionist theory considers the individual as an individual and not as a repeatable and uniform cognitive pattern. How one person sees, hears, and feels something may be completely different from another person. This impact on language learning is taken into consideration by the Social-interactionists.

The primary differentiator between the Behaviorist, Nativist (and Cognitivist), and Social-interactionist theories is whether language acquisition is an outcome of nature, nurture, or a combination of the two. The Behaviorist theory represents a nurture approach to language acquisition, whereas the Nativist theory promotes the nature approach. The Social-interactionist theory combines these and defines language learning as one of nature and nurture.

Definition of Terms

1. CDAS: CALL Design Analysis Survey. The aggregation of Hofstede's VSM, Kolb's LSI, Reid's PLSPQ, and a demographics section used in this study.
2. L2: Second language. Generally used to identify a language that is not a speaker's native language.
3. LSI: Learning Style Inventory. A survey instrument designed by David Kolb to measure experiential learning styles.
4. PLSPQ: Perceptual Learning Styles Preference Questionnaire. A survey instrument designed by Joy Reid to measure perceptual learning styles.
5. TEFL: Teaching English as a Foreign Language
6. TESL: Teaching English as a Second Language

7. VSM: Values Survey Module. A survey instrument designed by Geert Hofstede to measure cultural dimensions quantitatively.

Significance of the Study

There was some overlap between the three primary areas of this dissertation: cultural dimensions, learning styles, and CALL design. In most studies, researchers have identified and investigated the intersection of two of these three areas. There was, and continues to be, a need to identify the intersection of all three of these disciplines.

The use of learning styles to identify effective CALL design has been studied (Liege & Janicki, 2006; Rasmussen & Davidson-Shivers, 1998; Wang, Wang, Wang, & Huang, 2006). Leveraging cultural dimensions in designing corporate websites has been studied (Avery, Baradwaj, & Singer, 2008; Huh & Shin 2008; Sinkovics, Yamin, & Hossinger, 2007). There have been some limited studies on the theoretical connection between learning styles and cultural typologies (Yamazaki, 2005). However, the next step is to determine the intersection of cultural dimensions and learning styles and use this to identify a construct for designing more effective CALL programs that account for the learning styles associated with the cultural background of a group of English language learners from a particular country.

Many of the commercial CALL programs available today typically take a generic approach. This approach standardizes the program so that it can be used to teach any language merely by translating the content from one language to another. These CALL programs rarely consider the cultural background or preferred learning style of the language learner. The assumption is that one size does fit all.

The current focus of CALL is on the technology and not enough on the content or cultural aspect of the program itself. It may never get to the point where commercially produced language learning software focuses on individuals at the individual learning style level, but the next best solution is to target the predominant learning styles that are associated with certain cultural dimensions and those cultural dimensions in many cases can be aligned to particular countries. In this way, CALL designers can narrow the scope of the target audience for these programs and thereby increase the potential for more effective CALL programs.

The next chapter focuses on the review of literature in the primary subject areas applicable to this dissertation.

CHAPTER II

LITERATURE REVIEW

Overview

This chapter focuses on the body of literature in the primary subject areas applicable to this dissertation and is divided into three sections. The first section covers the history of culture studies, the movement toward quantitative culture analysis, and the relevant theories. The second section covers the history of the two learning models pertinent to this study and researchers' efforts to incorporate learning style analysis with culture. The third section discusses the evolution of Computer-Assisted Language Learning and its attempts to incorporate learning style and cultural dimension concepts.

Restatement of the Problem

Many of the commercial Computer-Assisted Language Learning (CALL) programs available today typically take a generic approach. This approach standardizes the program so that it can be used to teach any language merely by translating the content from one language to another. These CALL programs rarely consider the cultural background or preferred learning style of the language learner. The assumption is that one size fits all. Although there are a number of instruments to measure the learning styles of learners and a smaller number of instruments to measure cultural dimensions, there is no one instrument that combines both learning styles and cultural characteristics to determine a relationship between these two sets of variables. If such a measurement device existed, it could be used to design CALL programs that better consider the cultural background and learning styles of English language learners. This could lead to a

reduction in the generic nature of existing CALL programs and increase the potential for more effective technology- and internet-based language instruction.

Culture

The Nature of Cultural Study

Throughout history, people have tried to understand and identify differences in culture. In some cases it was to understand the differences and in other cases, it was to destroy the root of those differences. The history books are full of wars that were due to one ethnic group, cultural group, or religious group trying to destroy the other. However, there have been researchers throughout history who have tried to understand other cultures, not only to find the differences between cultures, but the similarities.

Much of this cultural research falls into the subject of cultural anthropology. The methods of research are generally classified as either spatial scope of study or temporal scope of study (Ember, Ember, & Peregrine, 2007). Spatial scope of study involves the study of societies of a region in isolation or as a sample of societies from multiple regions. This type of study is usually called ethnographic study and requires a researcher to live amongst the subjects being studied for a period of time. This participant-observation method of analysis requires subjectively trying to comprehend the experiences of living with the foreign or in some cases native culture and objectively observe the culture without diluting it with subjectivity. These are qualitative measures with results that are skewed to the subjectiveness of each observer/researcher. Therefore, a study on a given culture by two different researchers from two unique cultural backgrounds could elicit different observations and conclusions about the culture being studied (Freeman, 1983).

The temporal scope of study involves the historical or non-historical nature of the cultural study. Non-historical study looks at a culture at a given point in time, whereas the historical study compares descriptive material about a society between two points in time (Ember, et al., 2007), for example, the pre- and post-Europeanization eras of the indigenous people of the Americas. These types of comparisons are made using existing ethno-historical data, much of which was collected through some level of observation through the subjective lens of the observer. Therefore, this sometimes becomes an exercise in the comparison of subjective terminologies and analyses. Qualitative cultural research continues in much the same way to this day.

It was not until the 1960s when more and more multinational corporations began to expand beyond their own country borders and attempt to sell their products to markets different from their own that a more objective and repeatable measurement device for culture was initiated. Bartels (1967) created a list of measurement criteria in dealing with ethical marketing in a global marketplace. During the 1970s and 1980s, there was additional research in an effort to measure cultural values from a quantitative perspective and thereby lessen the subjective nature of existing qualitative cultural measurements (Hofstede, 1980; Triandis, 1995).

The seminal research in the field of cross-cultural comparisons using a quantitative model occurred between 1967 and 1973. One of the pioneers spearheading this movement toward quantitative cultural analysis was Hofstede. His work remains as one of the most widely quoted sources on cultural research (Bond, 2002; Hofstede, 1997).

Hofstede's Cultural Dimensions

Hofstede worked for a large multinational corporation (IBM) during a period when they were expanding their operations globally. During his tenure there, Hofstede was involved in an international employee attitude survey program conducted by the large multinational technology company. The purpose of this study was to understand how people from different countries approached personal interaction and relationships in the workplace. The type of research was a survey and statistical analysis across various countries. The research program ran from 1967 to 1973 in which two rounds of surveys were administered. This resulted in over 116,000 questionnaires in 20 languages covering 72 countries (Hofstede, 1980). The primary focus of the research was to analyze the differences in cultural values of the corporation's employees across the various countries.

Statistical analysis was conducted on the gathered data at the individual level as well as the group or country level. Furthermore, the breakdown of statistical results was categorized into occupation, gender, and age. Although the initial analysis covered 72 countries, the primary analysis later focused on the 40 countries that contained at least 50 respondents per country. Of these 40 countries, the lowest number of respondents for a country was 58 from Singapore and the highest number of respondents for a country was 11,384 from Germany. The participants of the initial research included 7 occupational categories: managers at the country office, managers at the branch office, systems engineers, data processing sales representatives, data processing customer engineers, office products customer engineers, and administrative personnel.

The original Hofstede study and later his first Values Survey Module (VSM 82) focused primarily on four cultural dimensions. These are Power Distance (PDI), Uncertainty Avoidance (UAI), Individualism (IDV), and Masculinity (MAS). In the VSM, each of these cultural dimension scores are ranked on a sliding scale from 0 (zero) to 100, with zero equating to very low levels of a dimension in a given country and 100 to very high levels.

Power Distance

The first of the four dimensions is Power Distance (PDI). PDI attempts to measure the level of inequality within a society and how each society looks at the differentiating factors within that society, for example, perceived status, power, and wealth. Power Distance was a term originally used by Mulder (1977), a Dutch social psychologist, who investigated the power dynamics of interpersonal relationships. Some of the hypotheses surrounding the concept of PDI include: “the mere exercise of power will give satisfaction; the more powerful individual will strive to maintain or increase the power distance to the less powerful person; the greater this distance from the less powerful person, the stronger the strive to increase it; individuals will strive to reduce the power distance between themselves and more powerful persons; and the smaller this distance from the more powerful person, the stronger the tendency to reduce it” (Mulder, 1977, p. 92).

Some of the areas where inequalities within a society occur include the perceived social status of a person or a group of people within that society and the perceived power associated with wealth as well as power itself. Table 1 lists examples of cultural differences associated with low and high PDI values.

Table 1

PDI Differences

Low PDI	High PDI
Value independence	Value conformity
All should be interdependent	A few should be independent, most should be dependent
All should have equal rights	Power holders are entitled to privileges
Parents treat children as equals	Parents teach children obedience
Teachers treat students as equals	Students treat teachers with respect even outside of class
Decentralized decision structures	Centralized decision structures
Pluralist govt. system based on outcome of majority vote	Military or autocratic govt. based on co-optation
Wealth more widely distributed	Wealth concentrated in hands of smaller elite
Less centralization of political power	Centralization of political power

Note. From *Cultures Consequences* (pp. 94-118), by G. Hofstede, 2001, Thousand Oaks, CA: Sage Publications, Inc.

In the VSM, PDI was computed from the country mean scores on three survey questions. These questions addressed the perception of leadership and how a person relates to it, for example, a person's preference regarding a superior's decision making and management styles. The PDI scores that resulted from Hofstede's initial study ranked from 11 for Austria to 104 for Malaysia. The U.S. and Taiwan, the two countries in this study, had scores of 40 and 58, respectively; Taiwan ranked 29th and the U.S. ranked 38th. The overall mean score for all countries was 57, therefore, Taiwan scored slightly near the mean and the U.S. scored below the mean.

Uncertainty Avoidance

The second dimension of the VSM is the Uncertainty Avoidance Index (UAI). Uncertainty in this context refers to the uncertainty of future events in domains such as technology, law, and religion. Societies generally have a predefined approach to handling uncertainty and these are usually passed down from one generation to another, either through social settings or through family. Uncertainty avoidance is different from risk avoidance, where “uncertainty is to risk as anxiety is to fear” (Hofstede, 2001, p. 148).

Society generally implements rules and rituals, some written and others unwritten, that allow the citizens of a society to face uncertain situations and adjust accordingly. Too many rules set within society have the potential of hindering autonomous judgment and could lead people to acts that would normally be considered bad. Table 2 lists examples of differences associated with low and high UAI values.

Table 2

UAI Differences

Low UAI	High UAI
Emotions have to be controlled	Expressions of emotions are normal
Less hesitation to change employers	Tendency to stay with the same employer
Low resistance to change	More resistance to change
Openness to change and innovation	Conservatism, law and order
Tolerance of diversity	Xenophobia
Non-traditional gender roles accepted	Traditional gender roles preferred
Teachers may say, “I don’t know”	Teachers supposed to have all answers
Relationship oriented	Task oriented
Willing to live day to day	Worried about the future

Note. From *Cultures Consequences* (pp. 160-181), by G. Hofstede, 2001, Thousand Oaks, CA: Sage Publications, Inc.

In Hofstede's VSM, scores ranged from 8 for Singapore to 112 for Greece. The U.S. scored fairly low with a score of 46 and Taiwan scored higher on the scale with a score of 69. The overall mean score for all countries was 65. Hofstede further combined and clustered the scores for UAI with PDI. He mapped all countries into four quadrants: small PDI and weak UAI, large PDI and weak UAI, large PDI and strong UAI, and small PDI and strong UAI. In this mapping, the countries used for this study were on opposite corners of the quadrant. The U.S. was placed in the small PDI, weak UAI quadrant and Taiwan was placed in the large PDI, strong UAI quadrant.

Individualism

The third dimension in Hofstede's VSM is Individualism (IDV). On the sliding scale for Individualism, Collectivism (COL) is defined as the antithesis. The general definition of the two extremes is that Collectivism represents cultures that tend to have a group mentality whereas Individualism focuses on the individual. Some societies view Individualism as a positive trait and important for the health of the society, as well as for each individual within the society. Other societies view Individualism as an alienating factor within society (Hofstede, 2001).

The concept of Individualism and Collectivism impacts the family, education, religion, and politics of a society. Countries that tend to lean toward collectivistic tendencies do not necessarily frown upon the well being of the individual, however, they make the point that a healthy society leads to a healthy individual (Ho, 1979).

There is an overriding general assumption that Western cultures tend to lean more towards the Individualism side of the scale and that Eastern cultures tend to lean toward

Collectivism. Table 3 lists examples of differences associated with low and high IDV values.

Table 3

IDV Differences

Low IDV (COL)	High IDV
More importance attached to training in use of skills in jobs	More importance attached to freedom and challenge in jobs
Company is responsible for its employees	Employees are responsible for themselves
Traditional society	Modern or post-modern society
Strong family ties	Weak family ties
Marriages are often arranged	Marriages supposed to be love based
Children learn to think in terms of “we”	Children learn to think in terms of “I”
Identity based on social system	Identity based on individual
Managers stress conformity and orderliness	Managers stress leadership and variety
Women express emotions less strongly than men	Women express emotions more strongly than men
Teachers deal with pupils as a group	Teachers deal with individual pupils
Belief in collective decision	Belief in individual decisions
Less social mobility across occupations	Greater social mobility across occupations

Note. From *Cultures Consequences* (pp. 226-245), by G. Hofstede, 2001, Thousand Oaks, CA: Sage Publications, Inc.

The VSM Individualism scores ranked from a low of 6 for Guatemala to a high of 91 for the U.S. Taiwan scored low on this scale with a score of 17. The overall mean score for all countries was 43. Hofstede compared Individualism against PDI and placed countries into four quadrants: small PDI and low IDV (or COL), large PDI and COL, small PDI and IDV, and large PDI and IDV. Within this chart, the U.S. was categorized under small PDI, IDV and Taiwan was categorized on the opposite corner of this scale with large PDI, COL.

Masculinity

The fourth dimension is Masculinity (MAS). The opposite end of the MAS scale was identified as Femininity (FEM). This scale determined the implications that gender or biological differences have on the emotional and social roles of the genders. During the era when Hofstede originally conducted his study, masculine interests within the workplace were identified as career advancement, earnings, training, and staying up-to-date on trends. On the other hand, values that were identified as important for women included friendly atmosphere, position security, physical conditions, and cooperation.

The Masculinity dimension was primarily applied to the role patterns of the dominant gender within a society. Table 4 lists examples of differences associated with low and high MAS values.

Table 4

MAS Differences

Low MAS (FEM)	High MAS
Values of men and women are hardly different	Values of men and women are very different
Belief in group decisions	Belief in individual decisions
Work is not central to a person's life space	Work is very central to a person's life space
Relationship orientation	Ego orientation
Stress on who you are	Stress on what you do
Sympathy for the weak	Sympathy for the strong
Quality of life and people are important	Money and things are important
Flexible family concepts	Traditional family concepts
Teachers give equal attention to girls and boys	Teachers pay more attention to boys
Small gender culture gap	Large gender culture gap
Larger share of women in professional, technology, and management jobs	Smaller share of women in professional, technology, and management job
International conflicts should be resolved through negotiation and compromise	International conflicts should be resolved through show of force or fighting
Single standard regarding sex for women and men	Double standard regarding sex: Women should be chaste at marriage, men needn't

Note. From *Cultures Consequences* (pp. 297-330), by G. Hofstede, 2001, Thousand Oaks, CA: Sage Publications, Inc.

In the original VSM, the country scores for the MAS index ranged from a low of 5 for Sweden and a high of 95 for Japan. The U.S. had a score of 62 and Taiwan had a score of 45. The overall mean score for all countries was 49. There were comparisons of MAS with IDV on a four-point chart with the following quadrants: COL and FEM, IDV and FEM, COL and MAS, and IDV and MAS. The U.S. and Taiwan were mapped on opposite ends of the spectrum with the U.S. in the IDV and MAS quadrant and Taiwan in

the COL and FEM quadrant. Moreover, there was a comparison of MAS with PDI, resulting in these combinations: small PDI and FEM, large PDI and FEM, small PDI and MAS, and large PDI and MAS. The U.S. fit in the small PDI and MAS quadrant and Taiwan in the large PDI and FEM quadrant, again on opposite ends of the scale. Finally, there was a comparison with the MAS and UAI, once again using the four-quadrant scale with weak UAI and MAS, strong UAI and MAS, weak UAI and FEM, and strong UAI and FEM. On this comparison, the U.S. fit in the weak UAI and MAS quadrant and Taiwan fit in the strong UAI and FEM quadrant, on opposite corners of the chart.

Long- versus Short-Term Orientation

In the second version of the VSM (VSM 94), a fifth cultural dimension was added. This dimension was the Long- versus Short-Term Orientation (LTO). The foundation for this dimension came from a study conducted by Bond and a team of global colleagues (Chinese Culture Connection, 1987). This study identified ten fundamental and basic values for people of Chinese ethnicity. Based on this values analysis, Bond created a questionnaire of forty items. The questionnaire was dubbed the Chinese Values Survey (CVS) and was administered to 100 student participants from 23 countries, both Asian and non-Asian. There were English and Chinese versions of the survey and it was based on a nine-point scale with 9 being of supreme importance and 1 being not important at all.

A factor analysis was conducted on the collected data and four dimensions were identified. The first dimension called Moral Discipline correlated with PDI ($r = .55$) and with IDV ($r = -.54$) from Hofstede's VSM, therefore, it was determined that the VSM already accounted for this dimension. The second dimension titled Integration correlated

with IDV ($r = .65$) and with PDI ($r = -.58$). A third dimension in the CVS called Human Heartedness correlated with MAS ($r = .67$). The fourth dimension, which was originally called Confucian Work Dynamism, did not correlate with any of the existing VSM dimensions. This dimension, which Hofstede renamed to Long- versus Short-Term Orientation (LTO), appeared to mirror the long-term and short-term tenants found in the teachings of Confucius. In Bond's study the East Asian countries generally scored higher on the LTO and Western countries scored lower.

An important outcome of the Bond study was the clarity of understanding what values were identified as normal and what were identified as different from culture to culture. For example, one of the items in the CVS was Filial Piety, which is not a common value nor is it weighted heavily in Western cultures, however, it is a very important trait in Eastern cultures. Hofstede and Bond (1984) identified that some of the original items in the VSM could potentially seem unusual to those from the Eastern cultures. Bond concluded that because the original VSM was conducted from a Western culture perspective, this more Eastern perspective dimension was overlooked and did not appear in the original evaluation of the IBM dataset. Table 5 lists examples of differences associated with low and high LTO values.

Table 5

LTO Differences

Low LTO	High LTO
Quick results expected	Persistence and perseverance
Immediate gratification of needs expected	Deferred gratification of needs accepted
Status not a major issue in relationships	Relationships ordered by status and order is observed
Shame is not a common feeling	A sense of shame is common
Most important events in life occurred in the past or in the present	Most important events in life will occur in the future
Living with in-laws is a problem	Living with in-laws is no problem
In business, short-term results: the bottom line	In business, building of relationships and market position
Belief in absolute guidelines about good and evil	What is good and evil depends on the circumstances
Humility is a feminine virtue	Humility is a general human virtue
Traditions are sacrosanct	Traditions adaptable to changed circumstances

Note. From *Cultures Consequences* (pp. 359-367), by G. Hofstede, 2001, Thousand Oaks, CA: Sage Publications, Inc.

Hofstede converted the Bond scores to the VSM scale ranging from 0 (zero) to 100, similar to the existing VSM dimensions. The scores for the LTO ranged from 0 (zero) for Pakistan to 118 for China. The U.S. scored 29 and Taiwan scored 87. The overall mean score for all countries was 46.

Indulgence versus Restraint and Monumentalism

In 2007, Minkov attempted to further expand the dimensional possibilities of culture by identifying three new dimensions. These were Exclusionism versus Universalism, Indulgence versus Restraint, and Monumentalism versus Flexumility, which is a self-defined term used by Minkov to represent flexibility plus humility.

In an analysis with the VSM, the first dimension of Exclusion versus Universalism strongly correlated with the PDI and IDV dimensions of the VSM, therefore, it was not identified as a new dimension. However, the Indulgence versus Restraint dimension did not correlate with any of the five VSM dimensions, therefore, Hofstede added it to the third and latest version of the VSM (VSM 08). Monumentalism versus Flexumility correlated with Short-Term Orientation ($r = .68$) and slightly with PDI ($r = .46$), however, since the VSM 94 showed some inconsistencies with the measurement of Long- versus Short-Term Orientation, this third Minkov dimension was likewise added to the VSM (Hofstede, 2008).

The Indulgence versus Restraint Index (IVR) measures a society's position on the freedom granted to its people to enjoy their lives. The Indulgence side of the index represents a society that allows relative freedom to pursue leisure, merrymaking with friends, spending, consumption, and sex. The Restraint side of the index represents a society that tends to control the pursuit of the above-mentioned activities (Hofstede, 2008). The Monumentalism (MON) dimension measures the flexibility of a society to traditions and personal beliefs. On the high Monumentalism side of the spectrum, people tend to be proud and unchangeable. On the low Monumentalism side, or Self-Effacement, people are rewarded by their society for humility and flexibility (Hofstede, 2008). The VSM 08, which measures these two cultural dimensions in addition to the five from VSM 94, was released in January 2008. There are currently no studies of note that have been conducted using this new version of the VSM.

Recreating Hofstede

The Hofstede study has been replicated many times and in most cases, on much smaller scales involving participants from only a few countries (Blodgett, Rose, Horton, & Bakir 2005; Ho & Lin 2008). Since Hofstede's publication of "Cultures Consequences," there have been six studies that have attempted to replicate the Hofstede study on a large scale. A large scale is defined by Hofstede (2005) as involving fourteen or more countries.

The first large-scale recreation of the Hofstede VSM was a dissertation study conducted by Hoppe (1990). The primary objective of this study was to perform a construct validation of Hofstede's model by comparing the data that existed in Hofstede's study with the data collected in Hoppe's study. Unlike the participants in Hofstede's study, where the participants were managers and other employees of a multinational company, the participants of Hoppe's study were alumni of the Salzburg seminar, which is a non-profit educational organization in Salzburg, Austria, that holds regular seminars on the arts, business, economics, education, environment, international relations, and politics. A majority of the seminar participants were identified by Hoppe as being the elites of their respective societies, which included CEOs of prestigious companies, top level administrators (at the national and international government levels), diplomats, chancellors, supreme court justices, as well as deans of universities.

The participant sample for this study comprised of 2,866 alumni from the Salzburg seminar and represented 19 countries. These were people who attended the seminar between the years of 1964 and 1983. The survey was conducted by mail and 1,590 completed questionnaires were returned, a 55% return rate. The country

representation ranged from 30 questionnaires from participants in Malta to 194 returns from Great Britain. The number of participants from the remaining 17 countries fell in between these low and high values. There were 81% male participants and 19% female. The age of participants ranged from 30 to over 60, with the highest concentration between the ages of 40 and 44. The average level of education was 18 years and over 70% of the respondents had either master or doctorate level degrees.

The instrument used to collect the data was the Intercultural Questionnaire. This questionnaire was made up of two parts: the first being Hofstede's VSM 82 and the second being Kolb's Learning Style Inventory (LSI). The Kolb LSI was used to compare the Active Experimentation (AE) and Reflective Observation (RO) learning modes with Hofstede's UAI and MAS dimensions.

Hoppe compared the culture dimension scores between his and those identified by Hofstede. The PDI mean across the 19 countries in this study ($\bar{x} = 16$) was lower than the Hofstede mean for the same 19 countries ($\bar{x} = 42$). The UAI had the mean score for Hofstede at 65 and the Hoppe at 33. With IDV, the mean score was 65 for Hofstede and 69 for Hoppe. Finally, for MAS, it was a mean of 46 for Hofstede and a mean of 3 for Hoppe. He went on to conduct a correlational analysis between the scores of his study with Hofstede's and found the PDI correlation at .67, the UAI at .64, the IDV at .69, and MAS at .36. For the learning mode comparison, he found that AE correlated with high MAS ($r = .64$) and weak UAI ($r = .47$), and that RO correlated with low MAS ($r = .53$) and strong UAI ($r = .51$).

