2009-04-03

Teaching Vocabulary Meaningfully With Language, Image, and Sound.

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TEACHING VOCABULARY MEANINGFULLY WITH LANGUAGE,
IMAGE, AND SOUND

by

Doraina Diane Pyle

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Arts

Center for Language Studies
Brigham Young University
April 2009
of a thesis submitted by

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ABSTRACT

TEACHING VOCABULARY MEANINGFULLY WITH LANGUAGE, IMAGE, AND SOUND

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This study was an exploration of how an instructional technique that uses language, image, and sound—that of a meaningful presentation of language with image by gradual, step-by-step sequencing—affects vocabulary acquisition. Research was carried out with volunteers from the BYU language community, who were randomly assigned to one of two testing groups. The two groups viewed Arabic language presentations wherein the presentation for the experimental group received line drawings to indicate vocabulary meanings, and the other group received English translations. Following the treatment, learners completed an online vocabulary test, and one week later, the same online vocabulary test. Statistical analyses indicated that one method of presentation was not better than the other method of presentation. ACT English scores and testing times, however, were significant for their affect on learning outcomes.
ACKNOWLEDGMENTS

First and foremost, I would like to thank my Heavenly Father because without Him, this thesis would not have come to its completion. I would like to thank my family, especially my parents Don and Araina, for their continual love and cheerleading.

Moreover, I would like to thank Professors Michael Bush, Norman Evans, Diane Strong-Krause, and Dee Gardner, along with the Center for Language Studies secretary Agnes Welch, for their help throughout this program. In addition, I would like to thank my roommates Risa, Claire, and Megan for their kindness and patience. Finally, I would like to thank Aibi, Zach, Marilyn, the CLAM, GAPRS employees, the BYU 145th Ward Bishopric and its members past and present, and all others for their encouragement.
# TABLE OF CONTENTS

**Chapter 1: Introduction** ......................................................................................................1

- Statement of the Problem..................................................................................................2
- Significance of the Problem...............................................................................................3
- Purpose of the Study ......................................................................................................3
- Research Questions and Overview of the Study ............................................................5
- Operational Definitions..................................................................................................6
- Assumptions and Limitations ........................................................................................8
- Summary ........................................................................................................................9

**Chapter 2: Review of the Literature** .............................................................................11

- The Concept of Vocabulary Acquisition ....................................................................11
  - Knowing Vocabulary .................................................................................................12
- Memory and Organization ............................................................................................13
  - Relating New to Known Information ....................................................................15
- The Importance of Meaningful Learning ....................................................................17
  - Meaningful versus Rote Learning ....................................................................17
  - Defining Context .....................................................................................................19
  - Context Contributes to Meaningful Learning ....................................................20
  - Context and Memory .............................................................................................21
  - Types of Context ....................................................................................................22
  - How to Use Context to Ensure Meaningful Learning .......................................22
  - Selecting Resources for Meaningful Learning ..................................................23
  - Solidifying the Relationship between Reading and Vocabulary .......................24
Frequency, Multiple Exposures ................................................................. 25
Challenges in Contextualizing Vocabulary Acquisition .......................... 27
Countering Challenges in Meaningful Learning ................................... 27
Teaching Methods and Principles ............................................................ 28
Course Textbooks ....................................................................................... 30
Assessment .................................................................................................. 31
The Value of Visuals in the Presentation of New Vocabulary .................. 32
Pictorial Composition .................................................................................. 32
Dual Coding of Multimedia and Multimodal Learning ......................... 35
Gradual and Meaningful Input ................................................................. 39
Cognitive Overload .................................................................................... 40
The Instructional Possibilities with Technology ........................................ 41
Listening and Sound .................................................................................. 42
The Importance of Arabic .......................................................................... 43

Chapter 3: Research Design ................................................................... 45

Overview of Study ..................................................................................... 46
Pilot Study .................................................................................................. 47
The Actual Experiment .............................................................................. 49
Subjects ..................................................................................................... 49
Instruments and Materials ...................................................................... 49
Procedures ................................................................................................. 52
The Post-test ............................................................................................. 54
Item Facility ............................................................................................... 54
Chapter 1: Introduction

Language is not merely a means of expression and communication; it is an instrument of experiencing, thinking, and feeling... Our ideas and experiences are not independent of language; they are all integral parts of the same pattern, the warp and woof of the same texture. We do not first have thoughts, ideas, feelings, and then put them into a verbal framework. We think in words, by means of words. Language and experience are inextricably interwoven, and the awareness of one awakens the other. Words and idioms are as indispensable to our thoughts and experiences as are colors and tints to a painting (Chomsky, 1957, p.3).

Thus are the words of Professor William Chomsky, father of the controversial Noam Chomsky, as he expresses his thoughts on the supreme importance of language.

Language, and thus the need to acquire vocabulary in a language, is pivotal to the whole of human experience. It connects individuals one to another, bridging meaning between that which is intended as communication to that which is understood. Also, language is an instrument of thought, which in turn, affects perception, thus defining our everyday experiences. Scholar Steven Pinker (1994) explains this closely intertwined relationship of language and human experience, by emphasizing that humans are most likely to be in communication one with another rather than silent. Because language pervades daily human activity, it is impossible to isolate language from experience.

Language, however, is a complex system of symbols and rules that humans use to represent meaning through interrelated auditory, textual, and visual representations. At the early stages of learning and acquisition, limited knowledge of the new language creates significant challenges for the second language learner. As language learners are
instructed efficiently and effectively to develop their skills, they become more capable of making the necessary connections between meaning and the new symbols being acquired, adding to their store of knowledge. They become more aware of the language rules that make possible the creation and understanding of semantic and syntactic structures.

Vocabulary is essential to language. Though often overlooked, it is through understanding vocabulary, these fundamental units of communication, that humans find meaning in language. The genius of a word comes from its ability to communicate, with precision, an experience, thought, or feeling. Alone, words may stand powerless, but when combined into chains of words, they become a potent force to create and format in another person’s brain representations of events, eliminating misunderstandings (Marlow, 2001; Ogden, 1968; Pinker, 1994). When learners are instructed well so as to understand the meanings of words and chains of words, learners increase in their capacity to communicate and to understand the world around them.

Statement of the Problem

Although the importance of vocabulary is typically recognized in language learning, the actual acquisition of vocabulary presents significant challenges to the language learner, especially in the earliest stages of the learning process. Researchers in foreign language acquisition have proposed numerous instructional and learning techniques, all designed to facilitate language instruction and learning. Even though researchers have presented various ideas that provide insights into the processes of improving language learning outcomes, a need to develop a more cohesive picture of effective instruction and learning of vocabulary remains. For example, most research has
restricted its study of vocabulary acquisition to Indo-European languages; few have examined the acquisition of Chinese or Arabic vocabularies by English speakers (Meara, 1996). More research is essential if the profession is to increase its understanding of appropriate techniques for effective vocabulary acquisition instruction and learning.

**Significance of the Problem**

Because Arabic is a language that is unfamiliar to many people in the United States, it was anticipated that the results of the study would contribute to what is known about vocabulary teaching and how to improve instructional techniques. Furthermore, this study could possibly reveal insights about the nature of language and how it is learned by connecting meaning to auditory and textual representations.

Within the past two decades researchers have sought improved instructional techniques for learning vocabulary, but their studies have not assessed the effect of the sort of meaningful presentation of language proposed in this project. The proposed instructional techniques were built on the principles put forth by scholars from various fields, hopefully pointing to possible improvements in language instruction and learning. Such improvements would be especially helpful in Arabic, with the increasing demands for skills since September 11, 2001.