One of the strengths of this study was the access to the large participant group, representing 19 countries, and having at least 30 respondents from each of the

represented countries. Having access to such a wide range of participants is not commonplace and rarely achievable. One of the deficiencies of this study was that most of the participants represented European countries. Of the 19 countries in this study, 18 were European. The only non-European country represented was the U.S. There were no countries from Asia, the Middle East, South America, or Africa.

There were five other major replications of Hofstede's study from 1990 to 2005 and they attempted to replicate most, if not all of Hofstede's cultural dimensions. Shane (1995) used the VSM 82 and the employees of six international corporations as participants. This study covered 28 countries and included the VSM items that covered the PDI, UAI, and IDV dimensions. She did not include the MAS dimension as a part of her study. Merritt (2000) replicated the VSM 82 using commercial airline pilots from 19 countries as participants. This replication of Hofstede's study validated the PDI and IDV dimensions. De Mooij (2004) conducted a study with the VSM 94, which included the fifth dimension of LTO, and used consumers as participants. This study covered 15 countries in Europe and confirmed the validity of all of the dimensions except PDI. The assumption for non-validation of PDI was based on the fact that the participants were consumers as opposed to a group of people with similar employment backgrounds.

The final two major replications of Hofstede's study did involve participants that were similarly employed, that is, they were of similar professions. The first study involved municipal employees in 114 countries (Mouritzen & Svara, 2002). This was conducted with the VSM 94 and validated 3 of the 4 cultural dimensions with Hofstede's original study, with IDV being the dimension with different results from Hofstede's. Van

Nimwegen (2002) recruited employees from an international bank covering 19 countries as participants for his study that validated the PDI and IDV dimensions, but not the UAI.

Individual versus Country Level Culture

Hofstede's seminal work spearheaded a drive towards the increased popularity of conducting cross-cultural research based on similar quantitative models. Although Hofstede's VSM was meant to measure cultural dimensions at the country, or sociological level, some researchers tried to use it to measure cultural dimensions of individuals at the psychological level (Spector, Cooper, & Sparks, 2001). Hofstede explicitly stated that his model represents cultural dimensions at the country level and not the individual level and that the VSM was meant to be a sociological tool to measure cultural beliefs of a group or a country as a whole (Hofstede, 2005). Although there are subdivisions of culture within countries, with each subdivision possessing its own sub-cultural beliefs, Hofstede believed that there are predominant sets of cultural characteristics for each country. Current researchers must consider that when Hofstede originally performed his analysis, the world was a more culturally disparate place. This was before the advent of the Internet and before the increased ease of global travel, therefore, many countries were not as influenced by the cultures of other countries, as is the case today.

Other Quantitative Measures of Culture

There have been attempts to create measurement devices that measure the variables of culture at the individual level as opposed to the sociological or country level, which is what Hofstede's VSM did. In 2002, Oyserman, Coon, and Kimmelmeier performed a meta-analysis on research conducted since 1980 on individualism and

collectivism across various cultures. Although the Hofstede VSM was clearly the most used cultural dimension measurement tool (Oyserman, et al., 2002), the studies using the Hofstede VSM were not included in this meta-analysis as the primary focus was on models that attempted to measure culture at the individual level, as opposed to the society, or country level.

This research investigated 83 independent studies that attempted to measure the levels of individualism and collectivism in individuals from a number of countries and tried to verify whether European Americans score higher in individualism and lower in collectivism than other cultural groups. This was theorized by Hofstede and other studies based on Hofstede's model, as well as by some of the qualitative observational analysis of culture (Ember, Ember, & Peregrine, 2007; Hofstede, 2005).

There were 27 different measurement devices among the 83 studies. Seven individualism variables and 8 collectivism variables were identified. The study was divided into two parts. The first was a comparison of individualism–collectivism variables between North Americans (i.e., Americans and Canadians) and international groups outside of North America. The second part was a within group comparison of people in the U.S. and it compared these groups based on their ethnic backgrounds, for example, those originating from Europe or European Americans compared with Americans from other ethnic and racial groups in the U.S., such as African-Americans, Asian-Americans, and Hispanic-Americans. Fifty of the 83 studies were used to gather data for the international comparisons and 35 of the studies were used for the within North America analysis. There were four sets of analysis: North Americans compared with people from other countries on the scale of Individualism; North Americans

compared with people from other countries on the scale of Collectivism; European Americans compared with Americans of other ethnic origins on the scale of Individualism, and the same group comparison on the scale of Collectivism.

One interesting result of this meta-analysis was that although the European Americans scored higher on the Individualism scale and lower on the Collectivism scale than other international groups, the level of relative difference between European Americans and the various Asian groups differed somewhat. For example, on the Collectivism scale, people of Chinese origin (those from People's Republic of China, Taiwan, and Hong Kong) scored noticeably higher than their American counterparts, whereas other Asian countries such as Japan and Korea had much smaller differences on the Individualism scale compared to the U.S.-based group and very little difference in the Collectivism scale. The authors make the point that this shows the shortsightedness of categorizing Asians or Asian Americans into one category as opposed to subdivisions based on a country of origin and not to a continent of origin.

Although there were many studies analyzed as a part of this research, some countries had very small representation, for example, Argentina and Bulgaria were represented only once. This makes it very difficult to gauge whether or not one sample is representative of that population as a whole. The overall result of this analysis was evidence that generally European Americans scored higher on the Individualism scale and lower on the Collectivism scale relative to the other countries that were included in the studies that were analyzed.

Horizontal and Vertical Dimensions

Of the 83 studies analyzed in the Oyserman, et al. (2002) study, 42 of these used a measurement tool founded on the concept of horizontal and vertical dimensions of individualism and collectivism. Triandis (1995) emphasized that there is not just individualism and collectivism on opposite ends of a scale but that there are different kinds of individualism and collectivism. There is the horizontal, which is defined as emphasizing equality, whether in the context of individualism or collectivism, and there is the vertical, which refers to the emphasis of hierarchy. Thus, by adding the horizontal and vertical factors, the individualism and collectivism variables are separated into another dimensional measure. Vertical Individualism represents achievement orientedness; Horizontal Individualism represents uniqueness; Vertical Collectivism represents dutifulness; and Horizontal Collectivism represents cooperativeness. An example used by Triandis (2001) is that both America and Sweden are associated with individualism, however, the individualism that represents America (Vertical Individualism) is different from that which represents Sweden (Horizontal Individualism). On the other end of the scale, both Korea and kibbutzim in Israel are associated with collectivism, however, the collectivism that represents Korea (Vertical Collectivism) is different from that which represents the kibbutzim in Israel (Horizontal Collectivism).

One of the first studies to put this model to use was conducted by Singelis, Triandis, Bhawuk, and Gelfand (1995). The main purpose of the study was to measure these four cultural dimensions (Vertical Individualism, Horizontal Individualism, Vertical Collectivism, and Horizontal Collectivism) and to determine whether they are more

desirable than measuring the more abstract, or higher level constructs of Individualism and Collectivism.

The participants in this study were undergraduate students from two universities. There were 96 students from the University of Illinois in Champagne and 171 students from the University of Hawaii at Manoa. There were 109 male and 156 female participants. The average age of the participant was 23, with a range between 18 and 55. The researchers split the ethnic background of the participants into East Asian ($n = 87$) and Western European ($n = 59$).

There were five sections to the test that was given to the participants and most parts were measured on Likert-like scales, ranging from never, or definitely no, to always, or definitely yes, with the responses in between being incremental layers of those two responses. Most of these sections measured the lower level constructs that make up Individualism and Collectivism. The four factors that make up the concept of individualism are self-reliance, competition, emotional distance from in-groups, and hedonism. On the other hand, collectivism is made up of three factors and these are interdependence, family integrity, and sociability (Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). In the concept of the four-part division with the horizontal and vertical dimensions, Horizontal Individualism is aligned with high self-reliance; Vertical Individualism is aligned with high competition, emotional distance from in-groups, and hedonism; Horizontal Collectivism is aligned with interdependence and sociability; and Vertical Collectivism is aligned with family integrity.

In a correlational analysis of the measured scales, the results showed that Horizontal and Vertical Collectivism were correlated ($r = .39$, $p < .001$), however,

Horizontal and Vertical Individualism were not correlated ($r = .00$, $p = ns$). The Horizontal dimensions showed a positive correlation ($r = .20$, $p < .01$) and the Vertical dimensions were positively correlated ($r = .14$, $p < .05$). Furthermore, it was interesting to note in the analysis that females scored lower than males on the Vertical Individualism measure. There was an additional analysis conducted on the cultural background of the two groups. One group was defined as those with a Northern, Western, or Eastern European background ($n = 101$) and the second group had an East, North, or South Asian background ($n = 100$). The Asian background group scored higher on the Vertical Collectivism variable than the European background group.

The benefit of this analysis was that the researchers found stronger results when using the horizontal and vertical layers of Individualism and Collectivism. They found that the alphas for these variables were higher than when the lower level constructs of items such as self-reliance or higher level variables such as Individualism or Collectivism were measured. According to the researchers, having this level of information is more useful than the higher level constructs of Individualism and Collectivism.

One of the main drawbacks to this study was the limited variety of the participant groups, which were comprised of undergraduate students from two universities in the U.S. These groups were not representative of the population as a whole. Moreover, the fact that the students had noted a certain ethnic background does not say anything about whether they were born in those countries, whether they spent their formative years in those countries, or if they were ethnically from that background but were descended from elders who had been living in the U.S. for several generations. All of these factors could have impacted the cultural beliefs of the participants.

Several years afterward, Triandis and Gelfand (1998) tested the measurement of the horizontal and vertical dimensions on a wider set of participants, including non-Western participants. This follow-up study was divided into separate phases. The first phase was conducted with 326 students from Chung-Ang University in South Korea. The measurement tool used was similar to the one used in the original Singelis, et al. (1995) study and the questionnaire included 27 items: 5 that aligned with Horizontal Individualism, 8 with Vertical Individualism, 8 with Horizontal Collectivism, and 6 items with Vertical Collectivism. The second part of this study included 127 undergraduate students from a university in the state of Illinois. The participants self-identified themselves as 74 % white, 4% Hispanic, 12% Asian, and 8% black. The gender separation was 54% male and 46% female. The same 27-item questionnaire was used for this group of participants.

The analysis showed that Horizontal Individualism and Vertical Individualism were negatively correlated, as expected, and the Horizontal and Vertical Collectivism were not noticeably different between the various groups. The results showed that those who were defined as Collectivistic scored low on competition, high on family integrity, low on emotional distance from in-group, low on hedonism, and high on sociability. For other dimensions, Vertical Individualism was associated with high scores on competition and hedonism, Vertical Collectivism with high scores on family integrity, and Horizontal Individualism with high scores on self-reliance. Overall, the analysis essentially supported the four cultural patterns defined by Triandis (1995).

The strength of the Triandis and Gelfand study was the multiple repetitions of these measurement devices on the participant groups. The researchers were able to

measure a group in the U.S. and a group in South Korea, which are countries typically identified as being on the opposite ends of the Individualism-Collectivism scale. The study pointed out that the model showed consistency in regard to people with similar backgrounds scoring similarly on the four dimensions. However, a glaring weakness of this study was again the participant base and the fact that it was a very small, non-representative sample of participants.

The focus of the study was to look at these cultural variables at the psychological/individual level as opposed to aggregating them and looking at them from a country or societal level. Triandis and Gelfand (1998) stated that what is measured at the individual level is generally independent from what is measured at the country or cultural level. This point was further emphasized by Hofstede (2005). The conclusion of this study was that the models available to measure the four constructs of culture (Horizontal Individualism, Vertical Individualism, Horizontal Collectivism, and Vertical Collectivism) were generally consistent in regard to the results for similar participant groups.

Benefits and Drawbacks of Existing Models

There are some cultural dimension measurement instruments that try to measure attitudes, values, and beliefs (Matsumoto, Takeuchi, Andayani, Kouznetsova, & Krupp, 1998). Many of the questions within the surveys ask questions in a particular context and may ask the participants to compare their beliefs to others. The participants will most likely make those comparisons between other people around them, who in most cases will have similar cultural beliefs. If those comparisons were to be made against people from countries with very different cultural beliefs, the responses could vary significantly.

Although there are claims that there are no current measurement tools that properly measure cultural dimensions, such as Individualism and Collectivism, from a quantitative perspective (Oyserman, Coon, and Kemmelmeier, 2002), the Hofstede VSM is the most widely used, therefore, there is the most literature on this particular measurement tool. Furthermore, not only does the Hofstede model measure the Individualism and Collectivism dimensions of culture, albeit on a single dimensional scale, the tool attempts to measure other cultural dimensions. It is because of these facts that this tool was selected as the primary tool to measure the cultural dimensions in this study.

Learning Styles

Foundations

The foundations of learning styles come from psychological research on individual differences. A learning style identifies how people receive and process information (Sims & Sims, 2006). The modern history of trying to identify the ways in which humans learn goes back to the 1850s (Driscoll, 2005), however, there was a significant increase in interest in the study of learning styles between the 1960s and 1980s. Curry (1987) conducted an analysis of learning style inventories that were created during this time. She found that learning style inventories tended to fit one of two categories. The first category of inventories was created for the K-12 population and the other category catered toward post-secondary students and adults. Of the 21 learning style inventories reviewed by Curry, 16 were developed by researchers in the United States. There were 6 inventories that were highly rated with 4 of these specifically targeting the college and adult populations. These 4 were created by Rezler and

Rezmovic (1974), Schmeck, Ribich, and Ramanaiah (1977), Kolb (1984), and Myers (1962), with the Kolb LSI and Myers-Brigs being the most widely used and the most widely emulated, that is, other learning style inventories were created based on the foundations that these two created.

Since 1990 and through the 2000s, there has been an increased focus in tying cultural diversity with learning styles (Sims & Sims, 2006), particularly in the K-12 population. There has been increased interest in cross-cultural psychology for the adult population as well, that is, the cultural influences on individual cognitive development. Although some researchers (Lemire & Gray, 2003; Walvoord, 2003) have expanded the literature on learning styles during the past two decades, very few studies have resulted in new inventories to measure learning styles. Moreover, there has been research attempting to use various forms of technology to accommodate the learning styles exhibited by learners (Milshtein, 2003).

Multiple Intelligence Theory

There is generally a historical relationship between cognitive theory and learning styles, and this is exemplified in Gardner's theory of Multiple Intelligences (MI). Gardner (1993) speaks of the areas of intelligences that people possess and the possibility of tailoring an educational curriculum to the particular profile of an individual and thereby increasing the effectiveness of the educational experience.

Multiple Intelligences is the theory that every individual has varying levels of nine intelligences. According to Gardner (1993), some people have strengths in one or more intelligences, whereas another person may have strengths in a different set of intelligences. The categories of intelligences include bodily/kinesthetic, interpersonal,

verbal/linguistic, logical/mathematical, naturalistic, intrapersonal, spatial, musical, and other intelligences.

The bodily/kinesthetic intelligence represents people who prefer activities such as sports and learn best through movement of their bodies. The interpersonal intelligence represents people who have good communication skills, easily interacts with others, and tend to be extroverts. The verbal/linguistic intelligence represents people who are generally good at reading and writing, memorizing words and dates, and learning languages. The logical/mathematical intelligence represents people with good logic, reasoning skills, and perform well in mathematics, computer programming, and scientific investigation. The naturalistic intelligence represents people who are in tune with nature and have an affinity for interacting with and caring for animals. The intrapersonal intelligence represents people who tend to be introverts and whose strengths are in working alone, as opposed to in teams. The spatial intelligence represents people with strong visual memory, good sense of direction, and good hand-eye coordination. The musical intelligence represents people who excel in music and generally learn best aurally. The other intelligences represent people who have strengths in areas such as spiritual intelligence, existential intelligence, or other areas not covered by the prior eight intelligences (Gardner, 1993).

Gardner did not design a learning styles inventory to measure the intelligences of his MI theory. A learning style inventory that attempts to capture five of the nine MI theory intelligences is the Perceptual Learning Styles Questionnaire.

Perceptual Learning Styles

Reid's (1987) study of Perceptual Learning Styles was founded on the concepts of Gardner's Multiple Intelligence theory. The Perceptual Learning Style Preference Questionnaire (PLSPQ) is a thirty-item Likert-like survey that measures perceptual learning styles that are similar to the learning style variables typically associated with Gardner's theory. Since its introduction, the PLSPQ has been one of the most widely used learning style assessment tools in the ESL field (Wintergerst, DeCaua, & Itzen, 2001).

The learning style variables in Reid's PLSPQ are Auditory, Visual, Tactile, Kinesthetic, Group, and Individual. Auditory learners learn best through listening to lectures and discussions. Reading a book aloud or hearing a book read provides better retention for these learners than simply reading silently. These characteristics tie closely with the verbal/linguistic intelligence of Gardner's theory. This type of learner generally thinks diametrically from the visual learners and tends to think in words as opposed to pictures (Gardner, 1993). The Visual learner learns optimally through diagrams, videos, and illustrations. This characteristic ties into the visual/spatial intelligence of Gardner's multiple intelligence. These learners have a tendency to think in pictures and require the images in their mind as clues to remember what they have learned. The Tactile and Kinesthetic learners learn by way of touching and physical movement. This characteristic ties closely with the bodily/kinesthetic intelligence of Gardner's theory. These learners learn best through movement and generally have a good sense of their spatial surroundings. The Group learning style is closely related to Gardner's interpersonal intelligence. These learners have the ability to perceive through the point of

view of others, encourage cooperation, and engage in communication with others. The Individual learning style is related to the intrapersonal intelligence of Gardner. These learners tend to be more cognizant of their inner self and with their relationship with others.

Reid (1987) conducted a study of perceptual learning styles and identified major, minor, and negative learning style preferences among students with nine unique native languages. Although comparisons were made across the country backgrounds of these nine languages, the PLSPQ tool itself does not measure the cultural characteristics of the learners. Reid merely associated learning styles with people speaking different native languages and the concept of cultural characteristics was not directly addressed as part of her studies, nor is it addressed in the PLSPQ survey instrument.

The research question for Reid's study was whether learning style preferences are significantly different between ESL students with different language backgrounds and with students from the U.S. whose native language is English. The participants of the study were 1,234 intermediate and advanced level ESL students in intensive English language programs from 43 universities in the U.S. The participants represented 98 countries, 29 major fields of study, and 52 language backgrounds. There were an additional 154 participants who were native speakers of English from Colorado State University. Some of the larger representative sample sizes came from students whose native languages were Arabic (n = 193), Spanish (n = 205), Japanese (n = 130), and Korean (n = 118).

The survey instrument used was a thirty-item questionnaire measuring 6 learning style types. These learning styles were Visual, Auditory, Kinesthetic, Tactile, Group, and

Individual. The survey was a five-point Likert-like scale with measurements ranging from strongly agree to strongly disagree, with the center variable being undecided. Five questionnaire items were used to score each of the six learning style types. Mean scores above 13.50 were identified as a major learning style preference, means between 11.50 and 13.49 as a minor learning style preference, and means below 11.49 as a negative learning style preference. The results of the questionnaires were divided and presented in many different groupings, for example, based on native language, TOEFL score, length of time spent in the U.S., length of time studying English in the U.S., major field of study, and gender.

In general, the ESL students had a preference for Kinetic and Tactile learning styles. Most did not prefer the group learning style in regard to each of the variables. Korean students had the highest scores on the Visual learning style and native English speakers scored lowest on this variable, with the other language backgrounds falling in between. For the Auditory learning style, the Japanese speakers scored the lowest and the Chinese speakers scored the highest with the native English speakers falling in between but closer to the Chinese speakers. For the Kinesthetic learning variable, the Arabic and Spanish speakers showed this as a high preference learning style whereas the Japanese speakers scored the lowest on this variable. The native English speakers scored just above the Japanese speakers and the Chinese speakers scored slightly below the Spanish and Arabic speakers.

In regard to the Tactile variable, the native English speakers scored the lowest, with the Arabic and Chinese speakers having the highest preference for this learning style. With the Group learning style variable, the Malay language speakers scored the

highest and the English native speakers scored the lowest. The gaps within this learning style variable were not that great, with all of the groups showing this as either a minor or negative learning style preference. For the Individual learning style variable, the native English speakers scored the highest and the Malay speakers scored the lowest. Chinese language speakers were much closer to the scores of the preference level of the native English speakers (see table 6).

Table 6

Learning Style Preference Means According to Language Background

Language	Learning Style				Group	Individual
	Visual	Auditory	Kinesthetic	Tactile		
Arabic	13.75	14.06	15.09	14.53	11.51	12.84
Spanish	13.39	13.29	15.11	14.18	10.79	12.79
Japanese	12.52	12.67	13.29	13.32	10.35	12.05
Malay	12.84	13.14	14.33	13.54	12.75	11.65
Chinese	13.55	14.09	14.62	14.52	11.15	12.41
Korean	14.07	13.73	14.58	14.48	11.42	12.46
Thai	13.40	12.83	14.63	14.09	11.49	12.94
Indonesian	13.41	13.78	13.90	13.47	11.15	13.07
English	12.12	13.82	13.64	12.69	10.08	13.13

Note: Means 13.50 and above = major learning style preference; 11.50-13.49 = minor learning style preference; 11.49 or less = negative learning style preference. From "The perceptual learning style preferences of ESL students," by J. Reid, 1987, *TESOL Quarterly*, 21, p. 96.

Overall, the results of this analysis showed that ESL students have different perceptual learning styles than those of native speakers of English. Moreover, there was a difference between ESL students with different native languages. Based on the analysis of the length of time in the U.S. and of studying English in the U.S., the results showed that the students had a tendency to adapt their learning style to the academic environment in the U.S.

This was a thorough analysis of learning style preferences across a number of backgrounds. There was a large participant group and, although not explicitly stated by

Reid, there could be a cultural influence on the way participants responded to the questionnaire, for example, it was noted that the Korean cultural group may lean towards providing positive responses on questionnaires. This cultural tendency to stay away from an outward show of negativity could skew the responses and impact the reliability of the results. One of the drawbacks to this study was that the population set was limited to university students and the majority of the participants ranged in age from 19 to 29. For some of the language backgrounds, there was a strong relationship between language and location, for example, the Japanese speakers were predominantly from Japan. However, some languages, such as Spanish and Chinese, are associated with a number of countries whose native language is Spanish or Chinese. For native speakers of these languages, there could be some cultural variations between these countries that were not captured in this study. Overall, this was a valiant but incomplete attempt at trying to identify the learning styles of ESL learners with different language backgrounds and trying to identify how they relate to teaching styles that can be used to target the specific learners.

There was a follow-up study that took the PLSPQ and performed a reliability analysis (Wintergerst, DeCaua, & Itzen, 2001). Through a factor analysis of the question items, it was determined that the 30 items in the PLSPQ did not load as expected to Reid's 6 learning style variables. As a result, an alternate three-factor model was proposed with the following factors: Group Activity Orientation, Individual Activity Orientation, and Project Orientation. The Group Activity Orientation factor, which focuses on group learning, was determined by 5 Group items (or survey questions) from the PLSPQ, 2 Auditory items, and 4 Kinesthetic items. The Individual Activity Orientation factor, which primarily focuses on individual learning, was calculated by

using 4 Individual variable items and 2 Visual items. These Visual items addressed reading, which was defined by the researchers as being an individual learning activity.

The Project Orientation factor combined the Tactile, Kinesthetic, and Visual learning style items. The researchers determined that the primary focus of the Project Orientation factor was that of participating in class-related projects. The alternate learning style factor structure was then analyzed against the original PLSPQ; the reliability and validity of both structures when used with ESL students were determined; and the type of relationships between the PLSPQ learning style variables and the participants' native language background was measured.

The participants for this study were 100 ESL students from a university in New York City. Their ages ranged from 17 to 49 and the students represented 4 language groups: Chinese (n = 51), Korean (n = 23), Spanish (n = 11), and Russian (n = 15). They represented 18 different countries. A majority of the participants had an average of four and a half years of studying English in their native countries.

In the first phase of the study, the Reid PLSPQ was administered to the participants and the survey questionnaire was scored according to Reid's calculations. Wintergerst, et al. (2001) performed an exploratory factor analysis to validate the hypothesized factor structure of the PLSPQ and the Cronbach alpha reliability estimate was used to determine the internal consistency of the PLSPQ. In the original analysis, three of the variables, Kinesthetic, Group, and Individual showed good reliability with alpha ranging from 0.69 to 0.87, however, the Visual, Auditory and Tactile learning styles, showed lower reliability scores with alpha ranging from 0.48 to 0.59. Wintergerst, et al. performed an item total correlation with the variables and determined the items that

would increase the alpha scores and thereby increase the reliability of a particular variable.

Although these changes increased the alpha value for some of the factors, they eliminated the Visual, Auditory, Kinesthetic, and Tactile variables, which had low alpha values in the reliability analysis of Reid's original variables and scoring. Once the recalculation was made, based on the new three-factor model, the scores for the four language groups were compared. The results showed that the Chinese and Russian groups had similar learning style preference patterns. Furthermore, it showed their preference for Group Activity Orientation and Project Activity Orientation more so than Individual Activity Orientation. Korean students on the other hand showed a preference for Individual Activity Orientation and Project Activity Orientation, with a much lower preference for Group Activity Orientation. The Spanish students showed a preference for Project Activity Orientation, followed by Individual Activity Orientation, then Group Activity Orientation as the least preferred learning style.

The conclusion derived from this study was that measuring learning styles is not an exact science. Although the refactored formulas narrowed down the reliability of some of the factors, it removed some of the variables entirely. This was a study based on a small sample set and repeated measures are needed to further validate the PLSPQ against similar and different populations.

Experiential Learning

One of the most established learning style inventories is the Kolb Learning Style Inventory (LSI). The foundations of the Kolb LSI are rooted in Kolb's theory of Experiential Learning, which is an evolutionary work founded on the works of John

Dewey, Kurt Lewelling, Jean Piaget, William James, Carl Jung, and Paolo Friere (Kolb & Kolb, 2005). According to Kolb, learning is a holistic process and should not be viewed as the outcome of the process. Identifying and aligning the process that works best with a particular person's learning style leads to the most effective learning experience and thereby produces the most optimal outcome.

Experiential learning further espouses that how a person learns is dictated by how that person's past experiences are transformed from experience to knowledge (Kolb, 1984). According to Vygotsky (1987), a person experiences life within the context of culture and society. These experiences shape a person's thought processes and dictate how he or she learns best. Therefore, learning is not just a cognitive process, but it is closely tied to how a person thinks, feels, perceives, and behaves. Much of this is dictated by what defines a person and the definition of a person is usually the sum total of his or her upbringing and surroundings, both cultural and social.

Kolb's learning model is one that represents a circular process (see Figure 1) that progresses through four learning modes, beginning with Concrete Experience (CE), moving to Reflective Observation (RO), then Abstract Conceptualization (AC) and finally to Active Experimentation (AE). Another definition of this cyclical process is as follows: CE is Experiencing, RO is Reflecting, AC is Thinking, and AE is Doing. This is a cycle that repeats itself continuously for each person, or learner. The method in which a learner progresses through this cycle and the modes that represent strengths define a person's learning style.

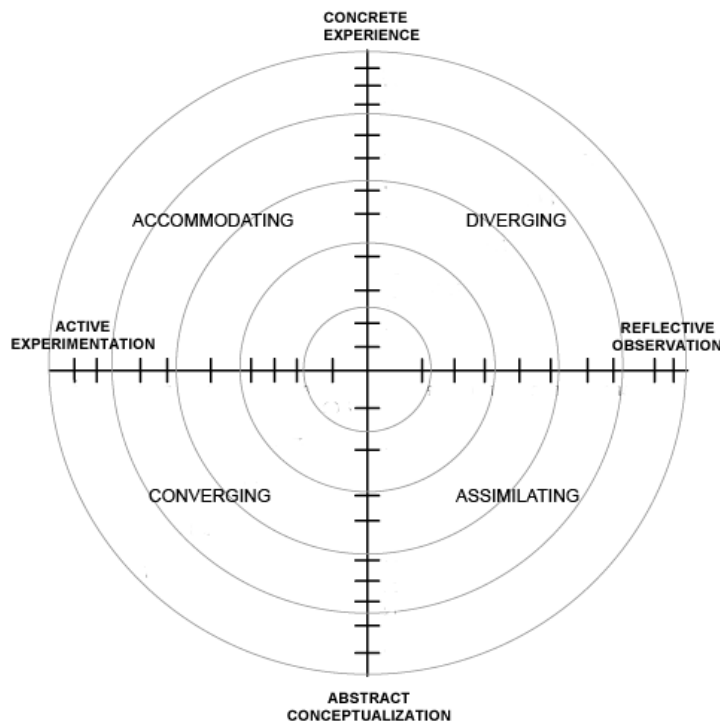


Figure 1. Kolb's Learning Style Profiles

*Note. From *Experiential learning: Experience as the source of learning and development*, by D. Kolb, 1984, New Jersey: Prentice Hall.*

Most people's learning style focuses on a certain combination of the four learning modes (CE, RO, AC, and AE) and is identified as a particular learning style type (Kolb & Kolb, 2005). There are four learning style types in Kolb's model. They are Diverging, Assimilating, Converging, and Accommodating. The Diverging learning style type combines the Concrete Experience (CE) and Reflective Observation (RO) learning modes. Diverging types are generally imaginative, people-oriented, have broad cultural interests, and are able to look at situations from many perspectives. The second learning style type is Assimilating and this type combines the Abstract Conceptualization (AC) and Reflective Observation (RO) learning modes. Assimilating types tend to do best in inductive reasoning and abstract concepts. They are good at theories and theoretical

models, but are generally not people-oriented. The third learning style type is Converging and this type combines the Abstract Conceptualization (AC) and Active Experimentation (AE) learning modes. Converging types tend to be practical, unemotional, and are usually focused on a small number of interests, as opposed to having a high level understanding of many interests. The fourth learning style type is Accommodating and this type combines the Concrete Experience (CE) and Active Experimentation (AE) learning modes. Accommodating types tend to be risk takers, can react to circumstances quickly, and solve problems intuitively.

The measurement tool used to determine a person's position in the Experiential Learning model is the Kolb Learning Style Inventory (LSI), which is a twelve-item forced-choice survey. Kolb's LSI is widely used throughout academia and corporate organization environments to effectively measure learning styles of people and how best to utilize the students' classroom environment or employees' working environment.

The LSI and Culture

There have been numerous studies conducted with Kolb's LSI and much of the research conducted on the analysis of learning style inventories usually includes the Kolb LSI (Cassidy 2004; Pickworth & Schoeman, 2000). There has been some criticism about the ipsative nature of the Kolb LSI (Geiger, Boyle, & Pinto 1993; Merritt & Marshall, 1984) and how that makes comparing results across various LSI studies difficult. Kolb has addressed some of these concerns by publishing normative scales of LSI scores to allow for comparisons across studies.

The Kolb study has been used in some research as it relates to culture. Jackson (1995) conducted an analysis of the Kolb learning cycle on students representing five

European national groups at a French business management school. Although there were some significant differences between the national groups, for example, the German group preferred logic over subjective cognitive orientation and the Spanish group preferred the opposite, generally, all groups preferred student initiated instruction over teacher direction. This was indicative of the similar European backgrounds of the participants in the study.

Another study that covered sub-cultural groups within a nation was a dissertation study conducted by Saucedo-Castillo (2001). This study compared the learning style differences between ethnically different American accounting students from the public university system in Texas. There were 409 participants, with the breakdown as follows: 41 African-American, 97 Anglo-American, 42 Asian American, and 194 Hispanic American. The results revealed a preference for the Assimilating learning style type for all of the groups except the Anglo-American group, which preferred the Converging learning style type. The study did not present detailed results for the learning style differences, if any, that were observed between the various ethnically different groups.

The most extensive use of the Kolb LSI in a cross-cultural context was a six-part theoretical and empirical comparison conducted by Yamazaki (2005). The purpose of the Yamazaki study was to determine how culture is related to learning styles and if there is a connection between specific learning styles and existing cultural typologies. This study attempted to link the differences among six cultural typologies with Kolb's Experiential Learning model and to evaluate past studies of learning styles, which used the Kolb LSI, that were conducted in several countries to determine whether the results varied across participants from different cultures.

The Kolb LSI data for the Yamazaki study were taken from four independent studies of learning styles that were conducted in various countries and cultures. The first of these studies was a comparison between Japanese and American learning styles. Yamazaki and Kayes (2005) looked at learning styles of Japanese managers and American managers working for Japanese multinational corporations in the United States and tried to identify the cultural differences between the two. There were 267 Japanese managers and 126 American managers. The second dataset came from a study by Fridland (2002), where he compared the learning styles of Chinese and American teachers in K-12 environments. There were 100 Chinese teachers and 105 American teachers. The third dataset was from a study by Barmeyer (2004) who compared the learning styles of 132 French, 98 German, and 123 Quebecois students, all majoring in business administration. The fourth dataset was from the Auyeung and Sands (1996) study that compared learning styles between 303 Australian, 172 Hong Kong, and 157 Taiwanese students, all majoring in accounting.

The first part of Yamazaki's study involved looking at six cultural typologies and theoretically mapping them with variables of Kolb's learning model. The first of these typologies was the high-context versus low-context culture proposed by Hall (1976), which says the high-context cultures are those where non-verbal behaviors are important as well as the environment in which communication takes place. Members of high-context cultures are those typically from countries such as Japan, China, France, and the Arabic language countries. According to Yamazaki, high-context cultures should be associated with Kolb's Concrete Experience (CE). Low-context cultures are those where non-verbal behavior is less important and verbal messages play a more important role in

communication. Countries that fit this definition of culture include the United States, Switzerland, and Germany. In relation to Kolb's learning model, low-context cultures should correlate with Abstract Conceptualization (AC).

The second cultural topology was that of shame versus guilt cultures. According to Benedict (1946), shame cultures are those where the individual feels a strong sense of being watched by others in society and have to conform to the societal values. Shame should be associated with the CE learning mode of Kolb's model. Guilt cultures tend to focus more on an individual's inner reflection. Guilt cultures should be associated with the Reflective Observation (RO) learning mode.

The third cultural topology was that of Hofstede's Uncertainty Avoidance (UAI). Those with a strong UAI should be associated with the RO learning mode of Kolb's model and those with weak UAI should be associated with the AE attributes.

The fourth cultural typology was that of M-type organizations versus O-type organizations. According to Hayashi (as cited in Yamazaki, 2005), M-types are generally consistent with Western organizations and O-types are generally associated with Japanese organizations. M-type organizations should match the AC abilities from a conceptual level and the O-type organizations should match the CE abilities.

The fifth cultural typology was that of independent-self versus interdependent-self. People from Asian, African, and Latin American as well as some Southern European countries are typically defined as interdependent-self cultures. Those defined as independent-self cultures are usually people from the American culture as well as the Western European countries. Yamazaki stated that interdependent-self versus the independent-self should be similar to the Collectivism versus Individualism dimension

defined by Triandis (1995) and Hofstede (1980). The interdependent, which is equivalent to Collectivism, should be conceptually tied to the CE and RO abilities of the Kolb model, whereas, the independent-self, or Individualism, should equate to the AC and AE abilities of the Kolb model.

The sixth cultural topology was that of field-dependent versus field-independent (Witkin, 1979). Field dependent defines people who rely on immediate context in order to solve problems and it should align with the CE abilities of Kolb's model. Field-independent defines people who rely on their inner self, have less reliance on the external society around them, and favor abstract activities. Field-independence should equate to the AC abilities of Kolb's model.

The data taken from each of the four independent studies were analyzed separately and then aggregated with the data in all of the studies. Some of the theories proposed by aligning the cultural typologies with Kolb's learning style dimensions proved true, whereas, others did not provide the anticipated results.

In the analysis using the dataset from the first study, all proposed relationships (cultural typologies aligned with learning styles) were supported. In the analysis using the dataset from the second study, three of the six proposed relationships were supported. In the analysis using the dataset from the third study, two of the proposed relationships were supported. In the analysis using the dataset from the fourth, and final, study, only one of the propositions was supported.

A strength of this study was that it was one of the rare examples where an attempt was made to map learning styles to cultural dimensions. Yamazaki attempted to map the learning styles of nine cultures, or countries, in relation to each of the other countries by

taking similarly acquired data from Kolb's LSI and comparing the results across the cultural background of the participants. One of the weaknesses of this study is non-verification of the validity of the LSI results across the four studies. The environments where these studies were conducted as well as the backgrounds of the participants did not appear to be accounted for when the data was mapped. For example, the Japanese and American learning styles were based on managers within a corporation. The Chinese and American learning styles were based on teachers in K-12 settings. The wide range of the participants' background and occupations would likely have an effect on data reliability when comparing them directly without an equalizing variable. This appeared to be a factor that was not taken into consideration.

Although the Kolb LSI has been administered and conducted in various countries and researchers have attempted to measure the differences in the Kolb results across the people in various countries (Yamazaki, 2005), the Kolb, in and of itself, does not measure cultural traits nor does it align the learning styles with the cultural background or characteristics of an individual learner or a particular group of learners.

There have been additional studies that looked at the learning style differences across cultures (Auyeung & Sands, 2003; Charlesworth, 2008). Each of these found significant differences in one or more learning style variables across the cultural groups being studied. However, in each of these studies, there was no actual measurement of the cultural characteristics of the participant groups. The cultural characteristics of the participants were assumed from the existing literature on what characteristics generally fit people from the countries represented in the studies.

Learning Styles and Culture

Various learning style inventories have been administered in studies across cultural groups and different native languages. These are generally indirect attempts to address the cultural impact of cognitive development. The field of study that focuses on this very topic is cross-cultural psychology, which is sometimes referred to as differential psychology. The general tenant of cross-cultural psychology is to “study similarities and differences in psychological functioning in various cultures and ethnic groups” (Berry, Poortinga, Segall, & Dasen, 1992, p. 2). Where many branches of psychology focus on the ways in which parents, friends, and other people impact human behavior, cross-cultural psychology investigates the impact that culture has on cognitive development and individual human actions.

Early cross-cultural psychology research was content with simply documenting the cultural differences of various psychological processes. Many of these studies were based on psychological research and theories that were founded in either the United States or Western Europe. This is generally referred to as the first phase of cross-cultural psychology (Matsumoto, 2001). The second phase of this evolutionary growth of cross-cultural psychology looked at trying to understand the differences between cultures through various cross-cultural psychological models. The works of Hofstede (1980) and Triandis (1995) have helped to advance the breadth of literature in this area and to better understand cultural differences at the individual and sociological levels. Matsumoto states that the next, or third, phase of this evolutionary process will be to move beyond the cross-cultural models identifying the behavior patterns of people from different

cultures and move to a more all encompassing understanding of human behavior and psychological processes that will be applicable to people of all backgrounds.

The Singelis, Triandis, Bhawuk, & Gelfand (1995) and Triandis and Gelfand (1998) studies mentioned earlier attempted to address the cultural impact and differences from this culture-based psychological perspective, as opposed to a sociological perspective. The Hofstede study looked more at the sociological perspective, which focuses on the cultural group as a whole as opposed to the individuals within the cultural group.

Although placing cultures into categorizable groups can be misconstrued as stereotyping, the objectives of these studies and this current research is not to turn the results into stereotypes, thereby categorizing individuals and limiting their potential. Research has shown that employing a teaching approach that does not suit the learning style of students can increase the affective filter (Krashen, 1982), thereby reducing the effectiveness of the lesson being taught. Some learning style theorists suggest that matching an instructional style with a student's learning style could optimize the learning experience, whether in a classroom or a CALL program (Kolb & Kolb, 2005; Walvoord, 2003).

Computer-Assisted Language Learning

Evolution of CALL

The evolutionary process of Computer-Assisted Language Learning (CALL) can be divided into three phases: Behavioristic CALL, Communicative CALL, and Integrative CALL (Warschauer, 1996). Behavioristic CALL represents the very early use of available technology to teach language. The technology used for CALL during this

time, 1960s through the 1970s, was large, bulky hardware that required a significant amount of physical space. The Behavioristic CALL designers integrated Behaviorist theory of learning and second language acquisition (Richards & Rodgers, 2001). They primarily used simple rote memorization and drill exercises and adapted these for the computer. According to Behaviorist principles, repetition of exercises was necessary to learn a content area, in this case a foreign or second language. It was thought that computers were ideal for this type of lesson because they “do not get bored with presenting the same material” repeatedly (Warschauer, 1996, p. 4). The one benefit of computer-based systems during the early days of CALL was that students could progress through the material at their own pace and stop and review material that they felt needed repeating, unlike a classroom setting where a lesson would be presented only once and never repeated.

From the late 1970s through the 1980s, the second phase came to prominence and this was Communicative CALL. Communicative CALL leveraged communicative teaching strategies that involved the learning of language through situational use as opposed to repetition of patterns and grammar (Richards & Rodgers, 2001). Communicative language teaching is founded on the communicative competence concepts of Hymes (1972) and incorporates the principles of the socio-interactionist language learning theory. Many of the CALL programs that existed during this era included those that asked questions of the user and tried to create a conversation-like flow of exercises. During this phase, there were some programs that were merely electronic reproductions of textbooks and additionally, there were programs that used games to increase the learners’ proficiency of the language being studied. Moreover, it was during

this era that computers that could sit on top of desks became widely available. These new personal computers (PCs) were unlike the large mainframe type of computer systems from the prior generation, which required a large room to host it, and this allowed for a wider acceptance of CALL programs.

The era of Integrative CALL began in the 1990s. This coincided with the increasing popularity of PCs and the growth of the Internet. Although computers have been used in language learning since the 1960s, the popularity of using technologically enhanced methods of learning language did not occur until the widespread popularization of the Internet. Furthermore, the availability of multimedia technology allowed CALL designers to use animation, pictures, graphics, and sound in ways that technologies of the past did not allow. Student interaction with CALL programs became more common and programs could be adjusted according to the student's skill and pace of learning. Whereas in the prior two phases, computers were minor supplements to a language-learning curriculum, CALL began to have more influence in the process of language learning (Warschauer, 2004).

Using computers to learn a language has both benefits and drawbacks. With the self-paced nature of many of today's CALL programs, students are free to adjust the content and pace of the learning without having to worry about teachers or other learners. For the younger generation of learners who have grown up immersed in technology, there is more motivation to use this type of language learning device (Huang, 2003). For learners not accustomed to modern technology, using computer-based programs can be a hurdle to learning language. Generally, CALL has been shown to improve the receptive skills of reading and listening, more so than the productive skills of speaking and writing

(Fotos & Browne, 2004). Although with the advanced technology available today, especially with real-time communication devices available on the Internet, CALL is showing improvements in being able to teach all four language areas to prospective language learners.

Learning Styles and CALL

There are many potential factors that can determine the effectiveness of a CALL program. Some of these factors can be controlled by the designer of a program and others cannot. Areas that cannot be controlled include the students' willingness, motivation, and attitude toward computers, technology, and internet-based learning programs. Generally, people with more experience using computers will have less anxiety in using such a program to learn language (Coryell & Chlup, 2007). This is especially true with younger generations who are growing up in a society immersed in technology. Another uncontrollable factor is the environment in which a CALL program is being used, for example, the use of a CALL program in a computer lab with other students using individual computer terminals, but at the same time being able to communicate and share the learning experience with each other. Or, the CALL program could be used by an individual student isolated in his or her own room. The same CALL program in two distinct environments could impact the effectiveness of the CALL lessons (AbuSeileek, 2007). These are factors that cannot be controlled by designers of CALL programs.

On the other hand, there are areas that can be controlled. Among these factors are the content of the programs themselves, the presentation of the programs, and the type of technology used to present the language lessons. For example, the lesson could be

presented by use of a PowerPoint presentation, a Flash-based animation, or a combination of video and audio programs. Furthermore, the flow of the language lessons can be controlled and altered. The designer might include the ability of the CALL program to allow the students to create their own flow of lessons. By doing so, the CALL program would not limit students to a step-by-step procedure, but instead allow them to navigate in a circular or random pattern through the content, based on what the learner thinks is the best path to learn the content being taught through the CALL program. There have been attempts to associate some of these designer controllable factors, whether it is presentation of material or the type of technologies used to present a lesson, with the learning styles of language learners, for example, using a structured, step-by-step layout for the CALL program to target learners with a particular learning style (Clariana, 1997; Liegle & Janicki, 2006).

In the area of software training research, Liegle and Janicki (2006) identified two factors that are adjustable for the learning styles of the user. The first is the creation of training material content and the way that it is used to match the needs of the learner. The second is the presentation mode of the material. This addresses the way in which the material is presented.

For presentation mode, there are two different methods to the way CALL programs are designed. First is the system control method where the program guides a student through a pre-defined set of steps. The other method is the learner control method. This type of CALL design allows a student to navigate freely through the various areas of the program to build up the knowledge on his or her own as opposed to following a pre-defined, structured order. Some researchers have claimed that the second

method may not be appropriate for beginning language learners as they may not have the foundation in place to be able to randomly learn the pieces and bring them together to a comprehensive whole (Chalmers, 2003; Murray, 1998).

Liege and Janicki (2006) conducted a study to determine the relationships between the explorer and observer learning style types, based on the Kolb LSI, with how they affect the users' navigational habits in web-based programs. Furthermore, they measured whether the learning style and presentation mode affect the amount of learning by the students. The primary question they tried to answer is whether learners with different learning styles use web-based programs differently.

This study consisted of four parts. The first part was the creation of the web-based learning program. The second part was a consultation with experts from a graduate school of education to determine whether or not appropriate learning concepts were used in the design of the programs. The learning principles used for the program were as follows: the overview of the learning objective, the prerequisite list, the use of various presentation styles, the ability of users to control the lesson as well as providing feedback, and a test portion. These areas addressed three particular styles of learning and these were: to have the lesson presented in a narrative format; to present the lesson by use of an example; and to have the learner perform an exercise to learn the material. The third part of this study was a beta test of the program, and finally, the fourth part was the completion of the web-based course by the actual participants.

There were 63 undergraduate student participants, five of these participants were identified as control subjects who did not use the program to learn the content being instructed but were asked to use the Internet to find information and topics related to the

material that was being covered in the web-based program, which the other 58 participants used. The participants were asked to perform a three-step process: the first was to complete the Kolb LSI; the second was to use the program to learn about management theory; and the third part was a test on the material that was learned through the web-based program. In terms of the Kolb LSI results, all participants were categorized as either an Observer (RO) or Explorer (AE) learning style type.

While navigating through the course, the students had the option of clicking a Next button to go to the next phase or to randomly select the various areas within the lesson being taught from a list of topics. The progression of web pages was recorded and tracked for each participant. The researchers analyzed whether students clicked Next for each successive topic area or whether they jumped from area to area. The results showed that the Explorer learning style types had a higher percentage of jumps to total pages as opposed to following the sequence of lessons by selecting the Next button. The Explorer group had 18% of pages that were identified as jumps, whereas the Observer group had only 8.5%.

In regard to the effectiveness and the scores on the test, the researchers found that the Explorer types who did not jump, but rather followed the sequence by selecting Next, had a lower mean score ($\bar{x} = 58.0$) than those students with the same learning style who jumped ($\bar{x} = 64.3$). On the other hand, the Observer learning style types who followed the sequence by selecting Next had a higher score ($\bar{x} = 61.8$) than the Observer learning style types who jumped more often ($\bar{x} = 48.3$).

Although the results showed that learning style differences affected the navigational preference and subsequently the test results, one of the drawbacks of this

study was that the actual lessons only covered a few pages. Had the lessons been more extensive and covered a larger number of pages, it is possible that the results could have differed because the lessons would have been more widely dispersed and the sequencing of events could have had a different effect.