**Purpose of the Study**

The purpose of this study was to increase our understanding of vocabulary teaching when using language, image, and sound. Specifically, this study explored how language learners can connect new vocabulary to what they already know using visual
and auditory channels, thereby facilitating acquisition. This exploration involved the use and the testing of the effect of an instructional technique that presents language and sound in a slow but progressive order with images to help to ensure comprehension. Throughout this study, this instructional technique was known as meaningful presentation of language with image by gradual, step-by-step sequencing. This method introduces new vocabulary bit-by-bit using visual, textual, and auditory cues, building on scholar I.A. Richards’ belief that gradual input through a multiplicity of channels is the best method of learning.

In his approach, Richards used simple stick drawings in books to illustrate basic words and phrases, gradually advancing to more complex language or groups of words stated in terms of known language. The simplistic, universal nature of the stick drawings allowed learners to make connections between concrete ideas and new second language elements. In addition to Richards, other scholars have promoted the idea of relating new knowledge to what is previously known. It appears, then, that this is a crucial concept for second language acquisition if learners are to grasp and comprehend elements of the new language. Presenting vocabulary as such not only facilitates acquisition, as these scholars have found, but the principles pioneered by Richards and others have been supported by principles of cognitive psychology that have come on the scene in the years since their work (Ausubel, Novak, & Hanesian, 1968; Schank, 1999; Smith, 2006).

Despite this firm foundation, this notion of connecting the new to the known has been overlooked in instructional design, supplanted instead with rote, or memorized, list learning presentation that typically involves target language with an individual’s native language translation. Though rote learning might have its place, cognitive psychology
provides ample evidence that would lead us to believe that in language learning, meaningful presentation is more effective than rote presentation (Ausubel, Novak, & Hanesian, 1968; Bugmann, Coventry, and Newstead, 2007).

Research Questions and Overview of the Study

Given the symbiotic relationship between language and human experience, this study examined particularly whether a certain instructional technique would facilitate the process of vocabulary acquisition. The software used in this study was designed to connect with this mental process and make vocabulary more accessible to the learner.

Specifically this study sought to answer the following research question: “What is the effect of a meaningful presentation of language (defined as gradual, step-by-step sequencing of language elements illustrated with images) on vocabulary acquisition, as measured by tests of vocabulary recall and retention?”

This research question was tested with volunteers from the BYU community who were recruited and paid to participate in the research study. One group of students received the experimental treatment, as administered by computer; the other group received a more conventional form of instruction using paired-associate learning, also administered on the computer. The computer software randomly assigned students to the treatment or control groups.

The instructional materials were specifically designed for learners in their earliest moments of instruction and introduced students to basic vocabulary and phrases in Modern Standard Arabic (MSA). Language and images were presented together, with new language elements introduced gradually to the learner, such that the new elements
could be more easily connected to known concepts or that which is already familiar to learners. The images were intended to help ensure that the presentation was meaningful and the audio presentation enabled the learners to acquire the sounds of the language.

Following their experience with the instructional exercises, students were given an online test in MSA on the new language elements and then were given the same test one week later. The test assessed the students’ ability to recognize and correctly indicate the meanings of each vocabulary item. After participants finished the initial treatment, they also completed a feedback questionnaire. Analysis of Variance was used to compare the two methods of presentation between experimental and control groups on vocabulary acquisition with a self-assessment of language ability on a Likert scale.

Operational Definitions

To facilitate the discussion of this research, the following operational definitions are provided:

The term meaningful means “relatable and anchorable” tasks to “relevant established ideas in cognitive structure” (Ausubel, Novak, & Hanesian, 1968, pp. 107-108). Simply stated, meaningful tasks are those tasks which learners can connect clearly to experience.

Presentation is defined as the way the learner experiences language and image. In this experiment, the presentation of new language elements and corresponding images were first given to the learner in full screen mode, and later reduced to smaller sizes for side-by-side comparisons. Sound accompanied this presentation.
Language represents foreign language words and phrases, sometimes represented by illustration.

Image refers to a simple graphic representation that gives enough detail to aid in comprehension.

Gradual refers to limited quantity of the presentation of new language elements to ensure learner comprehension.

Step-by-step refers to the one-at-a-time, gradual degree in which new language elements and images are presented to the learners.

Sequencing is the logical or pedagogically meaningful order in which the new language elements are presented. Because this instructional method took vocabulary and built upon it, forming connections or chains of language, the presentational order was conducive to fit this method.

For this study, acquisition is the attainment of initial vocabulary meanings, the ability to decode and recognize new language elements in another context. In this study, learners manifest their acquisition of vocabulary by correctly identifying new language elements as given in vocabulary tests.

Context is defined as the linguistic and nonlinguistic information and exposure to a word in a particular setting that links a word with a definition or meaning. In this study, then, context is the sentence in which the word is given, with meaning dependent upon what comes before and after the word, as well as the given image or literal English translation.
Paired-associate learning, sometimes referred to as rote learning, represents the literal English translations that accompany new vocabulary and phrases throughout the presentation of the control group.

Assumptions and Limitations

For this study to be successful in its exploration of the impact of a specific instructional technique on vocabulary acquisition, certain assumptions and limitations must be established.

Although each participant in this project may be classified as a beginning learner of Arabic, each was different with respect to life experience. This study recognizes that these differences can contribute to or diminish student learning, especially to the extent the instructional technique seeks to connect new language elements to that which is already known or familiar to the learner.

In addition, the theoretical underpinnings that guide this project acknowledge that differences in student skill level affect vocabulary acquisition, given that learners contribute in individual ways to the language learning process.

Moreover, this project has been designed to explore the effects on vocabulary acquisition in the initial stages of instruction. Although instruction may change as the language level of the student increases, the purpose of this study was to capture how the mind deals with language in the early stages of the language learning process.

This study is restricted in the number of new language elements that can be presented in a limited amount of time, as well as in the selection of language elements to be considered.
Some words are easier to illustrate than others. For example, a concrete visual representation is easier to achieve for nouns than those from other parts of speech. This is true even if a learner has limited background knowledge in the area being considered.

Furthermore, the theoretical foundation on which this project is established recognizes that some words have better translation equivalents than others.

Additionally, it is understood that words evoke different images for different individuals, especially in the case of varying backgrounds and across cultures. The instructional materials were designed to present a universal meaning by focusing on the more typical features of people, objects, and actions. The images are simple in that they remain on a basic level and allow learners to comprehend the language being presented.

Learners need time to fully develop the conceptual complexity and comprehension that comes with knowing a word. Vocabulary acquisition is a long-term, multifaceted process to generate and retain word knowledge, and, unfortunately, good testing scores do not ensure complete vocabulary knowledge.

The instructional technique of the meaningful presentation of language accompanied with image through gradual presentation is not a short-cut to learning, but rather it is a help to facilitate the learning process in the initial stages of language acquisition.

**Summary**

Again, this project proposed further exploration into how the instructional technique of a meaningful presentation of language using images, as administered through gradual, step-by-step sequencing, affects vocabulary acquisition as measured by
immediate and delayed post-tests. This teaching methodology presented language and image together, with new language elements introduced by steady degree to the learner. Together meaningful input of language and image built on the learner’s previous knowledge, connecting what is learned to what is already known or familiar to the learner.
Chapter 2: Review of the Literature

This project explored how an instructional technique that uses language, image, and sound—that of a meaningful presentation of language with image by gradual, step-by-step sequencing—affects vocabulary acquisition. Specifically this study was conducted to determine whether this instructional technique allowed learners to more easily connect new language elements to what they already know. Vocabulary acquisition presents significant challenges to the language learner, especially in the earliest stages of the learning process. To address these challenges, researchers in foreign language have proposed numerous instructional and learning techniques, all designed to facilitate language instruction and learning. Their research provides the principles necessary to the foundation of this project.