Wang, Wang, Wang, and Huang (2006) conducted research trying to identify which students associated with which Kolb learning styles performed best in a web-based learning environment. The participants of this study were 455 secondary school students (7th grade) in Taiwan. The researchers theorized that learning styles are a good predictor in determining the success of a web-based environment. The web-based program they used was Bio-Cal, an eLearning course for science. The Bio-Cal program consisted of science lessons with each lesson divided into five sections: learning content, self-examination, concept maps, Flash animations, and supplemental information. The content of the material appeared in PowerPoint presentations. Flash animation was used to provide visual variety to the lessons. After completing the course, the participants took a post-lesson achievement test. The researchers found that students with the Assimilating learning style scored the highest on this post-achievement test, with the Diverging second, followed by the Accommodating learning style, and then Converging. They concluded that learning styles had an impact on the performance level of students using a web-based learning program.

Rasmussen and Davidson-Shivers (1998) focused on learner control in a CALL program and how the level of learner control can be associated with particular learning style types. Learner control is the ability of the program to allow the learner to shape his or her own learning experience. Some examples of learner control include the learners'

ability to sequence the pieces of a lesson, to set a particular pace, and vary the level of practice and amount of content to be learned. Some learners may require less information than others, therefore, these learners could skip from section to section and still be able to learn the content. However, if that same student were forced to navigate through every sequential step of a given lesson, it may reduce the motivational level of the student, thereby reducing the effectiveness of the lesson itself.

The Rasmussen and Davidson-Shivers study addressed the question of how learning styles influence the immediate post-test and delayed post-test performances in different hypermedia environments. The participants of this study were 102 students from a university in the Southeastern U.S. A majority of the participants had some experience with computers, primarily word processing programs. The participants were randomly divided into three groups and each group assigned to a program with different levels of learner control. These were hierarchical structure, hierarchical with associative structure, and web structure. Hierarchical structure represented low learner control, where the flow of lessons was structured and there was very little user intervention in the flow of information. The hierarchical with associative structure allowed for a moderate level of user control, which allowed the students to select lessons at the lower levels of the structure. The web structure allowed the user a high level of control where the user could move from lesson to lesson according to any pattern that he or she defined. The independent variables were learner styles and learner control. The dependent variable was the performance on the two post-tests, taken immediately after the lesson and two weeks afterward. Prior to the lesson, the participants completed the Kolb LSI.

The results of this study showed that participants whose learning styles were more on the active side, for example, Active Experimentation (AE), had a preference for low levels of learner control and scored better in this structured environment. The reflective learners, for example Reflective Observation (RO), exhibited the best results with the moderate control structure. This looser structure provided the reflective learner with some guidance but it allowed them to seek additional information to add to their understanding of the lesson.

The studies reviewed in this section are a small selection of studies that tried to identify and associate learning styles with particular design concepts in CALL programs. Some of these showed statistically significant differences on the impact of learning styles and a particular CALL program design. However, much of this research was conducted in single culture environments and culture was rarely a variable in the analysis and results.

Culture and the Internet

The study of culture and the impact culture has on technology marketing and the presentation of websites have been studied intensively. There has been much marketing research to determine how to effectively target customers in this ever-increasing global market (Shriberg & Kumari, 2008; Soares, Farhangmehr, & Shoham, 2006). Open to debate in the international marketing sphere is the standardization versus adaptation approaches. The standardization approach is the product-oriented approach and the strategy is to promote a companies' products based on the benefits of the product itself, whereas the adaptation approach is more in line with analyzing customer behavior and

characteristics based on the background and culture of the target consumer (Sinkovics, Yamin, & Hossinger, 2007).

The reason some companies adopt the standardization method is to cut costs. Instead of focusing on individual websites and different marketing campaigns on their different language websites, there is just one message and that is promoting the product itself, regardless of the target country or culture. On the other hand, the adaptation approach involves understanding the target culture, which means hiring consultants and employees familiar with the target culture as well as linguists who are experts in the language of a given country.

Proponents of the adaptation method claim that standardization does not optimize market potential and could lead to a decrease in competitive advantage. Some research has determined that the interactive component between the website and the user, trust in the correct combination of quality, content, ease of use, speed, and frequency of updates determine the target audience's propensity to repeatedly visit a website (Sinkovics, et al., 2007). The adaptation method lends itself better to these web design factors.

In the area of cross-cultural web design, Huh and Shin (2008) looked at culture-based characteristics that existed in corporate websites for 50 U.S. based global corporations and 50 Korea based global corporations. There were a few criteria that the websites and the companies behind the websites had to meet. The companies had to market their products and services internationally, have headquarters in their respective countries (Korea and the U.S.), market to both the U.S. and Korea, and have an English website for the U.S. market and a Korean website for the Korean market. The U.S. companies were taken from the Fortune 500 list and the Korean companies were taken

from the Maekyung 1000 list, which is to Korean companies as the Fortune 500 is to U.S. companies.

A systematic coding was constructed and two Korean coders and two American coders reviewed and coded the websites independently. The researchers found a significant difference between the U.S. and Korean corporations' websites. Korean-based corporations generally used more information features that related to high Power Distance (PDI) cultures when their websites were targeted toward the Korean language audience. The U.S. corporations' websites targeting the same Korean language audience showed fewer features related to high PDI. The U.S. based companies tended to provide a larger amount of product information on their company websites. This was an indication of the low-context cultural characteristics inherent in the U.S.

One interesting note of this study is that for companies producing and marketing industrial goods, some of the U.S. based corporations were found to use more collectivistic features on the Korean language websites in comparison to the Korean companies' websites targeting the same Korean language audience. However, companies that produced and marketed consumer goods had the opposite effect in that the Korean companies' websites targeting Korean consumers contained more collectivistic features than the U.S. companies' websites targeting the same customer base.

This trend of analyzing cultural frameworks, such as Hofstede's, relating them to cross-cultural Internet advertising, and identifying how they are incorporated into the websites of global companies continued with a study conducted by Avery, Baradwaj, and Singer (2008). Avery, et al. looked at an international financial company's (Citibank) expansion into global markets and the promotion of online banking across 45 countries.

This financial company focused on adopting a strategy to customize online banking websites specifically for the country that it was targeting.

Through this analysis, the researchers determined that the use of some common designs across the websites could lead to different perceptions from online customers from different countries with varying cultural dimensions. For example, showing pictures of a group of customers enjoying the company's products on the website presented a positive connection with the Uncertainty Avoidance (UAI) dimension. However, this same picture could have a negative association with the Power Distance (PDI) because it could present a message that everyone was equal, that is, the bank is accessible to the average person and not just the power elite within a society. In countries with a high degree of egalitarianism, this could be perceived as the banking services of this financial company were not a privilege for the elite but rather something available to everyone, which would closely align these images with lower levels of the Individualism (IDV) cultural dimension.

Furthermore, this analysis indicated that the images of males on the website would reduce the uncertainty for customers in male dominated societies, which positively correlate with the Masculinity (MAS) and PDI dimensions. On the other hand, having pictures of females on the website would imply that males and females are equal in the eyes of society and could lead to different outcomes in different countries. This could show negative association with PDI, positive association with IDV, negative association with MAS, and negative association with UAI. Pictures of families were expected to have a positive association with UAI, however, since families represent a group concept, it could be negatively associated with the IDV dimension. Overall, this study found that

the four Hofstede cultural dimensions did impact the various attributes of the financial company's online banking website.

Another study that looked at country and culture specific websites was Sinkovics, Yamin, and Hossinger's (2007) research on 100 German companies and their websites in three languages targeting multiple countries. Each of the companies in the study had a German language website targeting the German market, an English website targeting the U.S. and U.K. markets, and a Spanish website targeting the Latin American market. Content analysis was performed on 300 websites, 100 per each of the three languages. Two raters assessed the websites, spending 20 minutes per website. The researchers rated the websites based on six cultural dimensions: Collectivism, Uncertainty Avoidance, Power Distance, Individualism, High Context, and Low Context. All of these were measured on a five-point scale ranging from 1 (not depicted on the website) to 5 (strongly depicted on the website). Based on these six cultural dimensions, the results showed that the three language websites differed.

Although there were some differences between the German, U.S., and U.K. websites, there was a significant difference between these websites and the Latin American website. The results revealed that the Latin Americans websites had less Collectivistic attributes ($\bar{x} = 1.98$, $SD = 0.68$) compared to the German ($\bar{x} = 2.76$, $SD = 0.89$), U.S. ($\bar{x} = 2.55$, $SD = 0.81$) and U.K. ($\bar{x} = 2.57$, $SD = 0.81$) websites. UAI was more prominent on the German ($\bar{x} = 3.60$, $SD = 0.59$), U.S. ($\bar{x} = 3.48$, $SD = 0.58$) and U.K. ($\bar{x} = 3.47$, $SD = 0.58$) websites relative to the Latin American website ($\bar{x} = 2.94$, $SD = 0.56$). There were higher levels of PDI on the German ($\bar{x} = 3.20$, $SD = 0.93$), U.S. ($\bar{x} =$

3.10, SD = 0.90), and U.K. ($\bar{x} = 2.99$, SD = 0.94) websites, relative to the Latin American website ($\bar{x} = 1.43$, SD = 0.64) (see table 7).

Table 7

Means of Dimensions Across Markets

Dimensions	Germany		US		UK		Latin America	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Collectivism	2.76	0.89	2.55	0.81	2.57	0.81	1.98	0.68
Individualism	3.30	0.83	3.28	0.87	3.24	0.85	2.17	0.79
UAI	3.60	0.59	3.48	0.58	3.47	0.58	2.94	0.56
PDI	3.20	0.93	3.10	0.90	2.99	0.94	1.43	0.64

Note. From “Cultural adaptation in cross border e-commerce: A study of German companies,” by Sinkovics, Yamin, & Hossinger, 2007, *Journal of Electronic Commerce Research*, 8(4), 221-234.

There is a fair amount of similar research that investigates cultural adoption on corporate websites and their effects on cultural dimensions. The Sinkovics, et al. (2007) study went as far as measuring the cultural dimensions that were identified in each of the websites but did not take the next step of determining the effectiveness of these websites in each of the particular countries.

Culture and CALL

In the area of leveraging cultural dimensions for use in optimal CALL design, there is very little research in the literature. However, the same struggle between standardization versus adaptation in corporate website design exists when it comes to culture and CALL. In most commercial CALL designs, the standardization method is the only one considered.

The commercial approach to creating of CALL programs is a generic one (Shaughnessy, 2003). Commercially produced CALL programs are designed for multiple

languages as opposed to strictly targeting a single language. These programs utilize shared components so that the program itself and the flow can be separated from the content. Therefore, the program becomes a shell, or a cookie-cutter process, and the content, no matter what the language, can be inserted into the flow of information and the processes that are designed into the program.

When CALL programs are designed, the team of designers and developers are typically made up of content providers and programmers. The programmers generally do not have a background in language, culture, or education but they provide the shell and the flow of the program itself, the technological components (Dudley-Marling & Owston, 1987). The content provider, or language expert, fills in these empty containers that make up the modules of each CALL lesson. The primary responsibility of the content provider is to make sure that the language content is error free and that the correct information is being conveyed to the learners. This is the only responsibility of the content providers. They generally have no input on the instructional design or flow of the CALL program.

The use of this type of program shell is consistent across all languages with the language content being the only varying factor. This is a concept in CALL design known as cloning (Shaughnessy, 2003). Because of this cookie cutter formula, the content of the program, such as visual images, may be culturally inauthentic to the material that is being presented in a given lesson. An example of this may be the teaching of an Arabic lesson on shopping at a store but the picture in the lesson may show a store sign that is represented in English as opposed to Arabic. Another example may be a language lesson associated with families that shows a typical family setting and depicts a house with a

white picket fence and a two-car garage. This may be the prototypical American dream house but it may look awkward when the context is transferred to a language such as Bahasa Malay, where the Malaysian representation of a typical home would not be the same as that in the U.S. The primary emphasis of these commercial CALL programs is on the technological aspect as opposed to the content, cultural accuracy, or the cultural dimensions of the potential users of the program.

Summary

As evidenced by this review of literature, there is some overlap between the three primary areas of cultural dimensions, learning styles, and CALL design. In most studies, researchers have identified and investigated the intersection of two of these three areas. There is a need to identify the intersection of all three of these disciplines. However, being able to identify cultural dimensions associated with learning styles and being able to incorporate this into the design of a CALL program is only one step of the process. Convincing the providers of these commercial programs to invest in narrowing the scope of their programs and correctly targeting the appropriate audience will be difficult. The current focus of CALL is on the technology and not enough on the content or cultural aspect of the program itself. This could change in the future. It will be a prodigious task to convince corporate producers of CALL programs to develop language learning software that focuses on individuals at the individual learning style level. However, the next best solution is to target the predominant learning styles that are associated with certain cultural dimensions and those cultural dimensions in many cases can be aligned to particular countries. This intermediate step of targeting a group of learners with similar cultural backgrounds is a less cost-prohibitive approach to CALL design than accounting

for each individual learner. In this way, CALL designers can narrow the scope of the target audience for these programs and thereby increase the potential for more effective CALL programs.

The next chapter focuses on the methodology used in this dissertation.

CHAPTER III

METHODOLOGY

Overview

This chapter focuses on the methodology used in this dissertation and is divided into four sections. The first section describes the participants. The second section details the instrumentation. The third section outlines the procedure. The fourth section discusses the data analysis.

Restatement of the Problem

Many of the commercial Computer-Assisted Language Learning (CALL) programs available today typically take a generic approach. This approach standardizes the program so that it can be used to teach any language merely by translating the content from one language to another. These CALL programs rarely consider the cultural background or preferred learning style of the language learner. The assumption is that one size fits all. Though there are a number of instruments to measure the learning styles of learners and a smaller number of instruments to measure cultural dimensions, there is no one instrument that combines both learning styles and cultural characteristics to determine a relationship between these two sets of variables. If such a measurement device existed, it could be used to design CALL programs that better consider the cultural background and learning styles of English language learners. This could lead to a reduction in the generic nature of existing CALL programs and increase the potential for more effective technology- and internet-based language instruction.

Restatement of the Research Questions

This study addressed the following research questions:

1. To what extent is Hofstede's Values Survey Module (VSM) an appropriate tool to measure cultural dimensions for language learners from Taiwan and the United States?
2. To what extent are cultural dimensions and learning styles that are derived from the Experiential Learning theory related?
3. To what extent are cultural dimensions and learning styles that are derived from the Multiple Intelligences theory related?
4. To what extent can the relationships between cultural dimensions and learning styles be used as a construct to design Computer-Assisted Language Learning (CALL) programs?

Research Design

This research was a correlational study using data collected by administering the following three surveys:

- Hofstede's Values Survey Module Questionnaire (VSM)
- Kolb's Learning Style Inventory (LSI)
- Reid's Perceptual Learning Style Preference Questionnaire (PLSPQ)

The aggregation of these three surveys and a demographics section were given the name CALL Design Analysis Survey (CDAS). The CDAS was administered to two groups of participants. The first participant group was born and spent their formative years of education through high school in Taiwan. The second group of participants was either born in or spent their formative years in the U.S. The Taiwan group represented a country that is usually associated with traditional collectivistic values. Countries

identified by Hofstede to fit this category tend to score lower on the Individualism scale of the VSM. The U.S. group is on the other end of the Individualism-Collectivism spectrum. They tend to score higher on the Individualism scale of the VSM. The Hofstede (1980) results showed differences for the other cultural dimension as well. For example, Taiwan had higher scores than the U.S. on the Uncertainty Avoidance Index (UAI) and Long-Term Orientation (LTO), while the U.S. scored higher on the Power Distance Index (PDI) and Masculinity (MAS).

The four-part CDAS was hosted on SurveyMonkey.com and conducted online. Each of the three independent surveys within the CDAS appeared on a single web page, for example, the Hofstede VSM was on page 1 of the website, page 2 was Kolb's LSI, and page 3 was Reid's PLSPQ. Part 4 was the Demographics section made up primarily of the demographics questions from Hofstede's VSM. There were additional questions in the Demographics section about the participants' use of computers and CALL programs that assisted in analyzing the data.

Participants

The goal was to have 50 participants in each of the two participant groups. The participants were recruited through an announcement that was distributed through email and other online social networks. The announcement directed the participants to the CDAS, which was hosted on SurveyMonkey.com. Once the valid survey returns were calculated, there were 38 participants from Taiwan and 34 participants from the U.S. As previously mentioned, the first participant group was born and spent their formative years of education through high school in Taiwan. Some of the participants in the Taiwan group are still in Taiwan. There are some Taiwan group participants who have moved to

and have lived in the U.S. for the past several years. All participants in the Taiwan group are non-native speakers of English and Chinese (Mandarin) is their native language. They studied and learned English at some point during their secondary education. The second group of participants was either born or spent their formative years in the U.S. English is the native language for all of the U.S. participants and all participants had studied at least one foreign language at some point in their lives. Having studied a foreign language was included as a requirement because the results of this study and eventual CALL design will be directed to language learners. See Chapter 4 for additional participant demographics.

Protection of Human Subjects

Prior to distributing the survey and collecting data, an application for approval to conduct this research was submitted to the Institutional Review Board for the Protection of Human Subjects (IRBPHS) (Appendix A). All data and records collected were, and continue to be, kept confidential. No individual identities were used in any reports or publications resulting from the study. The study information has been coded and is kept in locked files. Only the researcher had access to the files. Participation in the survey was voluntary and access to the survey was through an anonymous user. See Appendix B for the introduction letter that appeared on the cover page of the survey.

Instrumentation

The survey used for this study was a combination of three existing surveys plus a demographics section. The three surveys were Hofstede's Values Survey Module Questionnaire (VSM), Kolb's Learning Style Inventory (LSI), and Reid's Perceptual

Learning Style Preference Questionnaire (PLSPQ). Table 8 shows the theories associated with these surveys.

Table 8

Theory and Associated Measuring Tool

Theory	Measuring Tool
Cultural Dimensions	Hofstede's Values Survey Module Questionnaire (VSM)
Experiential Learning	Kolb's Learning Style Inventory (LSI)
Multiple Intelligences	Reid's Perceptual Learning Style Preference Questionnaire (PLSPQ)

The aggregation of these three surveys and the demographics section were given the name CALL Design Analysis Survey (CDAS). The VSM section of the CDAS was used to measure cultural dimensions and the LSI and PLSPQ sections were used to measure learning styles. Researchers have used each of these surveys independently, however, there are only two known instances in the literature (Hoppe, 1990; Yamazaki, 2005) where comparisons were made between some of the variables across the surveys. Both of these studies made a brief comparison between one variable in the VSM with one or more variables in the LSI.

Values Survey Model (VSM)

The Hofstede VSM (Appendix C) is a twenty-eight question, primarily Likert-like, survey. The survey is divided into three sections. The first section contains fourteen questions in a five-point Likert-like format. The responses range from 1 to 5 and are as follows: 1 = of utmost importance, 2 = very important, 3 = of moderate importance, 4 = of little importance, and 5 = of very little or no importance. The second section contains

ten questions and is in a five-item multiple-choice format. The third section contains five questions in a five-point Likert-like format. The responses range from 1 to 5 and are as follows: 1 = strongly agree, 2 = agree, 3 = undecided, 4 = disagree, and 5 = strongly disagree. The twenty-six responses collectively measure seven cultural dimensions, or variables. These variables are Power Distance Index, Individualism, Masculinity, Uncertainty Avoidance Index, Long-Term Orientation, Indulgence versus Restraint, and Monumentalism (Hofstede, 2008).

The Power Distance Index (PDI) measures the perceived level of inequality that exists within a society. For example, does the defined authority of a particular country have more power than those that it rules or does power tend to be distributed more equally across the individuals within a given country? Smaller PDIs generally imply a more democratic society whereas a larger PDI is more indicative of an authoritarian or autocratically ruled society (Hofstede, 2005).

The Individualism (IDV) dimension measures the level of individualism or, on the other side of the spectrum, collectivism of a group of people. Higher levels on the Individualism scale define a country where individuals are not as reliant on society and the focus tends to be more on the individual and his/her direct family. Lower levels of Individualism, which means high Collectivism, represent countries where the interests of the group tend to outweigh the interests of the individual (Hofstede, 2005).

The Masculinity (MAS) dimension measures the level of masculinity or, on the other side of the scale, femininity. This dimension is associated with the gender roles within a given society. Countries that score high on the Masculinity scale have stronger definitions of male and female roles within a society, whereas countries that score lower

on the Masculinity scale have a more blurring line between the roles of men and women (Hofstede, 2005).

The Uncertainty Avoidance Index (UAI) measures a group's level of comfort with change. Countries that score high on this dimension are generally those that prefer set rules within society, structured situations, and understanding of ranks within that society. On the other hand, countries that score low on this scale are those that are open to change and prefer to have fewer societal rules relative to those scoring high on this dimension (Hofstede, 2005).

The Long-Term Orientation (LTO) dimension measures a country's perceived importance on the concept of time, for example, are the people of a given country future oriented or more past and present oriented. Some of the values associated with countries scoring higher on the Long-Term Orientation dimension are thrift and perseverance. Countries scoring low on this scale are those with a short-term orientation. They associate with values of respect for tradition, emphasize the fulfilling of social obligations, and value the concept of "face" (Hofstede, 2005).

The Indulgence versus Restraint Index (IVR) measures a society's position on the freedom granted to its people to enjoy their lives. The Indulgence side of the index represents a society that allows relative freedom to pursue leisure, merrymaking with friends, spending, consumption, and sex. The Restraint side of the index represents a society that tends to control the pursuit of the above-mentioned activities (Hofstede, 2008).

The Monumentalism (MON) dimension measures the flexibility of a society to traditions and personal beliefs. On the high Monumentalism side of the spectrum, people

tend to be proud and unchangeable. On the low Monumentalism side, or Self-Effacement, people are rewarded by their society for humility and flexibility (Hofstede, 2008).

Explicit permission to use the VSM for the purpose of this study was not necessary. The VSM manual specifically states that the survey “may be freely used for academic research projects” (Hofstede, 2008, p. 11).

Learning Styles Inventory (LSI)

The second survey that was used in this study was Kolb’s LSI (Appendix D). This survey is a twelve-item ipsative scale survey where each item has four responses that are ranked from 1 to 4, with no duplicating scores or ties. The scores are calculated to measure four modes of a learning cycle. The four learning modes are derived from the Experiential Learning theory and they are Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). These modes are positioned on four points, similar to the primary points of a compass. CE is at the northern point, RO is at the eastern point, AC is at the southern point, and AE is at the western point. The four quadrants between each of these four modes represent the four learning styles defined by the results of the LSI. The four learning style types in Kolb’s model are Diverging, Assimilating, Converging, and Accommodating (see Figure 2).

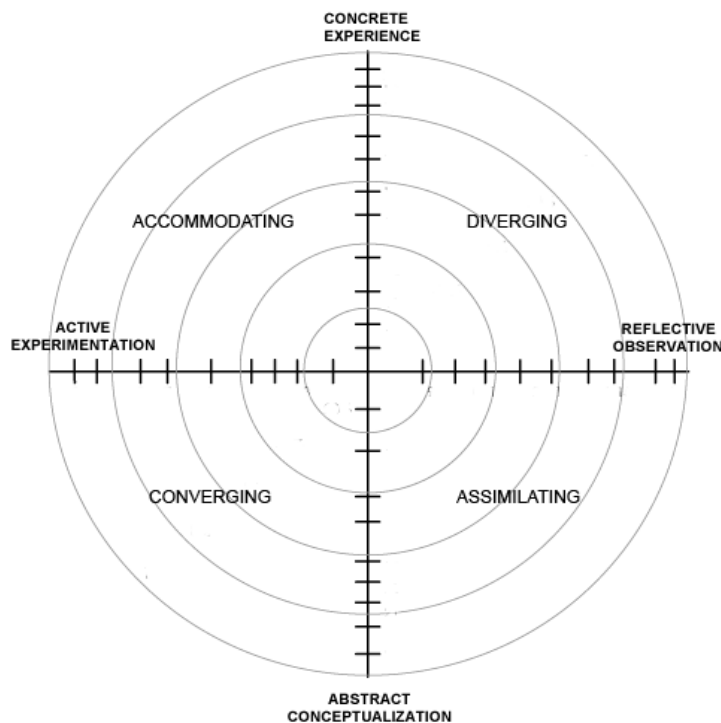


Figure 2. Kolb's Learning Style Profiles

Note. From *Experiential learning: Experience as the source of learning and development*, by D. Kolb, 1984, New Jersey: Prentice Hall.