This chapter will discuss several of these key principles, including vocabulary acquisition, memory, the importance of meaningful learning, context, the value of visual presentation, the role of technology and sound, and the importance of Arabic.

The Concept of Vocabulary Acquisition

Vocabulary, perhaps at the very heart of language, constitutes its basic building blocks and thus carries the central message in communication. From words come larger structures, namely sentences, paragraphs, and whole texts, all accessed as speaker and listener tap into memory and recover those words and larger structures in their mental dictionaries (Pinker, 1999; Read, 2000). Learners make connections between “a lexicon of words and the concepts the words stand for (a mental dictionary) and a set of rules that combine the words to convey relationships among concepts (a mental grammar)” (Pinker,
1994, p.76). Through these words and connections of words, language learners may use and manage the ideas that come to their minds (Richards & Gibson, 1974).

Knowing Vocabulary. Although there are still illiterate people in the world, education has become a truly universal phenomenon (Richards & Gibson, 1974). With this phenomenon, however, one area of concern remains, in particular, Vocabulary knowledge. In brief, there are various aspects, degrees, and levels to knowing a word, and although test scores can reflect great vocabulary knowledge or high grammatical skill, learners still may not know how to communicate simple needs (Nation, 2001; Read, 2000). Stated another way, the fact that students can learn how to put words in order, figure out word categories and structures, or even group words into phrases does not mean that they can do so when engaged in communication (Pinker, 1994). Furthermore, can they, when acting as listeners, decode and understand messages that others are trying to communicate to them?

The polysemous, or multiple meaning and function of words, make vocabulary knowledge difficult (Carlo, August, & Snow, 2005). Because of its complexity, true vocabulary knowledge encompasses the following principles: Recognizing word meaning and function, decoding individual items in text and in conversation, understanding how a word fits in the world and unfamiliar contexts, knowing a variety of word knowledge types, and making sense of given information for increased comprehension (Chun & Plass, 1996; Hiebert & Kamil, 2005; Mondria & Wit-de-Boer, 1991; Nagy, 2005; Ogden, 1968; Smith, 2006; Stahl, 2005). In brief, vocabulary knowledge is not isolated or memorized definitions of specific words; rather it is an integrated network that
encompasses a variety of types of word knowledge that is established through practice such as through learning in context (Nagy, 2005; Scott, 2005; Stahl, 2005).

Although word knowledge does not guarantee a learner’s ability to communicate in a language, word knowledge does facilitate the process whereby learners put thought into words and words into thought (Pinker, 1994). Thus, knowing a word is a stepping stone in the complex process of learning to communicate that takes learners beyond recitation to application, allowing them to overcome robotic communicative tendencies (such as presenting memorized phrases), and granting them the capacity to understand unfamiliar vocabulary (Richards & Gibson, 1974; Taylor, Graves, & van den Broek, 2000).

**Memory and Organization**

When the brain receives new information, humans activate cognitive processes to understand, organize, and integrate such new information into existing knowledge structures (Stull & Mayer, 2007). In sum, this process extracts relevant information, taking simple before complex, and makes sense of the information, connecting new language to what is known from prior experience (Anderman, 1996; Ellis, 2002; Mayer, Dow, & Mayer, 2003; Mitchell & Myles, 2004). Most of the time, the greater the amount of information provided in the new messages, the more this information can be related to experiences in memory (Schank, 1999).

Memory is a “flexible, open-ended system” (Schank, 1999, p. 1). The relationship between language and memory is intertwined, given that memory helps in the acquisition, storage, and later retrieval of language for communication purposes (El Essawi, 2006). In
fact, language learning begins with memory, and then leads to an interpretation and an application of memory to ensure comprehension (Waters, 2006). Memory is central to language acquisition and production, given that it helps the learner garner relevant information from embedded memory structures to produce output (Griffiths & Parr, 2001; Skehan, 1998).

Several limitations to memory contribute to the complexity of the language acquisition process. Bunting, Cowan, and Saults (2006) compared fast and slow presentation rates, along with fixed versus free recall, for running memory with 25, then 66, native English university students in 50-minute sessions. When students had four to six items to recall, a slower presentation rate was more helpful. When students were given freedom to choose what and how many items to recall, as opposed to a fixed amount, students performed better on post-tests.

Regarding word length, Campoy (2008) conducted three experiments using various two and three syllable words in Spanish. Learners were asked to view lists of words via a computer program and to either read the words silently to themselves, audibly in a microphone, or to listen to the words. There were groups with time delays between words and one group with no delay. The differences observed were statistically significant for word length: Learners have better recognition with lists of short words than for lists of long words most likely due to their phonological complexity.

People understand and perceive the world in terms of their memories about experiences they have already had (Ellis, 2002). Moreover, humans are “sense-makers,” looking to organize new information so as to find meanings, significance, or patterns in it, in order to embed such information in long-term memory (Schank, 1999). When
learners cannot make sense of new information, they will either create a sense or meaning for the information or leave the information as incomprehensible “noise” (Larsen-Freeman, 2002, p. 280).

**Relating New to Known Information.** Creating a new item in memory is said to be more cognitively demanding on learners than introducing a similar item into an already existing memory through the activation of existing mental schema. In other words, it is easier to attach a new name to a familiar concept and then notice differences between the ideas (Ellis, 2002; Lotto & de Groot, 1998; Schank, 1999; Scott, 2005). When learners restructure, or recode, novel information to make it more familiar, they are better able to remember this information, and thus, they have higher recall and inference capacity (Jiang, 2004; Jones, Levin, Levin, & Beitzel, 2000; Skehan, 1998). Furthermore, although first and second language words are not exactly equivalent, learners reduce cognitive load when they make information more familiar because learners create a stronger relationship between first and second language words (de Groot & Keijzer, 2000).

The idea of relating new language concepts to preexisting language structures is found in a number of instructional methods. For example, in the keyword method, learners make associations between native and target language by linking target words to similar resembling and/or sounding native words, and then constructing a sentence with those words (Sagarra & Alba, 2006).

Another example of connecting new to previously-known information can be found in an instructional technique based on the semantic transfer hypothesis where
learners map second language elements to existing cognitive structures. When they do so, learners understand new language elements such as definitions, and translations in terms of their existing or first language structure (Jiang, 2004).

In a similar vein, Celik (2003) implemented a technique in his classroom research which he calls code-mixing. While telling a story in the students’ native language, the teacher would selectively insert Turkish words at strategically selected points in the narrative. The research found that as the students listened, they would create links between the Turkish words and words that already existed in their vocabularies, as was evidenced later in student writing samples.

No matter the technique, the principle of relating new information to known information is important because of its advantages over rote learning, or list-learning. Connecting new vocabulary and structures to language structures that are already known to the learner requires deeper cognitive processing than memorizing lists (Sagarra & Alba, 2006), activating the system in which a learner codes information. To make an association and then to integrate that with existing knowledge, as the mind is predisposed to do, leads to memory impressions that are more flexible and profound and creates more tightly bound links between form and meaning, which ultimately, improves retention (Butcher, 2006; Rodríguez & Sadoski, 2000; Stahl, 2005). The more learners make and integrate associations, the stronger the association grows in memory (Mitchell & Myles, 2004).
The Importance of Meaningful Learning

The concept of meaningful learning might appear to be simple, but like language and vocabulary, it, too, is quite complex. Often words are polysemic, with the intended meaning dependent on a context that can vary in different ways. To ensure comprehension of words and meanings, learners must first understand the context of the language to be understood. If learners do not understand context, comprehension is guaranteed to break down because learners will be unable to use what they know to understand what they do not know. Thus, learners could not utilize linguistic information to map meanings for either input or output (Hiebert & Kamil, 2005; Scott, 2005).

Despite the numerous types and kinds of context, a context that ensures meaningful learning must be taken into account in order to maximize learning to peak effectiveness, as context affects vocabulary meaning, as well as syntactical, grammatical, and orthographical knowledge (Webb, 2007). Knowledge and understanding of the context in which a particular language sample occurs will help make learning meaningful for learners as they make inferences about form and function and acquire new language, thereby improving language communication and comprehension (Batstone, 2002).

Meaningful versus Rote Learning. In opposition to meaningful learning is rote learning, a more direct learning method that promotes lists of vocabulary and the memorization of such lists. Although learning vocabulary through rote learning is doable—for rote learning does have a place and a purpose such as for passing vocabulary tests—many arguments have been advanced against such a method. Rote learning leads to confusion among words in the learner’s minds and less motivation, not to mention lower retention because of the lack of cognitive foothold. This argument is supported by
the life of François Gouin, a pedagogue who moved to Germany to acquire German. Even though he probably should have known better, Gouin still spent countless hours in his room memorizing lists of nouns and verbs. When, finally, he ventured out to a German classroom, he was unable to speak, let alone understand, the language. Despite his numerous efforts to memorize the parts of the language over a year’s time, Gouin did not learn German (Brown, 1994).

This outcome is not surprising; rote learning, or sheer memorization, is not real learning (Schank, 1999). In rote learning, word knowledge is restricted to a list, making it difficult for learners to know the same word encountered in different contexts (Schouten-van Parren, as cited in Mondria & Wit-de Boer, 1991). In addition, rote learning fails to provide access to the fundamental polysemic nature and semantic variation of words (Beheydt, as cited in Bogaards, 1994).

Meaningful learning, on the other hand, allows tasks to attach firmly to ideas already established in a learner’s cognitive structure (Ausubel, Novak, & Hanesian, 1968). Grinstead, in his research (as cited in Meara, 1996), compared meaningful learning to list learning. He made this comparison by having students in one group read and list all unknown words in a text and students in another group go through a given list and cross off any known words. Both groups then looked up any unknown words. At the end, retention was tested in both groups, with results showing that the group learning words meaningfully, as in a context, produced a small advantage over those students who learned from a list.

Bugmann, Coventry, and Newstead (2007) compared rote learning to contextual or meaningful learning by using a mapping activity. Ultimately, the group of students
who had to use context to make sense out of information, navigate, and create routes by themselves in this activity gave better descriptions when tested than the group who were given direct direction. When tested for information retrieval, learners that had access to the context of the words they were learning were able access various types of information, having established a cognitive foothold with the information.

Defining Context. There are numerous definitions of context but perhaps two occur more frequently: Context can be the sentence where a word occurs, or the minimal recognition of vocabulary knowledge needed to facilitate reading and comprehension. Other literature proposes context to be an introduction to vocabulary, as well as that which is more than a method of presentation. Context can also be considered to be the everyday actions and work in which learners are engaged, and the particular method and variables employed in a classroom. Finally, context may refer to a place, such as a home, an immersion program, or a study abroad experience (Collentine & Freed, 2004; Zahar, Cobb, & Spada, 2001).

This study focuses on one particular definition of context, the linguistic and nonlinguistic information and exposure to a word in a particular setting that links a word with a definition or meaning (Baumann, Font, Edwards, & Boland, 2005; Read, 2000). More than likely words in specific contexts are not interchangeable, but rather, they apply to a specific topic area (Aitchison, 1996). They are then decoded and the meanings predicted by learner linguistic knowledge of contextual or situational clues, rather than by use of the dictionary (Baumann et al, 2005; Rogers, 1996).
Context Contributes to Meaningful Learning. Whether the means in which a learner becomes aware of context is audio, visual, physical, or written, context provides a situation for learners to infer and to retain the meaning of new vocabulary more meaningfully. Thus, context has the capacity to help and to affect areas of vocabulary knowledge and comprehension, especially in determining a more precise definition or definitions of a word. Indeed, context may be the most important and precious source for discovering word sense(s) (Bogaards, 1994). Context provides a learner the opportunity to mentally engage in communicative processes that aid in understanding and retaining word meaning (Read, 2000). Such processes may be through reading or listening, which force learners to discover and to know the meanings of unknown or unfamiliar words. Then students may take these connections, which require deeper mental processing, and incorporate them into their lexicon (Cunningham, 2005).

Though words are initially learned in relation to a given context, eventually the knowledge of words will develop until there is a greater understanding of the full range and complexity of a word (Aitchison, 1996). As learners advance in both age and skill, they will progress from context-bound or controlled vocabulary to word knowledge independent of context. Learners will have the opportunities to read any text without great difficulty.

The study by Fukkink, Blok, and de Glopper (2001) illustrates this process of incremental word knowledge. Thirty students in grades two, four, and six, were given 100-word, level-appropriate texts to learn 12 new vocabulary words. Scores were determined by the percentage of correct attributes, false attributes, and contextualization of the meaning(s) of each word, which were assessed by two independent raters. This
study found that grade two students gave more context-bound definitions, whereas grade six students gave more de-contextualized definitions. The researchers found that although younger students experience severe difficulties with abstract words, over time, word knowledge improves with both an increase in correct attributes and a decrease in false attributes. In essence, word learning is a multi-encounter process of both learning correct and unlearning incorrect word meanings that leads to an understanding of a word independent of context, with particular meanings for a given situation determined through an understanding of the context.

Such an increase in correct attributes and a decrease in false attributes not only come with time but with understanding contextual settings, participants, ends or purposes. In addition, each context carries an act sequence, meaning the form and content of utterances, as well as norms of interaction and interpretation. Within context, there is a genre. Moreover, each context has key verbal and nonverbal manners that are expected for a particular context, though not always planned. Collentine & Freed (2004) argue that with so many variables, it is of little wonder that no two contexts are exactly alike; rather each context is defined by a unique set of situations, each with their individual cultural characteristics.

**Context and Memory.** Context does more than create memory representations (Vakil, Raz, & Levy, 2007); context acts as an element-retrieval cue for memory (Dougal & Rotello, 1999). Because context embeds these representations and their multi-level relationships to environment in memory, when later questioned, learners will have facilitated recall. For example, one study asked learners to assess men and their
compatibility with hats that they were wearing. After a series of 64 photos, varied mnemonic processes, and testing, the researchers concluded that “context stimulus specifically cued memory for its accompanying target (Vakil, Raz, & Levy, 2007, p. 921).”

Types of Context. There are many types of context. For example, context may be rich, or it may be poor. Debate continues as to whether rich context is more conducive to learning or more distracting than simpler contexts. In any case, rich context provides additional information so as to help learners infer or derive meaning, whereas poor context is sparse, prone to misinterpretation and mistake.

Also, context is classified as clear, semi-clear, or unclear. As the quest is difficult, daresay next to impossible, to find perfectly clear context, a mixture of the types of context must suffice. Although such a mixture may slow down reading—especially as learners will have to wade through that which is semi- or unclear—ultimately, in the realm of reading, this mixture will expedite vocabulary acquisition (Zahar, Cobb, & Spada, 2001).

Finally, context is either a communicative or a learning context. In communicative context, learners utilize their second language as a tool for exchanging information, as when participating in important social and interpersonal functions. In a learning context, however, learners attend to form in input and take risks with output in the ultimate goal of improving linguistic expertise (Collentine & Freed, 2004).