The first learning style type identified by the LSI is Diverging and this type combines the Concrete Experience (CE) and Reflective Observation (RO) learning modes. Diverging learners are generally imaginative, people-oriented, have broad cultural interests, and are able to look at situations from many perspectives (Kolb & Kolb, 2005).

The second learning style type is Assimilating and this type combines the Abstract Conceptualization (AC) and Reflective Observation (RO) learning modes. Assimilating learners tend to do best in inductive reasoning and abstract concepts. They are good at theories and theoretical models, but are generally not people-oriented (Kolb & Kolb, 2005).

The third learning style type is Converging and this type combines the Abstract Conceptualization (AC) and Active Experimentation (AE) learning modes. Converging learners tend to be practical, unemotional, and are usually focused on a small number of interests, as opposed to having a high-level understanding of many interests (Kolb & Kolb, 2005).

The fourth learning style type is Accommodating and this type combines the Concrete Experience (CE) and Active Experimentation (AE) learning modes. Accommodating learners tend to be risk takers, can react to circumstances quickly, and solve problems intuitively (Kolb & Kolb, 2005).

Permission to use the LSI for this study was requested through the Hay Group Transforming Learning, which owns the copyright to the LSI. Permission to use the LSI was granted by Hay Group with the caveat of not publishing the actual test or the results calculation formula directly in this study (Appendix E).

Perceptual Learning Styles Preference Questionnaire (PLSPQ)

The third survey that was used in this study was Reid's PLSPQ (Appendix F). The PLSPQ is a thirty-question Likert-like survey. Each question has five possible responses. They are (1) Strongly Agree, (2) Agree, (3) Undecided, (4) Disagree, or (5) Strongly Disagree. The results are used to calculate scores for each of the following six learning style variables: Auditory, Visual, Tactile, Kinesthetic, Group, and Individual. These learning style variables are derived from the Multiple Intelligences theory and are different from those measured by Kolb's LSI.

Learners scoring high on the Auditory variable learn best through listening to lectures and discussions (Reid, 1998). Reading a book aloud or hearing a book read

provides better retention for these learners than simply reading silently. Learners scoring high on the Visual variable learn optimally through diagrams, videos, and illustrations. These learners have a tendency to think in pictures and require the images in their mind as clues to remember what they have learned (Gardner, 1993). Learners scoring high on the Tactile and Kinesthetic variables learn by way of touching and physical movement (Christison, 1998; Reid, 1998). These learners learn best through movement and tend to have a good sense of their spatial surroundings (Gardner, 1993). Learners scoring high on the Group variable have the ability to perceive through the point of view of others, encourage cooperation, and engage in communication with others (Gardner, 1993; Reid, 1998). Learners scoring high on the Individual variable tend to be more aware of their inner self and their relationship with others (Reid, 1998).

Permission to use the PLSPQ for this study was requested through the author Dr. Joy Reid. Dr. Reid granted permission to use the PLSPQ and sent along additional literature describing the variables that are measured through the survey (Appendix G).

Demographics

The Demographics section of the survey was comprised of twelve questions (Appendix H). Of these, six are directly taken from the Demographics section of the Hofstede VSM. The additional questions were added by this researcher and pertain to the participants' study of a second or foreign language and their use of computer-based language learning programs.

Procedure

The CDAS, a survey comprised of the three independent surveys and a demographics section, was presented through SurveyMonkey.com, an online Internet-based survey program. The data was collected and the following analysis performed:

- Calculation of cultural dimension and learning style scores
- Comparison of scores with results from past studies
- Correlational analysis of the cultural dimensions and learning styles

Pilot Study

Prior to sending out the actual survey to the two groups, a pilot test was conducted on the survey. The survey was sent out to three individuals: one whose background is similar to the Taiwan participants, another whose background is similar to the U.S. participants, and a third person who has some background in creating and conducting surveys. The three pilot participants were asked to take the survey and respond to an eight-item questionnaire about the survey (Appendix I). The purpose of the pilot study was to determine the clarity of the survey instructions and the questions in the demographics section of the survey.

The only concern that was identified from the pilot study was the length of time it took for one of the pilot study participants to complete the survey. The reason for this was an over-thinking of the survey questions, particularly the LSI and PLSPQ learning style surveys where the same questions are asked in slightly different manners. This concern prompted the addition of “Please respond to the items below with the first answer that comes to mind” at the top of each page of the CDAS.

Data Analysis

The survey data was collected by SurveyMonkey.com. It was downloaded into a spreadsheet and reviewed for completeness. Once the data was reviewed and formatted, it was uploaded to SPSS for analysis. The first step was to calculate the variable values for the VSM, LSI and PLSPQ sections of the survey and perform a comparison with past results conducted with similar groups of participants. This was to determine the similarities and differences between the results obtained in this study to past studies using the VSM, LSI, and PLSPQ. Then, a correlational analysis was performed to identify the relationships between the variables in the LSI and the VSM sections of the CDAS, and between the PLSPQ and the VSM sections of the CDAS. Finally, the results were analyzed to determine its feasibility for use as a construct to design CALL programs.

Cultural Dimensions

The method of calculating the cultural dimensions for the VSM is outlined in the VSM manual published by Hofstede (2008). The VSM is calculated based on country means as opposed to each participant independently. Therefore, it was necessary to first calculate the mean score for each survey item for each of the two participant groups.

The indexes for each of the seven VSM cultural dimensions were calculated by using a formula that has been predefined by Hofstede (2008). Each formula takes into consideration the mean scores for four unique items from the survey. For example, the first cultural dimension is the Power Distance Index and is calculated as follows:

1. Calculate the group mean for each of the PDI items: 2, 7, 23, and 26.
2. Subtract the mean for item 2 from the mean for item 7.

3. Multiply the result (of Step 2) by a constant value of 35. This total will be called A.
4. Subtract the mean for item 26 from the mean for item 23.
5. Multiply the result (of Step 4) by a constant value of 25. This total will be called B
6. Add A and B. This is the UAI value.
7. If the UAI value for all participant groups fall between 0 and 100, then the calculation is complete.
8. If not, add a floating constant to the total for all participant groups so that the UAI values fall between 0 and 100.

In prior versions of the VSM, the floating constant did not exist, therefore, some of the variables could fall outside the 0-100 scale. Table 9 shows the formulas for calculating each cultural dimension variable.

Table 9

Cultural Dimensions Calculation Formulas

Cultural Dimensions	Formulas
Power Distance Index	$PDI = 35(m7 - m2) + 25(m23 - m26) + C(PDI)$
Individualism	$IDV = 35(m4 - m1) + 35(m9 - m6) + C(IDV)$
Masculinity	$MAS = 35(m5 - m3) + 35(m8 - m10) + C(MAS)$
Uncertainty Avoidance Index	$UAI = 40(m20 - m16) + 25(m24 - m27) + C(UAI)$
Long-Term Orientation	$LTO = 40(m18 - m15) + 25(m28 - m25) + C(LTO)$
Indulgence versus Restraint	$IVR = 35(m12 - m11) + 40(m19 - m17) + C(IVR)$
Monumentalism	$MON = 35(m14 - m13) + 25(m22 - m21) + C(MON)$

Note. m = mean, C = floating constant. From *Values survey module 2008 manual*, by G. Hofstede, 2008, Retrieved August 10, 2008, from <http://feweb.uvt.nl/center/hofstede/ManualVSM08.htm>.

The first five cultural dimensions of the VSM that were used for this study are identical to the ones that existed in the prior version of the VSM, which was VSM 94. This study used the most recent version of the VSM (VSM 08), which added two new cultural dimensions.

Once the indexes for the cultural dimensions for each of the two participant groups were calculated, the results were compared against each other and the floating constant adjusted so that all of the variables fell within the 0-100 scale. The cultural dimensions that required an added constant were MAS (constant of 40) and UAI (constant of 90). These scores were then compared against each other and against the cultural dimensions country scores that exist on the Geert Hofstede website. Although a straight comparison could not be made between the Taiwan group in this study and the Taiwan country scores on the Hofstede website, the differences that exist between the Taiwan group and the U.S. group in this study could be compared against the differences that exist between Hofstede's Taiwan and U.S. country scores. For example, if the U.S. country scores on the Hofstede website are 25% higher on the Individualism index relative to the country scores for Taiwan, then there should be similar differences between the U.S. group and the Taiwan group in this study.

Learning Styles - Kolb

The learning modes of the Kolb LSI were scored according to the formulas defined by Kolb (2005). There is a score that was calculated for each of the four points in the cycle of learning, which are Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentalization (AE). There are twelve items in the LSI and for each survey item, there are four choices (or responses)

that are ranked from 1 to 4. These four responses within each of the twelve items must be ranked one through four without any duplicates. A combination of these items is added together to determine the score for each of the four learning modes. As there are twelve items and four responses per item, there are 48 scores that are divided equally among the four learning mode variables. Therefore, twelve items are used to calculate the CE score, twelve to calculate the RO score, twelve for AC, and twelve for AE. The exact formulas for calculating these scores have been left out at the request of the publishers.

Each of these four scores represents a point on a circular chart (see Figure 2). The four points are plotted on the chart, a line drawn to connect the four points, and the interior shaded. This creates a diamond shape and usually the shaded area occupies more volume in one of the quadrants in relation to the remaining three quadrants of the Kolb scoring chart (see Figure 3). These scores determine a person's tendency or strength in one of the four learning areas: Diverging, Assimilating, Converging, or Accommodating.

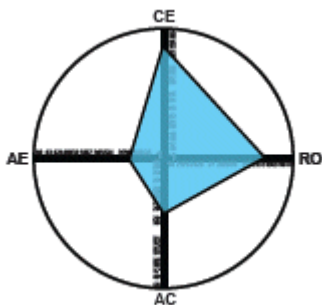


Figure 3. Diverging-Focused Learner

*Note. From *Experiential learning: Experience as the source of learning and development*, by D. Kolb, 1984, New Jersey: Prentice Hall.*

Kolb provided charts with normalized scores from past administrations of the LSI. There is a frequency calculation for the raw scores for each of the four learning modes.

The mean scores for these four points were calculated for each of the two participant groups and compared against the normalized scores available from the Hay Group publishing company. Finally, the scores between the U.S. group and the Taiwan group were compared with each other to identify the differences that existed between the two groups of participants.

Learning Styles - Reid

The six learning style variables of the PLSPQ were calculated by using a formula defined by Reid (1987). Each of the variables were calculated by adding the scores from five pre-categorized items from this thirty-item survey and multiplied by two. Each of the six variables has five unique question items used in its calculation and the scores for each of the items are not duplicated across any of the variables. There are five possible responses for each of the thirty items and the responses are scored as follows: Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2, and Strongly Disagree = 1.

As an example, the Visual learning style score is calculated by adding the scores for questions 6, 10, 12, 24, and 29, then multiplying by two. If the respondent answered “Strongly Agree” for each of the five items, the Visual learning style score would be 50 $((5 + 5 + 5 + 5 + 5) \times 2)$. A similar calculation method was repeated for the remaining five learning style variables.

Once these scores were calculated for each individual in this study, then a mean for each of the variables was calculated for each of the two participant groups. This produced country mean scores for the Taiwan group and for the U.S. group. The scores for the two groups were compared against each other to identify any learning style differences that were noticeable among the two groups. Unlike the VSM and LSI, which

have been administered many times and consequently there exist much literature on the respective topics, the PLSPQ is not as widely used, and therefore, past results are not readily available in the literature.

Correlational Analysis

After completion of the analysis for each of the three surveys, a correlational analysis was performed. The tool that was used to perform the analysis was the Statistical Package for the Social Sciences (SPSS) version 11.5. The bivariate correlate function was selected to determine the Pearson correlation coefficient for each cultural dimension-learning style relationship.

From this calculation, a correlation matrix was created and analyzed for strong correlational tendencies between the variables. The primary focus was to identify strong correlational tendencies between the variables in the VSM section of the CDAS with the variables in the LSI section of the CDAS and between the variables in the VSM section of the CDAS and the variables in the PLSPQ section of the CDAS.

The correlational analysis was conducted with all of the data together and then conducted with just the data for the Taiwan participant group and the U.S. participant group independently. Those correlations were compared against each other to determine if any similarities existed between the two groups.

Background of the Researcher

The researcher was born into a bi-cultural family, to Japanese and Chinese parents. He was raised in the United States during the so-called melting pot era, of which the latter phase was a result of the Immigration and Nationality Act of 1965. He was immersed in this multicultural environment during his formative years.

The researcher has had a career in both education and information technology. After graduation from university, he began his career in education as a high school teacher in the United States. Shortly thereafter, he moved to China to teach literature and English as a foreign language to students at a university that trains individuals whose ambitions include employment in the foreign services as diplomats and interpreters.

After four years of teaching English abroad, he had a desire to learn about the global movement toward adopting computers and the Internet. At the time, this was a movement that seemed to be engulfing American society at a very rapid pace. He decided to return to school and pursued a graduate degree in business administration with an emphasis in management information systems.

Upon graduation, the researcher ventured on the path of information technology. This second career began with a three-year tenure as a consultant for one of the Big 5 global consulting firms. Since then, the researcher has been involved in consulting, development, quality assurance, and education of business solutions and Enterprise Resources Planning (ERP) products. He has authored several product guide books and designed and developed in-class and online curriculum. He is currently a director of product management for a global software firm that specializes in enterprise business solutions.

The researcher's current objective is to bring together his experience and knowledge from the areas of education and information technology to better understand how technology affects the ways in which people think and learn, especially the younger generations who have no awareness of a world without computers, cellular phones, satellite television, video games, or the Internet.

The next chapter focuses on the analysis of the data collected through the CDAS.

CHAPTER IV

RESULTS

Overview

This chapter focuses on the analysis of data collected through the Computer-Assisted Language Learning (CALL) Design Analysis Survey (CDAS) and is divided into five sections. The first section analyzes the participant demographics information that was collected through the CDAS and describes the profiles of the two participant groups. The subsequent four sections analyze the data directly pertinent to the four research questions. The first of these sections, or the second section in this chapter, analyzes the data that was collected through the Hofstede's Values Survey module (VSM) portion of the CDAS and is pertinent to research question 1. The third section is pertinent to research question 2. This section analyzes the data that was collected through the Kolb's Learning Styles Inventory (LSI) portion of the CDAS and identifies relationships between the LSI variables and the VSM cultural dimensions. The fourth section is pertinent to research question 3. This section analyzes the data that was collected through the Reid's Perceptual Learning Style Preference Questionnaire (PLSPQ) portion of the CDAS and identifies relationships between the PLSPQ variables and the VSM cultural dimensions. The fifth section is pertinent to research question 4. This section looks at the relationships between the cultural dimension and learning styles variables and attempts to identify relationships that can assist in the design of a CALL program.

Participant Demographics

There were two participant groups in this study. The primary differentiator between the two participant groups were the participants' country of origin and country of the participant's formative years of education. The first participant group was born and spent their formative years of education through high school in Taiwan. Some of the participants in the Taiwan group are still in Taiwan. There are some Taiwan group participants who have moved to and have lived in the U.S. for the past several years. All participants in the Taiwan group are non-native speakers of English and Chinese (Mandarin) is their native language. They studied and learned English at some point during their secondary education. The second group of participants was either born or spent their formative years in the U.S. English is the first language for all of the U.S. participants.

The second required criteria was that the participants studied a second or foreign language at some point in their lives. For a majority of the Taiwan participants, English was listed as the second language. Three participants from the Taiwan group listed languages other than English (Japanese, Russian, and French), however, all participants had studied English for several years in school leading up to and through university, at a minimum. It is important to note that the Taiwan educational system requires all students to study English starting from junior high school. For the U.S. participant group, all participants had studied at least one foreign language at some point in their lives. The breakout of the languages studied by the U.S. participant group is in Table 10.

Table 10

<i>L2 for U.S. Participants</i>		
	#	%
American Sign Language	1	2.9
Cantonese	1	2.9
French	8	23.5
German	2	5.9
Japanese	5	14.7
Lithuanian	1	2.9
Malay	1	2.9
Mandarin	2	5.9
Portuguese	2	5.9
Spanish	11	32.4
Total	34	100

There were 91 participants who accessed and started the online survey. However, only 72 survey results met the requirements stated above. Of these 72 valid survey results, 38 results were from the Taiwan participant group and 34 from the U.S. group. The remaining 19 results were discarded due to several factors, including incomplete surveys, incorrect completion of surveys, and participants not meeting the two criteria mentioned above, i.e., from either Taiwan or the U.S. and have studied a foreign language.

The participants were not asked for their exact age. They were instead grouped into age brackets. The age brackets were defined by Hofstede (2008) and the question was directly from the demographics section of Hofstede's VSM. For the Taiwan group, the highest number of participants was in the 20-24 age bracket with 9 participants, or 23.7% of the Taiwanese participants. Eight Taiwan group participants were in the 40-49 age bracket, which was 21.9% of the group. Each of the age brackets were represented in the Taiwan group (see Table 11). For the U.S. group, there was a higher concentration of participants in the older age brackets. The 40-49 age bracket had 15 participants, which

was 44.1% of the U.S. participants. There were no U.S. participants under the age of 20 or in the 20-24 age brackets. For the participant groups combined, the largest age brackets were the 35-39 and 40-49, which together made up 48.6% of the entire participant population.

Table 11

Age Range of Participants

Age	Taiwan		U.S.		Total	
	#	%	#	%	#	%
Under 20	4	10.5	0	0.0	4	5.6
20-24	9	23.7	0	0.0	9	12.5
25-29	2	5.3	2	5.9	4	5.6
30-34	3	7.9	5	14.7	8	11.1
35-39	7	18.4	5	14.7	12	16.7
40-49	8	21.1	15	44.1	23	31.9
50-59	4	10.5	2	5.9	6	8.3
60 or over	1	2.6	5	14.7	6	8.3
Total	38	100	34	100	72	100

For gender, 21 of the Taiwan participants, or 55.3%, were female and 17 participants, or 44.7%, were male. For the U.S. group, there was a 50-50 separation between female and male participants, 17 for each gender. For the participant group as a whole, there were 38 female (52.8%) and 34 male (47.2%) participants (see Table 12).

Table 12

Gender of Participants

Gender	Taiwan		U.S.		Total	
	#	%	#	%	#	%
Female	21	55.3	17	50.0	38	52.8
Male	17	44.7	17	50.0	34	47.2
Total	38	100	34	100	72	100

Regarding the educational background of the participants, the years of education were skewed toward the higher side of the selections available. For both the Taiwan and U.S. participant groups, there were zero participants who had 11 or less years of education. For the Taiwan participant group, the highest number of participants was 12 for 18 years or more of education, which made up 31.6% of the Taiwan participants. The next highest level of education for the Taiwan group was 16 years and there were 10 participants, which made up 26.3% of that group. For the U.S. participant group, 20 participants had 18 years or more of education and this represented 58.8% of the U.S. group. Another 38.2 % had either 16 or 17 years of education (see Table 13). Based on this information, a majority of the participants had 16 or more years of education. In fact, 71.9% had 16 years or more, equating to at least a bachelors degree or higher.

Table 13

<i>Years of Education of Participants</i>						
Years of Educ.	Taiwan		U.S.		Total	
	#	%	#	%	#	%
10 years or less	0	0.0	0	0.0	0	0.0
11 years	0	0.0	0	0.0	0	0.0
12 years	3	7.9	0	0.0	3	4.2
13 years	1	2.6	0	0.0	1	1.4
14 years	4	10.5	1	2.9	5	6.9
15 years	4	10.5	0	0.0	4	5.6
16 years	10	26.3	7	20.6	17	23.6
17 years	4	10.5	6	17.6	10	13.9
18 years or more	12	31.6	20	58.8	32	44.4
Total	38	100	34	100	72	100

For job or profession, the Taiwan group had 10 participants, or 26.3%, who stated that they were “Academically trained professional or equivalent (but not a manager of people)”. Likewise, this represented the largest job category for the U.S. group with 22 participants, or 64.7%, claiming to be “Academically trained professional or equivalent”.

Furthermore, there were 6 participants from each of the two country groups who stated they were “Manager of one or more managers” and the Taiwan group had 7 participants (18.4%) who stated “No paid job (includes full-time students)”. There were no U.S. participants who claimed the “No paid job” category or claimed to be an “Unskilled or semi-skilled manual worker” (see Table 14). Therefore, a majority (61.1%) of the participants were either managers or academically-trained professionals.

Table 14

<i>Job/Profession of Participants</i>	Taiwan		U.S.		Total	
	#	%	#	%	#	%
No paid job (includes full-time students)	7	18.4	0	0.0	7	9.7
Unskilled or semi-skilled manual worker	3	7.9	0	0.0	3	4.2
Generally trained office worker or secretary	4	10.5	2	5.9	6	8.3
Vocationally trained craftsman, technician, IT-specialist or equiv.	6	15.8	1	2.9	7	9.7
Academically trained professional or equiv (but not a manager of people)	10	26.3	22	64.7	32	44.4
Manager of one or more subordinates (non-managers)	2	5.3	3	8.8	5	6.9
Manager of one or more managers	6	15.8	6	17.6	12	16.7
Total	38	100	34	100	72	100

On the demographics question related to CALL program usage, 38.9% of all participants claimed to have used a CALL program at some point in their lives (see Table 15). This breaks down to 15 participants from Taiwan, or 39.5% of that group, and 13 participants from the U.S., or 38.2% of that group. For the Taiwan participants who stated using a CALL program in the past, 13 participants, or 86.7%, claimed to have enjoyed using it and 2 participants, or 13.3%, claimed to have not enjoyed using the program to learn a language. For the U.S. participant group, there were 9 participants

who enjoyed using a CALL program to learn a language (69.2%) and 4 participants who claimed not to have enjoyed using it, which was 30.8%. Therefore, the Taiwan group had a higher percentage of participants who enjoyed using CALL programs. The follow up question was “Did the CALL program help in your efforts to learn the language?” For the Taiwan group, 11 participants, or 73.3%, claimed the CALL programs were helpful and 4 participants, or 26.7%, said No to the programs being helpful in their efforts to learn a language. For the U.S. group 8 participants, or 61.5%, claimed that CALL programs were helpful and 5 participants, or 38.5%, claimed that the programs were not helpful.

Table 15

Use of CALL

	Taiwan		U.S.		Total	
	#	%	#	%	#	%
Used CALL						
Yes	15	39.5	13	38.2	28	38.9
No	23	60.5	21	61.8	44	61.1
Enjoy Using (If Yes above)						
Yes	13	86.7	9	69.2	22	78.6
No	2	13.3	4	30.8	6	21.4
Helpful						
Yes	11	73.3	8	61.5	19	67.9
No	4	26.7	5	38.5	9	32.1

Another computer-related demographics question was “How many years of computer experience do you have?” The responses to this item are representative of the sign of these times, because had this question been asked nearly 30 years ago when Hofstede initially conducted his cultural dimensions studies, the answers would have been quite different. For this study, 2 participants from the Taiwan group stated that they had less than one year of computer experience; another 2 participants 1-3 years; 3

participants 4-6 years; and 31 participants, or 81.6%, claimed to have had more than 6 years of computer experience. The breakdown of computer experience was similar for the U.S. participant group. There were zero participants claiming to have less than 1 year of computer experience, 1 participant had 1-3 years of experience, 2 participants claimed 4-6 years of experience, and 31 participants, or 91.2% of the group, stated more than 6 years of computer experience. Overall, the participants were well versed in computer usage.

Research Question 1

The first research question was “To what extent is Hofstede’s Values Survey Module an appropriate tool to measure cultural dimensions for language learners from Taiwan and the United States?” As discussed in Chapter 2, the VSM has been used extensively in an attempt to measure culture at the group level and the individual level. Hofstede (2008) and other researchers (Oyserman, Coon, & Kemmelmeier, 2002) have surmised that the VSM is not a very precise tool to measure culture at the individual level. There are other tools whose purpose is to attempt measuring culture at the individual level, such as the Horizontal-Vertical model defined by Triandis (1995). The VSM is more appropriate for group analysis at the country level. This assumes that each country has identifiable cultural dimensions that are inherent to that country as a whole.

This section looks at the VSM scores collected through the CALL Design Analysis Survey (CDAS) and comparison of scores not on a one-to-one basis with VSM country scores on Hofstede’s website, but rather on a relative scale to the Hofstede country scores. This section compares the differences between these scores and identifies

the VSM variables that could potentially be used to define the cultural dimensions of Taiwan and the U.S., the two countries in this study.

A note about the differences between the VSM 94 and the VSM 08, which was discussed in Chapter 2, warrants repeating here. This study uses the VSM 08 and the reason for this selection is the addition of two cultural dimension variables that did not exist in VSM 94. To account for the additional variables, and to keep the number of survey items the same, the questions are not one-to-one equivalents between VSM 94 and VSM 08. Therefore, the scores between these two VSM versions can not be compared directly (Hofstede, 2008). For example, a score of 20 for PDI in VSM 08 is not equivalent to a score of 20 for PDI in VSM 94. Therefore, as part of this analysis, there were no direct comparisons between the scores from the CDAS and the country scores that Hofstede has posted on his website. Instead there was a comparison in terms of the relative differences between the PDI scores for Taiwan as a country to the PDI scores for the U.S. as a country in Hofstede's analysis compared to the relative scores of the PDI for the Taiwan and U.S. groups in this study.

CDAS Cultural Dimensions Results

The results from the CDAS showed that there were some tendencies that were similar to Hofstede's cultural dimensions country scores. The first cultural dimension was the Power Distance Index (PDI). PDI attempts to measure the level of inequality within a society, with lower scores associated with countries that value independence more than conformity and higher scores the opposite. The Taiwan participant group had a higher PDI value than the U.S. participant group. The relative difference of the PDI values from the CDAS was actually the closest to the Hofstede country scores. The

Hofstede country scores were 58 for Taiwan and 40 for the U.S. The scores from the CDAS were 27.8 for the Taiwan group and 20.3 for the U.S. group (see Table 16).

The second cultural dimension was the Individualism (IDV) variable. IDV measures the level of group or individual focus of a country, with lower scores representing collectivism and higher scores individualism. The IDV was extremely different between the two countries in Hofstede's scores. The country scores were 91 for the U.S. and 17 for Taiwan. For the CDAS analysis, the U.S. group scores were noticeably larger than the Taiwan group scores but not to the extent that the Hofstede scores showed. The U.S. group's IDV was 50.4 and the Taiwan group's was 27.6 (see Table 16).

Table 16

VSM Scores

Country	Cultural Dimension						
	PDI	IDV	MAS	UAI	LTO	IVR	MON
Taiwan (CDAS)	27.8	27.6	30.8	73.6	33.7	52.9	23.0
Taiwan (Hofstede)	58.0	17.0	45.0	69.0	87.0	-	-
USA (CDAS)	20.3	50.4	8.1	6.3	16.3	82.6	26.6
USA (Hofstede)	40.0	91.0	62.0	46.0	29.0	-	-

Note: CDAS scores (bold) are from this study and the Hofstede scores are from Hofstede's Cultural Dimensions. The yellow cells represent cultural dimensions with similar trends in the CDAS and Hofstede scores. The gray cells represent conflicting trends between the two. Hofstede country scores from *Geert Hofstede Cultural Dimensions*, by G. Hofstede, 2008, retrieved August 10, 2009, from http://www.geert-hofstede.com/hofstede_dimensions.php.

The third cultural dimension was the Masculinity (MAS) variable. MAS measures the gender-related social roles of a country, with lower scores representing gender-equality and higher scores a clearer separation of gender roles in society. The MAS score from the CDAS showed the opposite result from the Hofstede country scores (see Table 16). Hofstede had the U.S. country score at 62 and the Taiwan country score at 45. For the CDAS results the Taiwan score was 30.8 and the U.S. had 8.1.

The fourth cultural dimension was the Uncertainty Avoidance Index (UAI) variable. UAI identifies how countries approach the uncertainty of future events, with lower scores representing openness to change and a day-to-day approach to uncertainty and higher scores more resistance to change and a future-looking approach to uncertainty. For the UAI in Hofstede's country analysis, Taiwan had a score of 69 to the U.S. score of 46 (see Table 16). The difference between the Taiwan group and U.S. group scores in the CDAS was significantly more pronounced. The Taiwan group had a UAI score of 73.6 and the U.S. group had a score of 6.3.

The fifth cultural dimension was the Long- versus Short-Term Orientation (LTO) variable. LTO measures the level of typically eastern philosophical tenants inherent within a country, with lower scores representing the expectation of quick results and a lower importance on social status and higher scores a focus on perseverance and more importance on social status. The LTO showed a closer relative relationship between the CDAS and Hofstede's country scores compared to some of the other cultural dimensions. In Hofstede's analysis, Taiwan had a country score of 87 to 29 for the U.S. (see Table 16). In the CDAS analysis, the Taiwan group had a score of 33.7 and the U.S. group had 16.3.

The sixth cultural dimension was the Indulgence versus Restraint (IVR) variable. IVR measures a society's position on the freedom granted to its people to enjoy their lives, with lower scores representing more indulgence to the pursuit of desires and feeling and higher scores more restraint to these pursuits. For the IVR cultural dimension, there are no historical scores in the Hofstede country results as this is a new dimension that was introduced in VSM 08. For IVR in the CDAS, the U.S. group had a score of 82.6 and the

Taiwan group had a score of 52.9 (see Table 16). This says that the U.S. group is more on the side of restraint and the Taiwan group is more towards indulgence than the U.S.

The seventh cultural dimension was the Monumentalism (MON) variable. MON measures the flexibility of a society to traditions and personal beliefs, with lower scores representing countries where people are rewarded for humility and flexibility and higher scores where people tend to be proud and unchangeable. For the MON cultural dimension, there are no historical scores in the Hofstede country results as this is a new dimension that was introduced through VSM 08. For the CDAS results, the U.S. group scored higher on this scale with 26.6 and Taiwan had a score of 23.0 (see Table 16), which is not a significant difference.

Summary

Cultural dimensions are difficult to measure at any level, whether individual or group. However, based on the results from the VSM portion of the CDAS, the PDI, IDV, UAI, and LTO cultural dimensions are similar, on a relative scale, to Hofstede's country scores documented on his website. Although the IVR and MON cultural dimensions do not have historical Hofstede country scores, the results from the CDAS showed that there are some differences between the two country groups. Based on the use of the VSM as a component of the CDAS in this study and the similarities identified between the CDAS and Hofstede's published VSM scores, Hofstede's VSM appears to be an appropriate tool to measure cultural dimensions for language learners from Taiwan and the United States in this study.

Research Question 2

The second research question was “To what extent are cultural dimensions and learning styles that are derived from the Experiential Learning theory related?” The first step in answering this question involved analyzing the results from the Learning Styles Inventory (LSI) portion of the CDAS. The LSI scores were calculated for each individual participant based on Kolb’s pre-defined calculation formulas (Kolb, 2005). The individual scores were totaled and averaged to produce country mean scores for the Taiwan group and for the U.S. group. There were four variables calculated directly from the survey results. These were Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). Kolb defined these four variables as CE is Experiencing, RO is Reflecting, AC is Thinking, and AE is Doing. The second step in answering this research question was a correlational analysis between the LSI learning variables and the CDAS cultural dimension variables from research question 1. There were three correlational analysis performed: first with the Taiwan and U.S. groups’ data combined, second with just the Taiwan group data, and third with just the U.S. group data.

CDAS Experiential Learning Styles Results

For the Taiwan group, the highest of the four variables was AE at 37.1, followed by RO at 31.6, AC at 30.7, and CE at 25.8 (see Table 17). For the U.S. participants the highest value was AE at 33.1 followed by AC at 32.4, RO at 29.1, and CE at 25.3.

Table 17

LSI Scores

Country	Learning Modes					
	CE	RO	AC	AE	AC-CE	AE-RO
Taiwan	25.8	31.6	30.7	31.7	4.92	0.03
USA	25.3	29.1	32.4	33.1	7.09	4.00

Note: The RO-CE value is the x-axis point and the CE-AC value is the y-axis point. These are defined by Kolb (2005) and used to plot the country scores in the chart in Figure 5.

For the four learning values, each of the individual participant scores were calculated and placed into an LSI learning style quadrant (see Figure 4). Based on these calculations, 31.6% of the Taiwan participants were defined as Diverging learning styles, which mean their primary learning modes fall between Concrete Experience (CE) and Reflective Observation (RO). Another 31.6% were Assimilating, which means their primary learning modes include Reflective Observation (RO) and Abstract Conceptualization (AC). There were 21.1% who were Converging, which means their primary learning modes are Abstract Conceptualization (AC) and Active Experimentation (AE). Finally, 15.8% were Accomodating, which means their primary learning modes include Abstract Conceptualization (AC) and Concrete Experience (CE). For the U.S. participant group the largest percentage of the participants were Assimilating learning styles at 35.3%, followed by Converging at 26.5%, Diverging at 20.6%, and Accomodating at 17.5%.

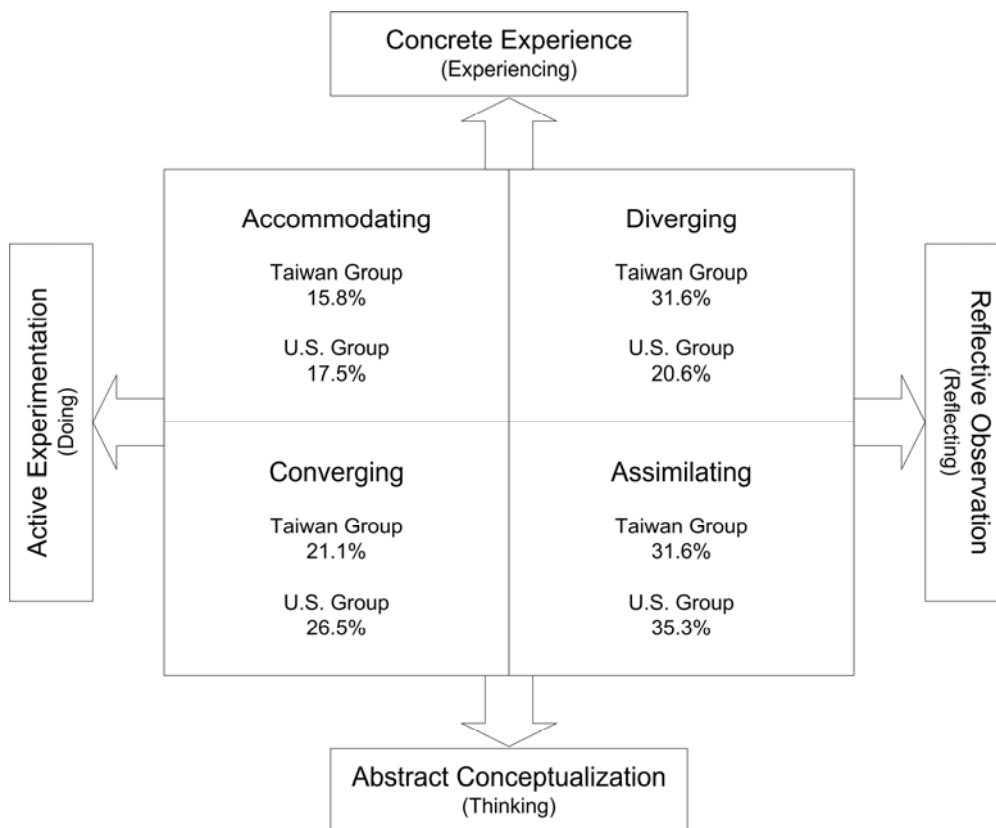


Figure 4. Breakout of Taiwan and U.S. LSI Learning Styles

The Taiwan group as a whole fell in the Diverging learning style quadrant but very close to the Assimilating quadrant. The U.S. group as a whole was in the Assimilating learning style quadrant. It was on the border of the Diverging quadrant and close to the Converging quadrant (see Figure 5). The scale represented in the chart in Figure 5 was defined by Kolb (2005). The RO value is subtracted from the AE value to determine the x-axis point and CE is subtracted from AC to identify the y-axis point. Table 17 represents the AC-CE and AE-RO values for the two countries.

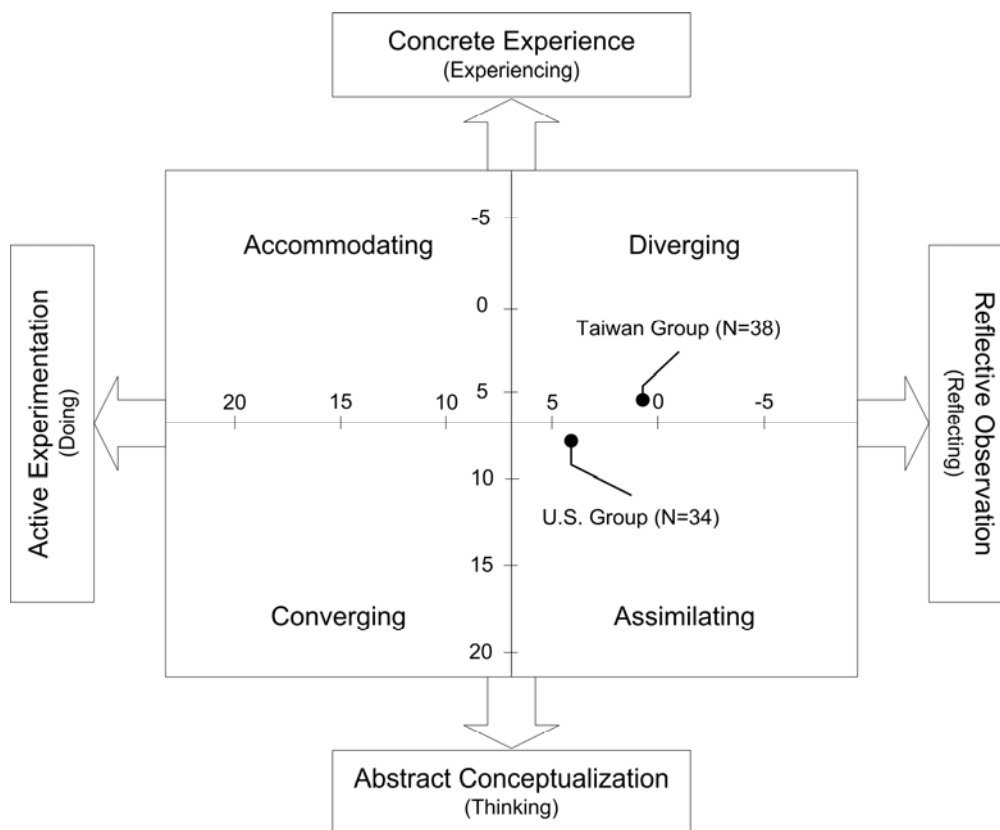


Figure 5. Taiwan and U.S. LSI Learning Styles

Experiential Learning Styles-Cultural Dimensions Relationships

For the correlation analysis between the VSM cultural dimension variables and the LSI learning variables, there were three separate correlational analysis performed. The first analysis was conducted with the Taiwan and U.S. groups' data combined; the second was conducted with just the Taiwan group data; and the third analysis was conducted with just the U.S. group data.

Based on Cohen's (1998) definition of strength of correlation, there were no correlations that could be defined as strong correlations in the combined data, however, there were a few that could be defined as moderate correlations. The highest of the correlations for the combined analysis had a Pearson correlation coefficient of .25 for the

UAI-RO relationship (see Table 18), which means the higher the UAI value, the higher the RO (i.e., more focus on the Reflecting learning mode). The next highest correlation was -.23 for the IVR-RO relationship, stating that higher the IVR value for the group, the lower the RO value. These were followed closely by the positive correlation between LTO and RO ($r = .21$, $p = ns$) and MAS-AC ($r = .20$, $p = ns$). All other correlation coefficients for the combined data set fell below the .20 value, which categorizes the correlations as either low-moderate or weak.

Table 18

Correlation Coefficients of VSM and LSI – Combined

Learning Variables	Cultural Dimension						
	PDI	IDV	MAS	UAI	LTO	IVR	MON
CE	-.15	-.01	-.08	-.01	-.08	-.02	.11
RO	.06	-.04	.02	.25*	.21	-.23	-.12
AC	.04	.04	.20	-.12	-.00	.05	-.10
AE	.04	-.03	-.13	-.13	-.14	.21	.15

Note: * Correlation is significant at the .05 level.

For the correlational analysis of the Taiwan participant group, there were four correlations that had Pearson correlation coefficient values greater than .20 (see Table 19). The highest correlation was for the LTO-AE relationship ($r = -.25$, $p = ns$), which states that higher the LTO value, the lower the AE value. The Taiwan participants as a whole had a noticeably higher LTO value than the U.S. participant group (33.7 to 16.3), therefore, lower values of AE or those learning methods associated with AE learning modes would likely be more efficient for the CALL design. The next strongest correlation was for MAS-AC ($r = .25$, $p = ns$), higher the MAS higher the AC. MAS was on the higher side of the spectrum relative to the U.S. group, therefore, higher values of AC and CALL design principles associated with them may be more beneficial. The next

highest correlation coefficient was for IVR and AE ($r = .24$, $p = ns$), stating that higher values of IVR relates to higher values of AE. The next highest correlation was for IDV and AE ($r = -.22$, $p = ns$). The top three correlations (LTO-AE, MAS-AC, and IVR-AE) could be considered as candidates for use in the design of CALL programs, however, all had moderate correlations and none were significant at the .05 level.

Table 19

Correlation Coefficients of VSM and LSI – Taiwan

Learning Variables	Cultural Dimension						
	PDI	IDV	MAS	UAI	LTO	IVR	MON
CE	-.09	.11	-.05	-.06	.08	-.09	-.14
RO	.00	-.03	-.09	.18	.01	-.14	.03
AC	.13	.06	.25	-.18	.09	.04	.07
AE	-.11	-.22	-.09	.06	-.25	.24	.11
LSI Learning Style	-.05	-.09	.17	-.09	.08	.09	-.02

For the correlational analysis of the U.S. group, there were several relationships that showed stronger correlation coefficient values than those in the Taiwan participant group. Two relationships had Pearson correlation coefficients exceeding .30 and six results were between .20 and .30 (see Table 20). The strongest correlation was LTO and RO with a correlation coefficient of .36 ($p < .05$). For the U.S., LTO was on the low side of the LTO cultural dimension spectrum. The second strongest relationship was MON and CE ($r = .35$, $p < .05$), which states that higher the MON value, the higher the CE value. The next highest significance was for MON and AC ($r = -.27$, $p = ns$), stating that higher the MON, the lower the AC. There was a moderate correlation for MON and RO ($r = -.27$, $p = ns$). Next on the strength of correlation was IVR and RO ($r = -.25$, $p = ns$). IVR was a value that the U.S. was on the high end of the cultural dimension spectrum, therefore, lower values of RO within the CALL program design would likely better suit

the users from the U.S. The next highest value was for LTO and CE ($r = -.23$, $p = ns$), higher values of LTO, lower the CE. LTO was low for the U.S., therefore, use of less design principles associated with CE would likely be more effective. Next was the correlation between PDI and CE ($r = -.22$, $p = ns$). Although there was not a significant difference between the PDI value of Taiwan and the U.S., the U.S. was a little lower on this value.

Table 20

Correlation Coefficients of VSM and LSI – U.S.

Learning Variables	Cultural Dimension						
	PDI	IDV	MAS	UAI	LTO	IVR	MON
CE	-.22	-.10	-.13	-.01	-.23	.07	.35*
RO	.09	.03	.05	.16	.36*	-.25	-.27
AC	-.05	-.02	.21	.07	-.06	-.00	-.27
AE	.20	.05	-.13	-.19	-.03	.15	.17
LSI Learning Style	.12	.08	-.15	-.07	-.15	.17	.17

Note: * Correlation is significant at the .05 level.

Summary

Although there were some moderate correlations between the VSM cultural dimension variables and the LSI learning variables in the CDAS, there were no strong correlations between these two sets of variables for the Taiwan participant group. There were a number of moderate to low moderate correlations for the U.S. participant group. The top two correlations for the U.S. group (LTO-RO and MON-CE) could be considered as valid correlations for the purpose of CALL design, as both of these relationships had high-moderate correlation coefficients and were significant at the .05 level. The next two (MON-AC and MON-RO) had moderate correlations and were not significant at the .05 level, however, could be considered when interpreting the results for CALL design purposes. Based on the use of the LSI as a component of the CDAS in this

study and the correlation analysis with the VSM cultural dimensions from the CDAS, the LSI does not appear to be a strong candidate to identify relationships between cultural dimensions and learning styles for the participants from Taiwan and the United States in this study.

Research Question 3

The third research question was “To what extent are cultural dimensions and learning styles that are derived from the Multiple Intelligences theory related?” The first step in answering this question involved analyzing the results from the Perceptual Learning Styles Preferences Questionnaire (PLSPQ) portion of the CDAS. The PLSPQ scores were calculated for each individual participant based on Reid’s pre-defined calculation formulas. The individual scores were totaled and averaged for a country score.

There are six learning style variables defined by the PLSPQ. These are Visual, Tactile, Auditory, Kinesthetic, Group, and Individual. For each of the learning style variables, scores higher than 13.50 are considered major learning style preferences. Mean scores between 11.50 and 13.49 are considered minor learning style preferences. Scores below 11.49 are considered negative learning style preferences (Reid, 1987). The second step in answering this research question was a correlational analysis between the PLSPQ learning variables and the CDAS cultural dimension variables from research question 1. There were three correlational analysis performed: first with the Taiwan and U.S. groups’ data combined, second with just the Taiwan group data, and third with just the U.S. group data.

CDAS Perceptual Learning Styles Results

For the Taiwan group, four of the learning style variables scored in the minor learning style preference category. In order, these were Group at 12.8, Individual at 12.8, Visual at 12.1 and Auditory at 12.1. Two learning style variables were considered negative learning style preferences. These were Tactile at 11.1 and Kinesthetic at 11.1 (see Table 21). There were no learning style variables that scored in the major learning style preference category for the Taiwan group.

For the U.S. group, all six learning style variables scored in the major learning style preference category. The rank order of these learning styles were 19.4 for Kinesthetic, 18.7 for Visual, 18.5 for Tactile, 16.4 for Auditory, 16.3 for Individual, and 15.7 for Group (see Table 21).

Table 21

PLSPQ Scores

Country	Learning Styles					
	Visual	Tactile	Auditory	Kinesthetic	Group	Individual
Taiwan	12.1	11.1	12.1	11.1	12.8	12.8
USA	18.7	18.5	16.4	19.4	15.7	16.3

Note: Means 13.50 and above = major learning style preference; 11.50-13.49 = minor learning style preference; 11.49 or less = negative learning style preference. From "The perceptual learning style preferences of ESL students," by J. Reid, 1987, *TESOL Quarterly*, 21, p. 96.

Perceptual Learning Styles-Cultural Dimensions Relationships

For the correlation analysis between the VSM cultural dimension variables and the PLSPQ learning style variables, there were three separate correlational analysis performed. The first was conducted with the Taiwan and U.S. groups' data combined; the second was conducted with just the Taiwan group data; and the third analysis was conducted with just the U.S. group data.

For the combined correlational analysis, there were strong correlations between the UAI cultural dimension and all but one of the PLSPQ learning style variables (see Table 22). The strength of relationship in order of rank were UAI-Visual ($r = -.55, p < .01$), UAI-Kinesthetic ($r = -.51, p < .01$), UAI-Tactile ($r = -.48, p < .01$), and UAI-Auditory ($r = -.35, p < .01$). All of these were negatively correlated, therefore, higher values of UAI means lower values of each of the four learning styles. The next strongest relationship was for IVR-Kinesthetic ($r = .33, p < .01$), which states higher the IVR, lower the Kinesthetic. Moving lower in the strength of relationship, there were a negative correlation for UAI-Individual ($r = -.28, p < .05$), a positive correlation for IVR-Tactile ($r = .27, p < .05$), a negative correlation for MAS-Group ($r = -.26, p < .05$), a positive correlation for IVR-Visual ($r = .26, p = ns$), a positive correlation for IDV-Visual ($r = .23, p = ns$), and a positive correlation for MON-Kinesthetic ($r = .22, p = ns$).