How to Use Context to Ensure Meaningful Learning. Even with so many arguments for the use of context, the capacity to utilize context effectively may prove challenging.
To surmount the daunting task of developing the skills to derive vocabulary meaning from context and thereby diminish ambiguity of meaning and increase comprehension, a few strategies have been suggested. Graves (as cited in Bogaards, 1994) created an eight-step model for learners that help to ensure that the context contributes to meaningful learning. Graves suggested the following ideas: identify the unknown word, make a preliminary guess on the word’s importance to passage comprehension, deduce the sense from preceding and succeeding context and by examining its constituent parts, and consult a dictionary or other reference source. Although this step-by-step process is difficult and time consuming, and does not account for variation, it is one way to approach learning from context to ensure meaningful learning.

Selecting Resources for Meaningful Learning. An advantage of written contexts is that the texts can be manipulated and that texts may provide many reference points for retention, which again, contribute to meaningful learning. Text selection requires careful consideration on behalf of the person doing the selecting using such important variables as the frequency range, off-word lists, cognates, time, learners, and learner differences. As teachers, there are numerous resources available for selecting various types and examples of sources of context. These include readers, dictionaries with examples of word usage, corpora, the Internet, and other media. Despite the subjectivity involved in choosing what constitutes a “good” text, teachers have access to numerous authentic texts suit their needs. Computer scanners, concordance analysis, and lexical profiling facilitate the verifying of the suitability of a text.

Choosing a text to build and to assess vocabulary first requires determining which words are important and which words are not important in the learning unit. This
demands careful consideration especially as excessive unknown words in a reading passage will decrease student learning (Scott, 2005). The vocabulary of written language is said to be more diverse and complex than that of oral language, introducing multiple new words at a time (Hiebert & Kamil, 2005). If these words and the overall language of a text fail to convey information in a sensible manner, comprehension breaks down and learning does not take place, such as when students are given a short text and are asked to infer the meaning of an underlined word (Nagy, 2005).

In 2001, Zahar, Cobb, and Spada conducted a study to investigate the appropriateness of various types and levels of reading materials. Because each student had a different background and had received various degrees of language instruction, each was placed in one of five groups, levels one through five, based on those differences. Because the study was designed to assess frequency and context types on language acquisition among all levels, the text selected for testing had to meet the needs of all participants. In other words, the text had to be low enough for beginner comprehension, and at the same time, challenging enough for advanced groups.

**Solidifying the Relationship between Reading and Vocabulary.** The relationship between vocabulary and reading is reciprocal, meaning that an increase in vocabulary increases reading competence, and the increase in reading competence improves vocabulary. With such an increase, students are more able to expand and refine their knowledge of vocabulary presented in text (Hiebert & Kamil, 2005). Solidifying this relationship and making its improvement a goal will change both the content and method of instruction for teaching vocabulary (Nagy, 2005). Vocabulary knowledge contributes positively to the understanding and comprehension of texts, and texts serve as a means of
assessing degrees of vocabulary knowledge. Because knowing vocabulary includes knowing both individual words and applications of words, texts provide opportunities for affirming vocabulary comprehension. Reading skills enable the learner to recognize and remember language acquired in the initial stages of acquisition and the supplication of newly acquired vocabulary.

*Frequency, Multiple Exposures.* Previous research has counted frequency, or the number of times a word must be encountered for it to be learned, as a factor in aiding in vocabulary acquisition. Multiple word exposure increases network word knowledge and expressive vocabulary development, as well as helps learners improve their scores on vocabulary tests (Cunningham, 2005; Greidanus & Nienhuis, 2001; Rott, 1999; Scott, 2005). Moreover, repeated exposure is said to help learners recognize and learn spelling, word association, and normal contextual occurrences (Webb, 2007). As learners encounter a word in different situations, namely, in isolation, sentences, and reading passages, as well as with definitions or with image-based glosses, learners can gain sufficient word knowledge so as to use the word correctly.

Although frequency does not account for complete vocabulary acquisition, repeated exposure at several contextual levels does help the learner to refine word meanings and definitions (Gass & Mackey, 2002). Single encounters with a word can provide some amount of learning, especially with a considerable amount of contextual support. Contextual support, however, does not guarantee that 100 encounters will engender native competence of the complex knowledge of the word. Thus, students cannot be expected to give a dictionary-like definition of an unknown word after just one
encounter. Incremental word learning involves learning and unlearning correct and false word meanings (Fukkink, Blok, & de Glopper, 2001). Simply reading through a text with unknown words—as with pleasure reading or purposeful studying—is not always effective, although it can lead to the vocabulary retention, especially if such words occur a number of times (Mondria & Wit-de Boer, 1991). Once enough knowledge is gained, the word is then categorized as known (Scott, 2005; Stahl, 2005).

Within the parts of speech of a language, i.e. nouns, verbs, adjectives, and adverbs, a specific core of words is used more often than others (Anderman, 1996). Given that recognizing this frequency of use is important in the determination of which words to teach, the identification of core vocabulary will assist in word choice. Teaching rare words, though noble in its endeavor to enrich vocabulary, is less efficient than teaching the more common or frequent elements of a language; therefore, exposure needs to focus on the central, more relevant elements found in various contexts (Scott, 2005). Such an approach promotes vocabulary growth and improvement, because word learning is dependent upon frequency, depiction, and redundancy (Cunningham, 2005).

In the past, many studies have focused on frequency, when ultimately the issue was not frequency, but rather, the learner. The chances of learning a word after one encounter are about fifteen percent (Swanborn & de Glopper, 1999). While some researchers have contended that six exposures are necessary, others say fourteen or twenty is the ideal number, and other researchers maintain that the level of frequency needed to learn a word is learner-dependent (Zahar, Cobb, & Spada, 2001). Introductory language learners or learners with weak vocabulary and comprehension skills need more repetitions and more comprehensible contexts to learn the definitions of novel words than
those learners with higher vocabulary knowledge. Learners with higher vocabulary knowledge know higher proportions of words in the vicinity of new words (Cain, Lemmon, & Oakhill, 2004; Zahar, Cobb, & Spada, 2001).

Challenges in Contextualizing Vocabulary Acquisition. Numerous issues challenge efforts to contextualize vocabulary acquisition. For example, there are misleading, nondirective, general, unrepresentative of real life, and concrete concept restrictions types of context. Context is ineffective if surrounding context does not give clues as to word meaning, and words are subject to misinterpretation when context unclear and/or misleading (Cunningham, 2005; Scott, 2005). Basically, learner guesses at definitions can be correct or wrong, or partially correct or wrong. The correct meanings of new words can only be determined from useful context, otherwise learners draw incorrect inferences of word meanings (Cain, Lemmon, & Oakhill, 2004; van Daalen-Kaptijns, Elshout-Mohr, & de Glopper, 2001). Moreover, other contextual characteristics influence the understanding of a word, such as the relationship words have to each other in the text, text difficulty, the density of unknown words, and word repetition (Scott, 2005).

Countering challenges in Meaningful Learning. Countering the challenges that come with meaningful learning is done by creating opportunities for students to connect new words to familiar contexts and to apply their world knowledge in these contexts (Cunningham, 2005; Scott, 2005). Learners will encounter a variety of contexts to help in language learning, and thus learners will need to be able to be able to guess, to verify, and to analyze words given in context.

The importance underlying this idea of meaningful learning is how meaningful learning mediates the relationship between verbal IQ and vocabulary knowledge in
reading comprehension (Cain, Lemmon, & Oakhill, 2004). During the 1970s it was suggested that learners begin their studies by familiarizing themselves with different contexts before attempting language (Hymes, as cited in Collentine & Freed, 2004). Following the 1970s, other researchers put forth the idea that deriving meaning from context is incremental, so that word knowledge grows as a word is encountered in different contexts (Fukkink, Blok, & de Glopper, 2001). Context is an important aspect of vocabulary acquisition that materials developers must take into account (Zahar, Cobb, & Spada, 2001). Given sufficient frequency, the problems of what types of context do and do not support vocabulary learning are a non-issue. If students read level-appropriate texts, then a suitable range of context types will appear for each word as a statistical feature of natural text.