Table 22

Correlation Coefficients of VSM and PLSPQ – Combined

Learning Styles	Cultural Dimension						
	PDI	IDV	MAS	UAI	LTO	IVR	MON
Visual	-.14	.23	-.07	-.55**	-.11	.26	.18
Tactile	.03	.20	-.19	-.48**	-.10	.27*	.16
Auditory	.09	.10	-.08	-.35**	-.02	.15	.14
Kinesthetic	.04	.12	-.15	-.51**	-.09	.33**	.22
Group	.11	.09	-.26*	-.16	.06	.06	.05
Individual	-.18	.10	-.50	-.28*	-.12	.11	.03

Note: * Correlation is significant at the .05 level.

** Correlation is significant at the .01 level.

For the correlational analysis of the Taiwan participant group, there were a number of strong correlations (see Table 23). The strongest correlation was for MON-Visual ($r = .52, p < .01$), which reveals higher MON equates to higher Visual. Going down in strength of relationship, there were a positive correlation for LTO-Auditory ($r = .42, p < .01$), a negative correlation for UAI-Visual ($r = -.40, p < .05$), a negative

correlation for MON-Group ($r = -.39, p < .05$), a positive correlation for IDV-Group ($r = .38, p < .05$), a positive correlation for IDV-Auditory ($r = .38, p < .05$), a negative correlation for PDI-Individual ($r = -.35, p < .05$), a negative correlation for MAS-Group ($r = -.34, p < .05$), a positive correlation for LTO-Group ($r = .34, p < .05$), a negative correlation for UAI-Auditory ($r = -.29, p = ns$), a positive correlation for IDV-Kinesthetic ($r = .28, p = ns$), and finally a positive correlation for PDI-Group ($r = .25, p = ns$).

Table 23

Correlation Coefficients of VSM and PLSPQ – Taiwan

Learning Styles	Cultural Dimension						
	PDI	IDV	MAS	UAI	LTO	IVR	MON
Visual	-.11	.14	.19	-.40*	.10	.07	.52**
Tactile	.14	.24	-.30	-.02	-.18	.06	.06
Auditory	.22	.38*	-.06	-.29	.42**	-.07	.08
Kinesthetic	.23	.28	-.21	-.09	-.11	.11	.15
Group	.25	.38*	-.34*	.00	.34*	-.23	-.39*
Individual	-.35*	-.06	.09	-.23	-.01	-.02	.21

Note: * Correlation is significant at the .05 level.

** Correlation is significant at the .01 level.

For the correlational analysis of the U.S. group, there were strong correlations between some of the cultural dimension variables and the PLSPQ learning style variables (see Table 24). The strength of relationship in order of rank were a positive correlation for MON-Kinesthetic ($r = .46, p < .01$), a positive correlation for MON-Group ($r = .40, p < .05$), a negative correlation for IDV-Kinesthetic ($r = -.34, p < .05$), a negative correlation for UAI-Tactile ($r = -.34, p < .05$), a negative correlation for MON-Tactile ($r = .34, p < .05$), a negative correlation for IDV-Auditory ($r = -.32, p = ns$), a positive correlation for IVR-Kinesthetic ($r = .29, p = ns$), a negative correlation for UAI-Kinesthetic ($r = -.27, p = ns$), a negative correlation for IDV-Group ($r = -.24, p = ns$), a positive correlation for MAS-Kinesthetic ($r = .23, p = ns$), a negative correlation for

LTO-Auditory ($r = -.23$, $p = ns$), and finally a positive correlation for MON-Auditory ($r = .21$, $p = ns$).

Table 24

Correlation Coefficients of VSM and PLSPQ – U.S.

Learning Styles	Cultural Dimension						
	PDI	IDV	MAS	UAI	LTO	IVR	MON
Visual	-.15	.12	.04	-.13	-.11	.13	-.06
Tactile	.10	-.07	.20	-.34	.18	.20	.34
Auditory	.12	-.32	.12	.13	-.23	.08	.21
Kinesthetic	.08	-.34*	.23	-.27	.16	.29	.46**
Group	.04	-.24	-.10	.05	-.06	.14	.40*
Individual	.00	.08	.01	.07	-.10	.01	-.14

Note: * Correlation is significant at the .05 level.

** Correlation is significant at the .01 level.

Summary

The relationships between the VSM cultural dimensions and the PLSPQ learning variables from the CDAS were noticeably stronger than the relationships between the VSM cultural dimensions and the LSI learning variables. For the Taiwan group there were three relationships that could be categorized as strong to low-strong correlations and six relationships that could be defined as low-strong to high-moderate correlations. For the U.S. group, there were two relationships that could be defined as strong correlations, three that could be defined as high-moderate, and an additional three as moderate. Therefore, in showing cultural dimension relationships with learning styles, the PLSPQ learning variables showed stronger relationships with the cultural dimensions than the LSI learning variables. Based on the use of the PLSPQ as a component of the CDAS in this study and the correlation analysis with the VSM cultural dimensions from the CDAS, the PLSPQ appears to be a tool capable of identifying relationships between cultural

dimensions and learning styles for the participants from Taiwan and the United States in this study.

Research Question 4

The fourth research question was “To what extent can the relationships between cultural dimensions and learning styles be used as a construct to design Computer-Assisted Language Learning programs?” The analysis for this question was a two-step process. The first step was to take the correlations from research questions 2 and 3 and place them in a single rank-order list by strength of correlation. The second step was to incorporate the relational differences between the Taiwan and the U.S. cultural dimension scores in determining the relative importance of the cultural dimension-learning style relationships.

Relationship of Variables for Taiwan

The relationships between the CDAS cultural dimensions and the CDAS experiential learning variables and between the CDAS cultural dimensions and the CDAS perceptual learning variables for the Taiwan participant group were placed into a single list. This list was ranked in order of correlation strength and all relationships with less than high-moderate to strong correlations were removed. These were relationships with Pearson correlation coefficients weaker than $\pm.30$ (see Table 25). For the Taiwan participant group, there were nine relationships that met this criteria of the correlation coefficients being stronger than $\pm.30$. All nine were cultural dimension relationships with PLSPQ learning style variables. No cultural dimension-LSI learning variable relationships made this list.

Table 25

Taiwan Relationships – By Correlation Strength

Relationship		r	r ²	Relationship Direction	CD Score Relative to U.S.	LS Direction
Cultural Dimension (CD)	Learning Style (LS)					
MON	Visual	.52	.27	Positive	–	–
LTO	Auditory	.42	.18	Positive	+	+
UAI	Visual	-.40	.16	Negative	+	–
MON	Group	-.39	.15	Negative	–	+
IDV	Group	.38	.15	Positive	–	–
IDV	Auditory	.38	.14	Positive	–	–
PDI	Individual	-.35	.12	Negative	+	–
LTO	Group	.34	.11	Positive	+	+
MAS	Group	-.34	.11	Negative	+	–

Note: For CD Score Relative to U.S., + are higher CD scores and – are lower CD scores.

For LS Direction, + are higher values of LS and – are lower values.

The strongest relationship on the list was for MON-Visual. This relationship had a correlation coefficient of .52 and an r^2 , or coefficient of determination, of .27, which means that 27% of the variability in the Visual variable was associated with variability in the MON cultural dimension variable. Since the MON-Visual correlational relationship direction was positive ($r = .52$) and the Taiwan cultural dimension score for MON was lower than that of the U.S., the learning style direction was negative, which suggests de-emphasizing CALL design principles associated with the Visual learning style (see Table 25). The second strongest relationship on this list was the LTO-Auditory relationship with a correlation coefficient of .42 and a coefficient of determination of .18, which means that 18% of the variability in the Auditory variable was associated with variability in the LTO cultural dimension variable. Since the LTO-Auditory correlational relationship direction was positive ($r = .42$) and the Taiwan cultural dimension score for LTO was higher than that of the U.S., the learning style direction was positive, which

suggests emphasizing CALL design principles associated with the Auditory learning style (see Table 25). The third strongest relationship on this list was the UAI-Visual relationship with a correlation coefficient of $-.40$ and a coefficient of determination of $.16$. Since the UAI-Visual correlational relationship direction was negative ($r = -.40$) and the Taiwan cultural dimension score for UAI was higher than that of the U.S., the learning style direction was negative, which suggests de-emphasizing CALL design principles associated with the Visual learning style (see Table 25). The fourth strongest relationship was the MON-Group relationship with a correlation coefficient of $-.39$ and a coefficient of determination of $.15$. Since the MON-Group correlational relationship direction was negative ($r = -.39$) and the Taiwan cultural dimension score for MON was lower than that of the U.S., the learning style direction was positive, which suggests emphasizing CALL design principles associated with the Group learning style. See Table 25 for the order of the remaining five relationships for the Taiwan group.

Based on this list of relationships, the Taiwan participants had the following learning styles preferences, in order:

1. Visual (MON) – De-emphasize
2. Auditory (LTO) – Emphasize
3. Visual (UAI) – De-emphasize
4. Group (MON) – Emphasize
5. Group (IDV) – De-emphasize
6. Auditory (IDV) – De-emphasize
7. Individual (PDI) – De-emphasize
8. Group (LTO) – Emphasize
9. Group (MAS) – De-emphasize

The results for the first four learning preferences provide a short list of learning preferences that are associated with the Taiwan participant group as a whole. However, items 5 and 6 (de-emphasize Group and Auditory) begin to show results that are opposite

of items 2 and 4 (emphasize Auditory and Group), respectively. Therefore, the learning style preferences for the Taiwan group become unclear beyond relationship number 4.

The ranking analysis above looks strictly at the relationships without taking into consideration that not all cultural dimensions differences between the Taiwan and the U.S. groups are equal. For example, the MON cultural dimension variable had very similar scores between Taiwan and the U.S. (23.0 to 26.6, respectively), whereas, scores for the UAI cultural dimension variable had a large variance between the two country scores (73.6 for Taiwan and 6.3 for the U.S.). This means adjusting learning style characteristics associated with the UAI cultural dimension will likely have a larger impact on the Taiwan and U.S. groups than those learning style characteristics associated with the MON cultural dimension.

To take into consideration the differences between the cultural dimension scores across the two countries, a CDAS score was calculated for each of the relationships. The CDAS scores allowed the relationships to take the strength of the differences between the Taiwan and U.S. cultural dimensions scores as a factor. Before calculating the CDAS score, the % difference in each of the cultural dimension scores between the two countries were calculated. This was defined as the CD Index (see Table 26). Then, the following formula was used to calculate the CDAS for each cultural dimension-learning style relationship: $CDAS = 100((.9 \times \text{correlation coefficient}) + (.1 \times \text{CD Index}))$. It was necessary to use a small proportion for the CD Index (.10) in the equation because some of the cultural dimension score differences were very large.

Using this formula, CDAS scores were calculated for each of the nine high-moderate to strong correlation relationships for the Taiwan group. The relationships were then re-ranked by the CDAS score (see Table 26).

Table 26

Taiwan Relationships – By CDAS Score

Relationship		r	CD Index	CDAS Score
Cultural Dimension (CD)	Learning Style (LS)			
UAI	Visual	-.40	10.68	71.19
LTO	Auditory	.42	1.07	48.74
MON	Visual	.52	0.16	48.28
IDV	Group	.38	0.83	42.55
IDV	Auditory	.38	0.83	42.01
MON	Group	-.39	0.16	33.53
PDI	Individual	-.35	0.37	27.63
LTO	Group	.34	1.07	19.75
MAS	Group	-.34	2.80	2.22

Note: CD Index = % difference in cultural dimension scores between Taiwan and U.S.

The re-ranked list for the Taiwan participants had the following learning styles preferences, in order:

1. Visual (UAI) – De-emphasize
2. Auditory (LTO) – Emphasize
3. Visual (MON) – De-emphasize
4. Group (IDV) – De-emphasize
5. Auditory (IDV) – De-emphasize
6. Group (MON) – Emphasize
7. Individual (PDI) – De-emphasize
8. Group (LTO) – Emphasize
9. Group (MAS) – De-emphasize

This re-ranking moved the UAI-Visual relationship, which was previously ranked third, up to the top spot with a score of 71.19 (see Table 26). This shift was due to the large UAI score differences between the two countries. The second relationship on the list remained the same and this was the LTO-Auditory relationship with a score of 48.74.

The third relationship on the list was the MON-Visual relationship with a score of 48.28.

The fourth relationship was IDV-Group with a score of 42.55.

The important similarity between the two lists is that although two of the top three relationships changed, the learning preferences remained the same. These were to de-emphasize Visual, emphasize Auditory, and de-emphasize Visual. The fourth learning variable, Group, switched from emphasize in the rank by correlation strength list to de-emphasize in the rank by CDAS score list. This switch was due to the large IDV score differences between the two countries, relative to the small MON score differences. Therefore, the learning style variables to focus on in regard to CALL curriculum design for learners from Taiwan are to target learners with Auditory learning styles, de-emphasize designs that would cater toward the Visual learning style, and experiment with designs that favor learners with Group learning preferences.

Relationship of Variables for U.S.

Similar to the ranking of the relationships between the CDAS cultural dimensions and the CDAS experiential learning variables and between the CDAS cultural dimensions and the CDAS perceptual learning variables for the Taiwan participant group, a list of relationships was created for the U.S. participant group's results. The list was ranked in order of correlation strength and only relationships with high-moderate to strong correlations were included. These are relationships with Pearson correlation coefficients stronger than $\pm.30$ (see Table 27). For the U.S. participant group, there were eight relationships that met this criterion. Six of the relationships were cultural dimension relationships with the PLSPQ variables and two were relationships between the cultural dimensions and the LSI learning variables.

Table 27

U.S. Relationships – By Correlation Strength

Relationship		r	r ²	Relationship Direction	CD Score Relative to Taiwan	LS Direction
Cultural Dimension (CD)	Learning Style (LS)					
MON	Kinesthetic	.46	.21	Positive	+	+
MON	Group	.40	.16	Positive	+	+
LTO	RO	.36	.13	Positive	–	–
MON	CE	.35	.12	Positive	+	+
IDV	Kinesthetic	-.34	.12	Negative	+	–
MON	Tactile	.34	.11	Positive	+	+
UAI	Tactile	-.34	.11	Negative	–	+
IDV	Auditory	-.32	.10	Negative	+	–

Note: For CD Score Relative to Taiwan, + are higher CD scores and – are lower CD scores.

For LS Direction, + are higher values of LS and – are lower values.

The strongest relationship on the list was for MON-Kinesthetic. This relationship had a correlation coefficient of .46 and an r^2 of .21, which means that 21% of the variability in the Kinesthetic variable was associated with variability in the MON cultural dimension variable. Since the MON-Kinesthetic correlational relationship direction was positive ($r = .46$) and the U.S. cultural dimension score for MON was higher than that of Taiwan, the learning style direction was positive, which suggests emphasizing CALL design principles associated with the Kinesthetic learning style (see Table 27). The second strongest relationship on this list was the MON-Group relationship with a correlation coefficient of .40 and a coefficient of determination of .16, which means that 16% of the variability in the Group variable was associated with variability in the MON cultural dimension variable. Since the MON-Group correlational relationship direction was positive ($r = .40$) and the U.S. cultural dimension score for MON was higher than that of Taiwan, the learning style direction was positive, which suggests emphasizing CALL design principles associated with the Group learning style (see Table 27). The

third strongest relationship on this list was the LTO-RO relationship with a correlation coefficient of .36 and a coefficient of determination of .13. Since the LTO-RO correlational relationship direction was positive ($r = .36$) and the U.S. cultural dimension score for LTO was lower than that of Taiwan, the learning style direction was negative, which suggests de-emphasizing CALL design principles associated with the RO learning style (see Table 27). The fourth strongest relationship was the MON-CE relationship with a correlation coefficient of .35 and a coefficient of determination of .12. Since the MON-CE correlational relationship direction was positive ($r = .35$) and the U.S. cultural dimension score for MON was higher than that of Taiwan, the learning style direction was positive, which suggests emphasizing CALL design principles associated with the CE learning style. See Table 27 for the order of the remaining four relationships for the U.S. group.

Based on this list of relationships, the U.S. participants had the following learning styles preferences, in order:

1. Kinesthetic (MON) – Emphasize
2. Group (MON) – Emphasize
3. RO – Reflecting (LTO) – De-emphasize
4. CE – Experiencing (MON) – Emphasize
5. Kinesthetic (IDV) – De-emphasize
6. Tactile (MON) – Emphasize
7. Tactile (UAI) – Emphasize
8. Auditory (IDV) – De-emphasize

By looking at all of the learning preferences except relationship number 5, the results provide a consistent list of learning preferences that are associated with the U.S. participant group as a whole. Relationship number 5 reveals deemphasizing the Kinesthetic learning preference and it conflicts with relationship number 1, which promotes emphasizing the Kinesthetic learning preference.

As with the Taiwan analysis, the differences between the cultural dimension scores across the two countries (Taiwan and U.S.) were considered and a CDAS score was calculated for each of the relationships. The relationships were then re-ranked by the CDAS score (see Table 28).

Table 28

U.S. Relationships – By CDAS Score

Relationship		r	CD Index	CDAS Score
Cultural Dimension (CD)	Learning Style (LS)			
UAI	Tactile	-.34	10.68	76.59
LTO	RO	.36	1.07	43.16
MON	Kinesthetic	.46	0.16	42.61
MON	Group	.40	0.16	37.66
MON	CE	.35	0.16	33.07
MON	Tactile	.34	0.16	31.99
IDV	Kinesthetic	-.34	0.83	22.52
IDV	Auditory	-.32	0.83	20.54

Note: CD Index = % difference in cultural dimension scores between Taiwan and U.S.

The re-ranked list for the U.S. participants had the following learning styles preferences, in order:

1. Tactile (UAI) – Emphasize
2. RO – Reflecting (LTO) – De-emphasize
3. Kinesthetic (MON) – Emphasize
4. Group (MON) – Emphasize
5. CE – Experiencing (MON) – Emphasize
6. Tactile (MON) – Emphasize
7. Kinesthetic (IDV) – De-emphasize
8. Auditory (IDV) – De-emphasize

This re-ranking moved the UAI-Tactile relationship, which was previously ranked seventh, up to the top spot with a score of 75.59 (see Table 28). The second relationship on the list was the LTO-RO relationship with a score of 43.16. The third relationship on

the list was now the MON-Kinesthetic relationship, which was previously ranked first, with a score of 42.61. The fourth relationship was MON-Group with a score of 37.66.

The use of the CDAS scores for the U.S. relationships re-ranked the order of importance, however, since the learning preferences that were associated with the U.S. group were consistent with only one conflicting learning preference (Kinesthetic), the conclusion of the analysis did not change, that is, there were no changes in the learning styles to emphasize and de-emphasize. Based on the results of this analysis, the learning style variables to focus on in regard to the U.S. group are to target learners with Tactile, Group, and CE (Experiencing) learning styles, de-emphasize designs that would cater toward the RO (Reflecting) and Auditory learning styles, and experiment with designs that favor learners with Kinesthetic learning preferences.

Summary

The data analysis for the fourth research question showed that there were relationships between the CDAS cultural dimensions and the CDAS experiential and perceptual learning styles variables that were strong enough to warrant consideration in determining which learning preferences to emphasize or de-emphasize when designing a CALL program. The Taiwan results showed learning preference consistency for the top three relationships, however, relationships with weaker correlations and lower CDAS scores began to contradict the learning preferences of the stronger relationships. The U.S. results showed a strong consistency of learning preference in both the strength of correlation and CDAS scores lists. Based on this analysis of the relationships between the CDAS cultural dimensions and the CDAS experiential and perceptual learning styles variables, there is indication that there is some consistency in the relationships and they

can be used to experiment with CALL design. However, the results of this study are not entirely conclusive and the evidence needs to be further reinforced before proclaiming that the CDAS results can be used as a construct to design CALL programs.

The next chapter summarizes this study. It focuses on the limitations of this study, implications for practice, and recommendations for future research.

CHAPTER V

SUMMARY, IMPLICATIONS, AND CONCLUSION

Overview

This chapter focuses on the summary, limitations, and implications of this dissertation. There are six sections in this chapter: the first section is the restatement of the problem; the second section summarizes the findings of this study; the third section discusses the limitations of this study; the fourth section presents the implications for practice; the fifth section provides recommendations for future research; and the sixth section is the conclusion of this dissertation.

Restatement of the Problem

Many of the commercial Computer-Assisted Language Learning (CALL) programs available today typically take a generic approach to design. This approach standardizes the program so that it can be used to teach any language merely by translating the content from one language to another. These CALL programs rarely consider the cultural background or preferred learning style of the language learner. The assumption is that one size does fit all. Though there are a number of instruments to measure the learning styles of learners and a smaller number of instruments to measure cultural dimensions, there is no one instrument that combines both learning styles and cultural characteristics to determine a relationship between these two sets of variables. If such a measurement device existed, it could be used to design CALL programs that better consider the cultural background and learning styles of language learners. This could lead to a reduction in the generic nature of existing CALL programs and increase the potential for more effective technology- and internet-based language instruction.

Summary of Study

The purpose of this study was to determine whether a combination of survey instruments could be used to identify a relationship between cultural dimensions and learning styles; moreover, whether or not this relationship could be used to design a CALL program that addresses the specific learning styles associated with the cultural background of learners. Three survey instruments, one to measure cultural dimensions and two to measure learning styles, were used to collect the necessary information. The aggregation of these three surveys and a demographics section were given the name CALL Design Analysis Survey (CDAS). The CDAS was administered to two groups of participants. The first participant group was born and spent their formative years of education through high school in Taiwan. The second group of participants was either born or spent their formative years in the U.S. A correlational analysis was performed on the collected data to determine any patterns between the variables in Kolb's Learning Style Inventory (LSI) and Hofstede's Values Survey Module Questionnaire (VSM), and between Reid's Perceptual Learning Style Preference Questionnaire (PLSPQ) and Hofstede's VSM.

The first research question addressed the appropriateness of the VSM to measure cultural dimensions for language learners from Taiwan and the U.S. The analysis of the data collected revealed that most of the cultural dimensions results for the Taiwan and U.S. groups in this study were consistent with the country scores defined by Hofstede. Similar to Hofstede's country scores, the Power Distance Index (PDI), Uncertainty Avoidance Index (UAI), and Long-Term Orientation (LTO) scores from the CDAS had the Taiwan group with higher values than the U.S. group, and for the Individualism

(IDV) score, the U.S. group had a higher value than the Taiwan group. The Masculinity (MAS) cultural dimension results from the CDAS produced opposite results from the Hofstede country scores. For the CDAS, the Taiwan group had a higher MAS value than the U.S. For Indulgence versus Restraint (IVR) and Monumentalism (MON), the two cultural dimensions without historical Hofstede country scores, the U.S. group had higher values. Based on the use of the VSM as a component of the CDAS in this study and the consistency of results in relation to Hofstede's historical country scores, the VSM was an appropriate tool to measure cultural dimensions of the two participant groups in this study.

The second research question addressed the relationship between the VSM cultural dimensions and the LSI learning variables from the CDAS. The results from this analysis showed that although there were some high-moderate correlations between the LSI learning variables and the VSM cultural dimensions for the U.S. group, there were no significant correlations for the Taiwan group. Therefore, based on the use of the LSI as a component of the CDAS in this study and the correlation analysis with the VSM cultural dimensions from the CDAS, the LSI did not provide sufficient results to allow a comparison of the relationships between cultural dimensions and learning styles for the participants from Taiwan and the U.S. in this study.

The third research question addressed the relationship between the VSM cultural dimensions and the PLSPQ learning variables from the CDAS. The correlations of these relationships proved to be stronger than those revealed by the analysis between the VSM cultural dimensions and the LSI learning variables. For the Taiwan group, there were three relationships that could be categorized as strong to low-strong correlations and

these were the MON-Visual, LTO-Auditory, and UAI-Visual relationships. There were an additional six relationships that could be defined as low-strong to high-moderate correlations (see Table 23). For the U.S. group, there were two relationships that could be defined as strong correlations and these were the MON-Kinesthetic and MON-Group relationships. There were an additional three relationships that could be defined as high-moderate and another three as moderate (see Table 24). These results support the use of a number of the VSM-PLSPQ relationships when designing a CALL program for language learners from the U.S. and Taiwan. Therefore, based on the use of the PLSPQ as a component of the CDAS in this study and the correlational analysis with the VSM cultural dimensions from the CDAS, the PLSPQ provided sufficient results to allow a comparison of the relationships between cultural dimensions and learning styles for the participants from Taiwan and the U.S. in this study.