**Teaching Methods and Principles**

Teachers are invaluable resources to vocabulary acquisition, as they assist learners in the expansion and development of cognitive processes (Newton, 2001; Schank, 1999). Teachers can direct learner focus to specific items of information, thereby increasing a learner’s attention to detail, and allowing for learner input to convert to intake (Skehan, 1998). In addition, teachers can instruct learners how to take action, rather than to simply memorize, supplying error explanations when learners fail to do so themselves (Schank, 1999).

Although there is no particular approach to vocabulary instruction that is recognized as more effective than all others, many researchers have argued for a direct and systematic instruction that promotes word consciousness and focuses on specific
words and strategies. In addition, this instruction should be multifaceted and create a balance between form and meaning, encourage discussion and apply knowledge regularly and purposefully. Moreover, such instruction should yield multiple exposures to a word, solidify learner understanding, and provide rich context (Cunningham, 2005; Hiebert & Kamil, 2005; Nagy, 2005; Skehan, 1998; Stahl, 2005). Instruction does not consist simply of introducing important vocabulary words; it also provides opportunities for learners to become more efficient language learners, thereby helping them deepen vocabulary knowledge (Calderón, August, Slavin, Duran, Madden, & Cheung, 2005). Because teachers control word introductions, presentations, and exposures, teachers assist in vocabulary acquisition (Cunningham, 2005).

Optimal learning is not a product of one single approach (Baumann et al, 2005; Hiebert & Kamil, 2005). Rather, word knowledge is complex in nature, thus optimal learning comes through multifaceted instruction that connects word knowledge to world or existing knowledge. Learners must be able to process deeply both definitional and contextual information so as to meet communication needs, even overcoming situations in which unfamiliar words are used (Cunningham, 2005; Nagy, 2005; Read, 2000; Scott, 2005; Stahl & Fairbanks, 1986).

There are numerous ways to maximize opportunities for vocabulary acquisition. It is possible to carefully design materials with specific purposes and sequences in mind, recognizing which words can be gained through context and which need active instruction, identifying word relevance, and creating multiple teaching objectives (Scott, 2005; Baumann et al, 2005). Such a curriculum will help in the development of word knowledge and will guide student learning in vocabulary acquisition.
Course Textbooks

The topic of course textbooks is important because in language learning, course textbooks determine where learners begin in language, along with what material is most important in language. Typically, these course textbooks are restricted in lexical content, as they center on a core of general interest topics (Reda, 2003).

Koprowski, in 2005, decided to study the effectiveness of course textbook instruction by comparing types of lexical phrases, or pre-assembled phrases that are models in sentence building, in three course textbooks to a corpus of contemporary written and spoken English. Each book varied in types and numbers of lexical phrases. When compared to the COBUILD corpus, a significant number of textbook phrases, deemed as important, were not found in the corpus even one time. In brief, Koprowski’s study indicated that course textbooks are not only failing in their efforts to help learners understand useful language, but they are also failing in the similarity of the vocabulary they present, especially if frequency, range, and utility are the principles to which textbook writers adhere.

The use of corpora enables materials developers to determine the most frequent, common, and useful vocabulary to create meaningful course materials. Determining the most frequent requires looking at the necessary and pragmatic functions of language, as not all words and phrases are equal in their usefulness (Koprowski, 2005; Reda, 2003). As Odgen (1968) stated, materials should take into account the practicalities of language and not just fulfill an author’s agenda.

Though the effectiveness of the three books examined in Koprowski’s study was questionable, the books at least presented to learners short lexical phrases, assigning
future time to lengthened lexical phrase acquisition. Less is more in the initial stages of acquisition because simplicity does not compromise usefulness or learning. In his study, the course textbook with the least phrases had the highest usefulness score.

Assessment

Assessment, or more particularly, the evaluation of vocabulary knowledge, is an area of concern in the field of language acquisition because of its complexity. The need for gauging word knowledge, however, comes down to three main reasons: One, to conduct research on learner processes in inferring word meaning, two, to evaluate program success, and three, to assess learner ability to make inferences about unknown words (Read, 2000).

Assessment, however, is difficult, given the challenge of ensuring that an evaluation is actually measuring what it is purporting to measure or that a test score is a true representation of how well learners understood test material (Read, 2000). Using multiple methods of assessment that parallel information presentation are more likely to give an accurate understanding of the type and degree of learning that has taken place (Chun & Plass, 1996; Webb, 2005).

Language acquisition is a process of both learning correct vocabulary and grammar items and unlearning incorrect interpretations of vocabulary and grammar items; assessment is a means to checkpoint vocabulary knowledge, as it calculates how well individual words are known and where an individual is in the learning process (Fukkink, Blok, & de Glopper, 2001; Hiebert & Kamil, 2005). Assessment, however, does not show complete language mastery on behalf of a student; learners need hours of
instruction to increase vocabulary knowledge and to overcome learning plateaus (Horst & Collins, 2006; Milton, 2006).

**The Value of Visuals in the Presentation of New Vocabulary**

The use of images in the initial stages of learning of second language vocabulary acquisition and teaching has contributed to lifting the ‘learning burden’ associated with the required effort to learn language (Nation, 2001). Visual skill is included as one aspect of knowledge because learning is multimodal; no learner sets out to learn only through hearing, sight, or touch alone (Smith, 2006). The employment of images may serve the same function as words-in-context (Nelson & Castaño, 1984). Moreover, the use of images may elicit target language from learners and highlight and create crucial relationships between perception and comprehension (Butcher, 2006; Vakil, Raz, & Levy, 2007). In addition, images provide insight into target language society and culture (Allford, 2000). Researchers have found that visual imagery, particularly those related to more common or concrete objects, aids in the learning of foreign words, driving students toward connecting images to those already present in memory (Chun & Plass, 1996; Lotto & de Groot, 1998). Perhaps this accounts for the success of metaphors with advanced learners; metaphors conjure up rich mental images that can later be recalled (Boers, 2000).

**Pictorial Composition.** Other research has examined pictorial composition, concluding that pictures, for pedagogical purposes, should be kept simple. Given that the learning purpose in presentation is language acquisition, language phrases are the focus,
not pictures (Allford, 2000). Pictures are supplements to meaningful language statements to ensure language comprehension, and in simple form, pictures can still be distinctive, interesting, and comprehensible (Groninger, 2000; Mintzer & Snodgrass, 1999).

Adhering to this principle of simplicity will increase picture salience and learner perception, thereby increasing correct recognition and intake of language with pictorially-presented items.

When pictures are included in presentations, they should adhere to two principles: first, pictures should be simple for learners to be able to grasp the given concept, and two, pictures should be simple so as to be applicable for presentation to a mass audience. Overly-detailed images will impede learner progress, giving way to possible cognitive overload. In addition, learners will focus on other data than that desired, focusing more on details rather than grasping the whole picture. When learners focus on the basics, they master the basics before moving to and having to deal with more complicated language (Allford, 2000). Beginning language learners are limited in the amount of language to which they can attend to at any one time, thus providing additional justification for keeping pictures simple.

This principle of simplicity was illustrated in an experiment by Butcher (2006) in which learners were presented with text, text with simplified diagrams, or text with detailed diagrams. The diagrams depicted the human heart with various degrees of pictorial complexity. The simplified version focused on the heart’s functional properties and the detailed pictorial version illustrated its structural properties. Assessment revealed the most knowledge gain was achieved by the group with text and simplified diagrams. Butcher attributed this outcome to the fact that the simplified diagrams highlighted
crucial relationships, supported comprehension, and aided in better integrations between
textual and visual information, all necessary to learning.

Simplicity in the presentation of new language elements helps learners remain
interested without becoming overwhelmed. The presentation thus prevents arbitrary
glances, and at the same time, discourages over-examination. Because presentation itself
determines focal point, simplicity can create a positive focal point that avoids the
intensity that gives way to false identifications (Smith, 2006).

Moreover, because pictures can help represent words simply, clearly, and
separately, a significant amount of doubt may be removed as to what language the picture
represents (Ogden, 1968). Excessive detail in over-refined pictures causes a learner’s
understanding of the target language to become limited, leads learners to define a concept
in specific terms and to dismiss similar variations. Because detailed images are subject to
interpretation, it is better to present basic images so as to ensure uniform interpretation
and comprehension across learners (Allford, 2000). In testing, whenever students give
wrong answers or interpretations, most likely it is due to a picture that could have more
clearly presented the new vocabulary item (Ogden, 1968).

Groninger (2000) studied the role of images and imagery processes in conjunction
with a learner’s capacity to recall and to retain names of individuals. This study is
relevant for the principles it investigated:

1. Clarity and recall
2. Connections among words
3. Clues from context
4. Rehearsal
5. Impression on memory

Each of these items is directly related to the acquisition of new vocabulary. One, picture clarity is linked to future reconstruction and recall because it makes an impression in memory. The strength of a picture is manifested in its duration and its capacity to stimulate or to trigger remembrance in an individual. Two, visuals connect words and thus play an important role in processing information, especially in the initial stages of learning when there is much information to take in and to process. Three, context serves to provide clues, which trigger memory structures for meanings and interpretations. Four, rehearsal strengthens connections, meaning the more an image is reconstructed, the stronger that image becomes, until the image is no longer relevant because the knowledge associated with that image is then natural to a learner. Five, images need to make an impression in memory in order to gain cognitive foothold and thus be able to help in later retention and recall. And finally, recall and other variables are dependent on presentation. Presentation is an opportunity to stimulate the learning processes of individuals to connect new information to what they already know, thereby increasing recall.

**Dual Coding of Multimedia and Multimodal Learning.** Language is a closed system, meaning that language itself can either be explained using other language, or it can be explained with images that must be explained with language (Smith, 2006). When the latter occurs, meaning the presentation of image with language and learners take that image and language and make connections between the two in their minds, the phenomenon is known as dual coding. Dual coding, simply put, is the internalizing of separate verbal and visual explanations in working memory and constructing mental
referential and representational connections between them (Mayer & Sims, 1994). A human’s verbal and visual systems are “structurally and functionally distinct, yet interconnected functionally so activity in one initiates activity in another” (Paivio, 1986).

Dual coding stems from and is supported by the ideas and principles that language learning works best when facilitated by the use of images that enhance visual memory. This is because visual and verbal systems both have important functions in information encoding, registry, and retrieval (Paivio, 1986). Although words and pictures differ in “specific associative meaning,” they “may share common representation at the conceptual level” (Nelson & Castaño, 1984, p. 3). And so, words are best remembered and most easily learned when strongly associated with images or actual objects because the visual system will establish object identity and create a memory for it (David & Hirschman, 1998; Kellogg & Howe, 1971; Underwood, 1989). The words then become more meaningful as they are integrated with other information and connected to different contexts, along with prior knowledge, thus forming a connection between first language terms, images, and its foreign equivalent (Danan, 1992; Stahl, 2005). Finally, these meaningful connections lead to an increased capacity to construct and express discourse (Allford, 2000; Mayer & Sims, 1994).

A number of research studies illustrate the idea of dual coding and its potential impact on language learning. In 1994, Mayer and Sims created two experiments with two goals in mind: 1) to help students combine verbal and visual information to construct knowledge, and 2) to enable students to understand such information so as to transfer the new material to new situations. The two experiments presented visual animations and verbal narrations concurrently and successively. The successive presentations presented
verbal, then visual information and visual, then verbal information. Following treatment, all students took a problem-solving test. Post-experimental analysis showed what researchers call a "contiguity effect" in which students with concurrent presentation performed better than students who received successive presentations or no instruction because students created associations between information that was presented close together. Specifically, the concurrent presentation group generated 50 percent more creative solutions on transfer problems. In contrast, there was no significant difference between either of the successive treatments and the control group. The results from this study indicate that coordinated, concurrent verbal and visual presentation is beneficial, especially for low-experience, high-spatial ability students.

Mayer, Moreno, Boire, and Vagge (1999) expanded on these findings with a slight variation from the other experiment. In the second study the treatment groups received either concurrent or successive presentations in small or large information chunks. This time, the researchers concluded that both concurrent and small, successive information chunks are effective because they allow learners to retain verbal and visual representations in working memory simultaneously, allowing learners to make the necessary connections that come with dual coding.

Using a different approach, Danan (1992) addressed the idea of dual coding by combining it with reversed subtitling, or the presentation of English dialogue with French subtitles. In three experiments, college students were to listen only to a French audio track or to view a five-minute video excerpt with standard subtitling, bimodal French subtitling, or reversed subtitling. Ultimately, those students who received reversed subtitling outperformed those who received the other treatments. Danan attributed this
consistent success to the clear and definite correspondence between visual referents (such as physical object or action) and the subtitles, which were simple sentences.

In a different vein, Hall, Bailey, and Tillman (1997) compared three groups: one receiving text accompanied with illustrations, another with text alone, and yet another in which the subjects created their own illustrations. When tested, however, there was no significant difference between the two groups which either were provided illustrations or created their own visuals, both did better than the group receiving the text only treatment.

In 1996, Chun and Plass presented learners with annotations in different modalities, believing that multiple word lookup and exposure reinforces learning. Out of three possible annotations, text and pictures were used more often, yielding a significant difference in scores: 31.2 percent for picture and text, 17.9 percent for words with text only annotations, and 23.0 percent for words with video and text annotations. Learners showed a tendency to report pictures and text as the retrieval clue more often than the other two annotations, thus supporting this idea of dual coding in multimedia and multimodal learning.

Although dual coding does contribute to learning, expanding the amount of information that can be processed by utilizing multiple channels of input, as these studies illustrate, it can only do so under specific circumstances (Kalyuga, Chandler, & Sweller, 2000). Because dual coding is the process in which the mind deals with different visual and verbal types of information, learners must be able to build referential and representational connections between the two modalities (Mayer & Moreno, 1998; Mayer & Sims, 1994). In addition, the presentations themselves must introduce relevant
information simply, thereby eliminating the issue of extraneous information (Mayer & Moreno, 1998).

**Gradual and Meaningful Input**

The work of I.A. Richards combines these principles of context and frequency to increase vocabulary acquisition and to improve memory. He also presented visual and verbal information together, which, interestingly enough was years before Paivio published his theory of dual-coding. When Richards initially began teaching, his audience was one that consisted of adults and children who came from various facets of life: immigrant, non-English speaking, illiterate, disabled, and so forth (Russo, 1989). And so, Richards and his colleagues developed an approach, universal in its application that provides the opportunity for meaningful language learning instruction by beginning with simple words and phrases and then progressing gradually and systematically to that which is more complex, stated in terms of known language. Richards coordinates in key patterns these common or useful, frequent words with simple stick drawings, allowing learners to relate concrete ideas across to new language elements. Richards believed that language should be learned with meaning. In other words, learning comes through connections of images and ideas, as well as connections between ideas and principles (Russo, 1989).