The fourth research question addressed whether the relationships between the CDAS cultural dimensions and the CDAS experiential and perceptual learning styles variables could be used as a construct to design CALL programs. The data analysis for this fourth research question showed that there were relationships between the CDAS cultural dimensions and the CDAS experiential and perceptual learning styles variables that were strong enough to warrant consideration in determining which learning preferences to emphasize or de-emphasize when designing a CALL program. The Taiwan group results showed that CALL curriculum design for learners from Taiwan should emphasize designs that favor the Auditory learning style, de-emphasize designs that would cater toward the Visual learning style, and experiment with designs that are agreeable to learners with Group learning preferences. The U.S. group results showed

that CALL curriculum design for learners from the U.S. could benefit by targeting learners with Tactile, Group, and CE (Experiencing) learning styles, de-emphasizing designs that would cater toward the RO (Reflecting) and Auditory learning styles, and experimenting with designs that favor learners with Kinesthetic learning preferences.

Overall, the results of this analysis provided evidence that relationships between cultural dimensions and learning styles exist and that they can be used as a tool to design CALL programs that better consider the cultural background and learning styles of language learners. If the goal of this study was to discover a definitive tool that can be used to measure the relationships between cultural dimensions and learning styles for any and all countries consistently, the results would fall short. This study was however a positive step in the direction of finding such a measurement tool, a tool that could lead to more effective technology- and internet-based language instruction.

Limitations

Although every attempt was made to gather the best data available from the participants, there were some limitations to this study. The primary limitation was the unavailability of a larger number of varied participant groups. The two groups in this study were made up of 38 participants from Taiwan who have studied English as a second language and 34 participants from the U.S. whose first language is English and who have studied a foreign language. Ideally a larger sample size of one hundred per group and a larger number of groups with each group representing a different country could be used as opposed to just two countries. The additional groups would ideally be from countries that tend to score differently on the scales for one or more of the cultural dimensions, according to Hofstede's historical analysis.

Furthermore, if the backgrounds of the participant groups could have been narrowed down, the results would be appropriate for a narrower target audience. For example, if the two participant groups could have been isolated to people who are working in the engineering field, who are between the ages of 20 and 30, and who have studied English for 5 to 10 years, the backgrounds of the participants could be narrowed significantly and the resultant data possibly more precise.

Another limitation of this study was the unavailability of quantitative analysis tools to measure cultural characteristics and dimensions. Cultural characteristics are difficult to measure from a quantitative perspective. There has been abundant research in the area of culture, however, much of this has been in the area of qualitative analysis and ethnographic studies (Wardhaugh, 2006). There are very few instruments that have attempted to measure culture quantitatively (Hofstede, 2005; Matsumoto, 2000; Triandis, 1995). The VSM is the most widely used tool for measuring culture from a quantitative perspective (Oyserman, Coon, & Kemmelmeier, 2002), and therefore, there is the most literature available for this particular instrument. That was the primary purpose for using this instrument and by no means has it proven to be an always reliable device for measuring cultural characteristics and dimensions.

Yet another limitation to this study was that the surveys and their instructions were in English. The surveys were taken by two groups of people, one of which English is not their native language. One of the participant groups should not have experienced any language difficulty as English is their native language, however, the other participant group was originally from Taiwan and their native language is not English. These participants may have encountered a language hurdle to overcome. Although a majority

of the Taiwanese participants have studied English for a number of years and all of them have advanced intermediate English proficiency or better, there could have been some difficulty in fully understanding the instructions and the questions that were asked within the survey.

The final limitation that will be discussed here was the lack of literature that exists in regard to conducting similar studies. There are very few studies in the literature that have attempted to identify whether or not there is a correlation between quantitatively measured cultural characteristics with quantitatively calculated learning style variables. The results from this study may present a particular view of the correlation between learning styles and cultural characteristics, however, without a historical backlog of studies to compare these to, it is difficult to determine the level of accuracy and efficiency of the gathered information.

Implications for Practice

How to create a program with the most effective instructional method for the language learner is not the driving force behind most CALL programs today. The driving force behind most CALL programs produced by large corporate entities is profit. To maximize profits, it is necessary to cut costs and one of the most effective means of cutting costs is to produce language learning programs that are generic in nature and can be used for the instruction of an infinite number of languages. Most commercially available language learning programs are clone programs. This means that the program shell is consistent across all languages with the language content being the only varying factor (Shaughnessy, 2003). In an attempt to minimize cloning, a tool such as the CDAS can be used to isolate effective learning styles for a group of learners from the same

country and optimize the methods used to present language learning material through computer-based mediums. Furthermore, the CDAS results can be used for the creation of curriculum for TESL and TEFL, teaching methodology, and other areas of education. An inventory of CDAS results will be useful for educators teaching in an online format, businesses creating language applications for learners of English, and ultimately for the students who decide to use a CALL program to learn English or other languages.

There has been much research conducted by large corporations to identify how to effectively target global customers on the Internet (Shriberg & Kumari, 2008; Soares, Farhangmehr, & Shoham, 2006). This type of customer research and implementation of its findings are rare when it comes to creating CALL programs. The process of designing and developing software programs can be expensive and this is the reason most companies take the easy approach, which is to create the program without having to make adjustments based on the background of the end users. Outside of the corporate environment, there are a number of people who create smaller programs for a class, a school, or a district. If these CALL program designers know and understand their target audience, for example, if 90% of users are English language learners from Taiwan, the results from a tool such as the CDAS can be used to identify and isolate the learning styles that might be more applicable for the majority of learners from that particular country.

Identifying CALL program and curriculum design principles and matching them with learning styles is still more of an art than science. The more CALL practitioners can utilize the appropriate principles and direct them to the appropriate audience, the more likely that the process will approach becoming a science, that is, a repeatable and

effective use of learning style-related CALL design. For example, if the CALL users are from Taiwan, some of the design principles that can be incorporated in the CALL design and curriculum are to use audio extensively, embed sound for most activities and lessons, conduct some lessons in a virtual classroom, and use technologies such as real-time chat, voice communication, and video conferencing. Table 29 lists some examples of CALL design principles associated with various learning styles.

Table 29

<i>CALL Design and Learning Styles</i>	
<i>Learning Style</i>	<i>CALL Design Features</i>
Visual	Use of pictures, animation, Flash programs
Auditory	Use of audio, Embed sound for most activities and lessons
Kinesthetic	Include exercises with physical movement, Video game technology
Tactile	Lessons that require typing, Activities with on-screen movement of objects
Group	Conduct some lessons in a virtual classroom, Real-time chat, Skype, and video conferencing
Individual	Emphasize solitary lessons and activities, Include ability to self-pace lessons

Although the ultimate goal is to design CALL programs for the individual user, this approach is not financially feasible for corporations whose primary objective is to increase profit margins. Therefore, the next logical step would be to design a program according to the learning preferences of a country group. This would lead to two to four designs based on cultural dimension-learning styles relationships and would be a step in moving away from generic one-size-fits-all CALL programs.

Recommendations for Future Research

Based on the results and limitations of this study, there are opportunities to build upon the findings from this study and take this research to the next step. The recommendations for future research are:

1. Administer the CDAS to a larger sample of participants. The sample size used for this particular study was small and only two countries were represented. There needs to be additional administrations of the CDAS to participants representing more countries and to larger population sizes. Ideally, each country would have participants numbering in the hundreds. This would provide more precise data that can be used as a baseline when trying to identify learning styles for designing CALL programs.
2. Isolate the participant groups into sub-categories within countries. Another area for further research is to isolate the backgrounds of the participants, for example, administer the survey to a large group of engineers who are between a certain age bracket and who are intermediate language learners. Then, do the same for people who are in an arts-related field for the same age bracket and language experience. This type of analysis would show if the country-level cultural dimension-learning styles relationships would remain constant within the sub-groups of a country.
3. Investigate learning style instruments. The existing learning styles surveys used for the CDAS were Kolb's LSI and Reid's PLSPQ. There is much literature on the LSI, however, the LSI did not produce significant relationships with the VSM. Additional research would be needed to determine if the LSI is a valid tool to

measure learning variables and relate them to cultural dimensions. The PLSQP had much better results but, although it is widely used in the ESL field, it is not as widely used in other areas, relative to the LSI. Therefore, repeated administration of the CDAS would be necessary to determine whether or not the PLSPQ would produce consistent relationships in subsequent studies. Furthermore, other learning style instruments could be evaluated for their relationships with cultural dimensions variables.

4. Investigate other instruments to quantify culture. There are research opportunities to identify new cultural dimensions measurement tools. In addition to the VSM, the Triandis Horizontal-Vertical tool could be used to determine its effectiveness in combination with the learning styles instruments. This would attempt to isolate individual-level cultural dimensions in addition to country-level cultural dimensions.
5. Create an inventory of results. The more instances of similar studies that are conducted with similar types of tools, the larger the inventory of information. This information can be referenced by CALL designers to identify the learning styles generally associated with cultural dimensions or with countries. Furthermore, this information can be used in other areas of education, for example, curriculum design, teaching methodology, and language teaching in general. It should be noted that results of multiple administrations of the CDAS could show some variance over time. This is due to the increasingly global nature of culture. Cultures and countries are no longer as isolated as they were in the days prior to the Internet and other modern modes of communication. The CDAS

inventory would require periodic updates to keep pace with the evolution of cultures.

6. Create a CALL program with and without emphasizing the defined learning styles found to correlate with cultural dimensions in this study. To determine the long-term effectiveness of such a design process for CALL programs, the results of multiple studies using tools similar to the CDAS could be combined to design and develop two CALL programs: one that emphasizes learning styles favored by learners from a given country and another that de-emphasizes these same learning styles. The programs could be given to two identical groups of language learners and they could be tested for the difference in effectiveness of the CALL programs.
7. Conduct a mixed method study. In addition to gathering quantitative data, qualitative analysis can be incorporated into the study. An example of this would be to gather the subjective interpretation and perceived effectiveness of a CALL program optimized for learning styles based on cultural dimensions and of a non-optimized CALL program.

Conclusion

All journeys have a beginning, middle, and an end. The beginning of this journey was set in motion by culture researchers such as Bartels, Hofstede, and Triandis. In an effort to address ethical marketing in an increasingly global marketplace, Bartels (1967) strived to create an objective and repeatable measurement device for culture. Hofstede (1980) soon followed suit and conducted a study on cultural differences of countries in order to understand how people from different countries approached personal interaction

and relationships in the workplace. Triandis (1995) attempted to narrow the scope of culture research away from the country level and down to the individual level. These researchers attempted to define a repeatable quantitative method of identifying culture. Prior to the work by these researchers, qualitative cultural anthropology was the means by which researchers identified cultures. Although useful in their own way, the results were often infused with the subjective predilection of the researchers.

Culture is at times a constant and at others, elusive. There is the culture that historically defines a group of people and sometimes these labels can be misconstrued as stereotyping, which is a process of categorizing individuals and possibly limiting their potential. However, research has shown that employing a teaching approach that does not suit the learning styles of students can reduce the effectiveness of the lessons being taught. Some learning style theorists suggest that matching an instructional style with a student's learning style can optimize the learning experience, whether in a classroom or a CALL program (Kolb & Kolb, 2005; Walvoord, 2003). By identifying the relationships between learning styles and cultural dimensions, it is possible to optimize the language learning experience for people with similar cultural backgrounds.

Culture is ever evolving and modern technology has expedited this evolution in a more globally unified direction than ever before. The Internet has changed how people interact, communicate, and live their lives on a global scale. The Internet allows people from disparate cultures to step into each others homes and experience the lives of those in distant continents. This common thread that connects humanity like no other invention in the past is an optimal tool to promote language learning and education in general.

The Internet and computers are as familiar to the current generation as telephones and televisions were for past generations. Today's youth learn in ways that are unique to their generation. However, merely placing a language lesson on a computer does not provide an efficient means to learn a language. By understanding the learning styles of the new generation of students and tying these to their cultural backgrounds, more efficient methods of teaching language through computers can be discovered. This is the middle of the journey.

Although all journeys have an end, as long as cultural backgrounds affect the ways in which people learn, the journey is ongoing. As long as humans venture to understand each other's cultures and apply this knowledge to find the most efficient means to utilize the tools available to optimize the language learning experience, the journey will continue.

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APPENDIXES

Appendix A: IRBPHS Approval

Subject: IRB Application #09-048 - Approved
From: USF IRBPHS <irbphs@usfca.edu>
Date: Mon, October 5, 2009
To: Yun Shaw

October 5, 2009

Dear Mr. Shaw:

The Institutional Review Board for the Protection of Human Subjects (IRBPHS) at the University of San Francisco (USF) has reviewed your request for human subjects approval regarding your study.

Your application has been approved by the committee (IRBPHS #09-048). Please note the following:

1. Approval expires twelve (12) months from the dated noted above. At that time, if you are still in collecting data from human subjects, you must file a renewal application.
2. Any modifications to the research protocol or changes in instrumentation (including wording of items) must be communicated to the IRBPHS. Re-submission of an application may be required at that time.
3. Any adverse reactions or complications on the part of participants must be reported (in writing) to the IRBPHS within ten (10) working days.

If you have any questions, please contact the IRBPHS at (415) 422-6091.

On behalf of the IRBPHS committee, I wish you much success in your research.

Sincerely,

Terence Patterson, EdD, ABPP
Chair, Institutional Review Board for the Protection of Human Subjects

IRBPHS – University of San Francisco

Appendix B: Survey Cover Page

Dear Survey Participant:

My name is Yun Shaw and I am a graduate student in the School of Education at the University of San Francisco. I am conducting a study on the relationship between cultural characteristics and learning styles, and how this information can assist in creating more effective Computer-Assisted Language Learning (CALL) programs.

As the use of computers and the Internet become more a part of our lives, we turn to these modern inventions as another method of learning. There are online courses to teach a variety of subjects, including languages. The use of CALL programs can be an effective supplement to learning a language in the classroom. However, many of these CALL programs are designed as one-size-fits-all solutions. In other words, they are not designed according to the different learning styles that people with different cultural backgrounds may have.

The objective of this survey is to determine whether there is a consistent relationship between cultural characteristics and learning styles. There are five parts to this survey: two to determine cultural characteristics, two to determine learning styles, and one for demographics. The results will be compared to identify any relationships between cultural characteristics and learning styles. These relationships will be used to design Computer-Assisted Language Learning programs that better address the specific learning styles for language learners sharing similar cultural characteristics.

You are being asked to participate in this research study because you are a student who is currently studying a language that is not your native language. No individual identities will be used in any reports or publications resulting from the study. The study information will be coded and kept in locked files. Only study personnel will have access to the files. If you agree to be in this study, please complete this survey. Participation in this survey is voluntary.

If you have any questions about this research, please contact me at (408) 306-9686 or by e-mail at yshaw@usfca.edu. If you have further questions about the study, you may contact the IRBPHS at the University of San Francisco, which is concerned with protection of volunteers in research projects. You may reach the IRBPHS office by calling (415) 422-6091 and leaving a voicemail message, by e-mailing IRBPHS@usfca.edu, or by writing to the IRBPHS, Department of Counseling Psychology, Education Bldg., University of San Francisco, 2130 Fulton Street, San Francisco, CA 94117- 1080

Thank you for your participation.

Sincerely,
Yun Shaw
Graduate Student, University of San Francisco

Appendix C: Values Survey Module

PART 1: INTERNATIONAL QUESTIONNAIRE (VSM 08)

Please think of an ideal job, disregarding your present job, if you have one. In choosing an ideal job, how important would it be to you to ... (please circle one answer in each line across):

- 1 = of utmost importance
 2 = very important
 3 = of moderate importance
 4 = of little importance
 5 = of very little or no importance

1. have sufficient time for your personal or home life	1	2	3	4	5
2. have a boss (direct superior) you can respect	1	2	3	4	5
3. get recognition for good performance	1	2	3	4	5
4. have security of employment	1	2	3	4	5
5. have pleasant people to work with	1	2	3	4	5
6. do work that is interesting	1	2	3	4	5
7. be consulted by your boss in decisions involving your work	1	2	3	4	5
8. live in a desirable area	1	2	3	4	5
9. have a job respected by your family and friends	1	2	3	4	5
10. have chances for promotion	1	2	3	4	5

In your private life, how important is each of the following to you: (please circle one answer in each line across):

11. keeping time free for fun	1	2	3	4	5
12. moderation: having few desires	1	2	3	4	5
13. being generous to other people	1	2	3	4	5

3. of moderate importance
4. of little importance
5. of no importance

22. How proud are you to be a citizen of your country?

1. not proud at all
2. not very proud
3. somewhat proud
4. fairly proud
5. very proud

23. How often, in your experience, are subordinates afraid to contradict their boss (or students their teacher?)

1. never
2. seldom
3. sometimes
4. usually
5. always

To what extent do you agree or disagree with each of the following statements? (please circle one answer in each line across):

- 1 = strongly agree
- 2 = agree
- 3 = undecided
- 4 = disagree
- 5 = strongly disagree

24. One can be a good manager without having a precise answer to every question that a subordinate may raise about his or her work

1 2 3 4 5

25. Persistent efforts are the surest way to results

1 2 3 4 5

26. An organization structure in which certain subordinates have two bosses should be avoided at all cost

1 2 3 4 5

27. A company's or organization's rules should not be broken - not even when the employee thinks breaking the rule would be in the organization's best interest

1 2 3 4 5

28. We should honour our heroes from the past

1 2 3 4 5

Appendix D: Learning Styles Inventory

At the request of Hay Group, the LSI is not reproduced in its entirety. The following are the instructions and a sample question from the survey.

PART 2: LEARNING-STYLE INVENTORY

The Learning-Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. Below are 12 sentences with a choice of endings. Rank the endings for each sentence according to how well you think each one fits with how you would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job or at school. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn *best*, down to a "1" for the sentence ending that seems least like the way you learn. Be sure to rank all the endings for each sentence unit. Please do not make ties.

Example of completed sentence set:

1. When I learn: 2 I am happy. 1 I am fast. 3 I am logical. 4 I am careful.

Remember: 4 = *most* like you 3 = *second most* like you 2 = *third most* like you 1 = *least* like you

	A	B	C	D
1. When I learn:	—	—	—	—
	I like to deal with my feelings.	I like to think about ideas.	I like to be doing things.	I like to watch and listen.

Appendix E: Permission to Use the LSI

Subject: Congratulations! LSI Research Approval
From: Jennifer Salpietro (Hay Group)
Date: 3/25/2008 12:09 PM
To: Yun Shaw

Hi Yun,

Congratulations! Your research request regarding use of the *Learning Style Inventory* (LSI) has been approved. Attached you will find two documents (.pdf files--Adobe Acrobat 4.05):

* LSItest.pdf - This is a copy of the LSI test. You may print or copy this document as needed for your research.

* LSIprofile.pdf - The profile sheet contains the answer key for the test as well as the profiling graphs for plotting scores. This document may also be reproduced as necessary for your research. The AC-CE score on the Learning Style Type Grid is obtained by subtracting the CE score from the AC score. Similarly, the AE-RO score = AE minus RO.

These files are for data collection only. This permission does not extend to including a copy of these files in your research paper. It should be sufficient to source it.

We wish you luck with your project and look forward to hearing about your results. Please email a copy of your completed research paper to Jennifer_Salpietro@Haygroup.com or mail it to the following address:

**LSI Research Contracts
c/o Transforming Learning
Hay Group
116 Huntington Avenue, 4th floor
Boston, MA 02116**

If you have any further questions, please let me know.

Best,

Jennifer Salpietro
Hay Group Transforming Learning

Appendix F: Perceptual Learning Styles Preference Questionnaire

PART 3: PERCEPTUAL LEARNING-STYLE PREFERENCE QUESTIONNAIRE

People learn in many different ways. For example, some people learn primarily with their eyes (visual learners) or with the ears (auditory learners); some people prefer to learn by experience and/or by "hands-on" tasks (kinesthetic or tactile learners); some people learn better when they work alone while others prefer to learn in groups.

This questionnaire has been designed to help you identify the way(s) you learn best--the way(s) you *prefer* to learn.

Read each statement on the following pages. Please respond to the statements AS THEY APPLY TO YOUR STUDY OF ENGLISH.

Decide whether you agree or disagree with each statement. For example, if you strong agree, mark:

<u>SA</u> Strongly Agree	<u>A</u> Agree	<u>U</u> Undecided	<u>D</u> Disagree	<u>SD</u> Strongly Disagree
X				

Please respond to each statement quickly, without too much thought. Try not to change your responses after you choose them. Please answer all the questions. Please use a pen to mark your choices.

	<u>SA</u>	<u>A</u>	<u>U</u>	<u>D</u>	<u>S</u>
1. When the teacher tells me the instructions I understand better.					
2. I prefer to learn by doing something in class.					
3. I get more work done when I work with others.					
4. I learn more when I study with a group.					
5. In class, I learn best when I work with others.					
6. I learn better by reading what the teacher writes on the chalk board.					
7. When someone tells me how to do something in class, I learn it better.					
8. When I do things in class, I learn better.					
9. I remember things I have heard in class better than things I have read.					

	<u>SA</u>	<u>A</u>	<u>U</u>	<u>D</u>	<u>S</u>
10. When I read instructions, I remember them better.					
11. I learn more when I can make a model of something.					
12. I understand better when I read instructions.					
13. When I study alone, I remember things better.					
14. I learn more when I make something for a class project.					
15. I enjoy learning in class by doing experiments.					
16. I learn better when I make drawings as I study.					
17. I learn better in class when the teacher gives a lecture.					
18. When I work alone, I learn better.					
19. I understand things better in class when I participate in role-playing.					
20. I learn better in class when I listen to someone.					
21. I enjoy working on an assignment with two or three classmates.					
22. When I build something, I remember what I have learned better.					
23. I prefer to study with others.					
24. I learn better by reading than by listening to someone.					
25. I enjoy making something for a class project.					
26. I learn best in class when I can participate in related activities.					
27. In class, I work better when I work alone.					
28. I prefer working on projects by myself.					
29. I learn more by reading textbooks than by listening to lectures.					
30. I prefer to work by myself.					

Appendix G: Permission to Use the PLSPQ

Subject: Permission to Use Perceptual Learning Style Preference Questionnaire
From: Joy M. Reid
Date: 10/1/2008 2:39 PM
To: Yun Shaw

Dear Yun Shaw,

Thanks for writing to ask permission to use my Perceptual Learning Styles Preference Survey (PLSPS). Please consider this email as my formal permission to use the PLSPS for CALL programmers.

One caveat: as you probably know, the target audience for my survey was international ESL students in intensive English language programs in the U.S. The survey has been normed for that population. If you use the survey on another population, the results may be unreliable and invalid. At most, you will want to re-norm the survey on your target audience (see my "Dirty Laundry" article in the Forum section of the TESOL Quarterly in 1990 for my norming processes). At least, if you are publishing your results, you will need to indicate that the survey was not normed for your population.

You might be interested to know that my first edited anthology is out of print, so I have regained the copyright. Neil Anderson at BYU has had the entire book on the WWW. So everyone can access it, for free, at:

<http://linguistics.byu.edu/classes/ling677na/learningstylesbook.pdf>

If you intend to do statistical analysis on your data, and if you intend to do any comparisons with my original data, I need to tell you about the re-scaling I did on my original data. Although the students answered the survey on a 1-5 scale (strongly disagree to strongly agree), my statistics mentor suggested that we rescale to 0-4 for ease of doing the statistical analysis. If you decide to rescale, that will not change the trends of your results, only the numbers. If you decide not to, and you want to compare your data with mine, you need to know that the trends might be similar, but your numbers will be higher.

Thanks again for writing. I'd be happy to hear about the results of your research, so stay in touch, please. And I hope that your students find the information as helpful as mine have.

Joy Reid

Appendix I: Pilot Test Questionnaire

1. How long did it take to complete the survey?
2. Were the instructions clear?
 - If no, please describe the unclear areas.
3. Were the questions clear?
 - If no, please describe the unclear areas.
4. Was the navigation intuitive?
5. Are the demographics questions appropriate (i.e., politically correct)?
6. Any suggestions for improvement?