In each of his books, such as works like *English through Pictures, French through Pictures* or *German through Pictures*, Richards and his co-authors begin with a simple, universally-recognized stick figure of a man—a man who is “supranational, nonracial, [and] diagrammatic” (Russo, 1989, p. 436)—with captions of words and
phrases that introduce the idea of pronouns and other simple language concepts without
distraction. There are four frames per page, providing learners the opportunity to compare
language and image details from one frame to another and to formulate for themselves
why there are such changes until their understanding of the presentation is second nature
(Richards, Mackey, Mackey, & Gibson, 1953; Russo, 1989). All of his books have the
same basic flow to facilitate vocabulary acquisition and application.

*Cognitive Overload.* The need for gradual input arises with the obstacle of cognitive
overload. Because language learning requires making form-meaning connections, as well
as encoding new word forms, cognitive input must be kept simple (Barcroft, 2005). Too
much information at one time hinders learning, as does presenting items that are too
similar. One study demonstrated the latter issue by giving children and adults both
working and short-term memory tasks (St. Clair-Thompson, 2007). Among the
conclusions found were that when one difference exists between items that are already
very similar, cognitive processing is more difficult.

Techniques that are to be effective must take into account the need for
involvement. Hulstijn and Laufer (2001) investigated the involvement load hypothesis, or
the hypothesis on how information processed at a deeper level stays in memory longer,
by having intact groups perform three different tasks that varied in how much individuals
would have to process information. Ultimately, the task that required students to process
information more deeply yielded superior word retention than those tasks with lower
involvement because this task made more rich connections to existing knowledge.
"Technology brings with it the promise of exciting new venues for language learners (Cohen, 2007, p. 60).” This becomes possible due to the fact that technology can provide context, interaction, modalities, and various types of annotations, such as static and dynamic images, as well as sound, to learners (Patron, Miller, Chisamore, & Lee, 1999). Thus, technology may be used as an instrument to expand learner and pedagogue possibilities (Madhany, 2006; Samy, 2006; Smith, 2006; Stevens, 2006).

Moreover, technology can contribute positively to pedagogy. For example, technology may be used to produce specific ideas in organized increments, allowing for a more comprehensible presentation. Through various programs and software, technology can track learner action and response, providing a means for later analysis that will give way to creating more effective teaching methodologies.

Numerous studies illustrate the benefits of wise applications of technology; among which is a study involving teaching with embedded multimedia (Chambers, Madden, Slavin, Cheung, & Gifford, 2006). In this study, the researchers randomly assigned ten elementary schools to receive reading instruction that incorporated video content within teachers’ lessons. In the end, researchers concluded that this video content, or embedded multimedia, has the capacity to augment instructional effectiveness.

In other research, Chun and Plass (1996) used a software program called Cyberbuch to investigate the effects on reading comprehension of text, picture, and video multimedia annotations. The learners began with a program preview, after which they read the annotated story. Because the program recorded each student action, Chun and Plass were able to find improvement in both word recognition and production. They
accredited increased recall to technology, which heightened definition availability, annotation variation, and word look-up and encouraged active behavior that reinforced learning.

Another study explored the benefits of using a diglot program as compared with a computer drill and practice program to see which computer program would be best in increasing the quantity and understanding of vocabulary items (Christensen, Merrill, & Yanchar, 2007). Introductory-level students in two groups received one of two treatments: the diglot program or a computer-based drill and practice program. The diglot method, also known as a diglot reader, gradually introduces second language elements within first language context until second language overtakes first language. The computer-based drill and practice program presents language in a flash-card-type presentation with no context, but much review for the learner to master the vocabulary. Students tested these two programs in three 50-minutes sessions. In both groups, students controlled how long they viewed each vocabulary item and were given corrective feedback in review sessions. After analysis, the two computer programs were assessed as equally effective in facilitating the vocabulary acquisition of each group, though students did express a preference for the diglot method.

*Listening and Sound*

The use of listening as a language skill has been debatable in regards to its contribution to language acquisition. Some researchers have suggested listening to be an aid in language learning and recall, so long as learners know to listen with purpose, whereas other researchers have said that learning is more dependent on individuals and
their motivation than on whether learners use listening as a skill (Barcroft & Sommers, 2005; Stahl, 2005; Vidal, 2003).

In 2005, De Jong tried to determine how much second language grammar could be learned through listening comprehension activities. Three groups—a receptive, a receptive and productive, and a control group—learned Spanish vocabulary in four, 90-minute training sessions. These sessions consisted of vocabulary, sentence, and target structure trainings, as well as different sorts of comprehension tasks. At the end of the study, De Jong discovered that some grammar can be learned through listening; the input received through listening helped learners to build a knowledge base that made language available in later recall.

Vidal (2003), on the other hand, found that knowledge gain and retention depended on other variables such as learner proficiency, word forms and types, frequency, and the amount of elaboration given on the meaning of a word. Even though students listened to the same series of three, 15-minute lectures, they varied in vocabulary acquisition and retention because of differences in their proficiency levels. Vidal concluded that vocabulary acquisition comes through the attention, effort, and deep processing that a learner gives to vocabulary, and not though the use of listening as a skill.

The Importance of Arabic

The world situation is such that learning Arabic is important. Because relationships are volatile, particularly between the United States and Arab nations, enrollment into Arabic language programs has served as a means to increase
understanding between nations to end estrangement (Badawi, 2006; Belnap, 2006).

Learning Arabic, however, is difficult and language programs are not achieving their full potential. It is important to do research in Arabic.

Many learners find Arabic a difficult language for some, if not all, of the following reasons: Arabic is written left to right, is non-transparent, and has a 28-letter alphabet, with different letter forms and sounds. There are numerous cultural norms, words and roots, as well as synonyms, which vary with speaker and with region (Madhany, 2006). Also, when no standard native Arabic speaker exists, or when there are large differences between native and target language, the acquisition process becomes more difficult (Stevens, 2006; Winke & Acquil, 2006). Moreover, Arabic is diglossic, even multiglossic, meaning that the language has formal and informal varieties used in different contexts or for different functions (Eisele, 2006; Ryding, 2006).

Other challenges in this field have come in the creation and production of Arabic materials. With an increased international desire to acquire Arabic, instructional materials, testing instruments, and online supplements are needed to meet, assist, and strengthen learner needs in both individual and classroom learning settings (Al-Batal & Belnap, 2006; Younes, 2006). Too often materials are thrown together with no thought for learner proficiency level, structure or focus; there is no sequence or reinforcement to vocabulary (Badawi, 2006; Stevens, 2006). Well-designed and well-planned materials, ones that develop cognitive processes, such as contexts that connect new words with familiar vocabulary and grammatical structures, will ensure that learners receive the most advantage in learning (Abdalla, 2006).
Chapter 3: Research Design

The purpose of this study was to investigate how a specific instructional technique would help learners acquire vocabulary in a language. This technique, a meaningful presentation of language with image by gradual, step-by-step sequencing, introduced learners to basic Arabic vocabulary and phrases with language, image, and sound. It was anticipated that an increased understanding of the effectiveness of this method would facilitate the development of improvements in language learning outcomes. The language, image, and sound were presented together in a specific way with the intent to allow language learners to build upon previously acquired knowledge.

Arabic was chosen as the language of study in this instructional technique because of its dissimilarity to English. Because Arabic is a Semitic language, more closely related to Hebrew and Aramaic than to English, it shares very few if any cognates with the languages of the subjects used in the study. Thus, the choice of Arabic pushed learner-focus toward looking at the method as a whole, rather than an approach that observes the language or image separately. The instructional materials introduced students to basic vocabulary and phrases in Modern Standard Arabic (MSA).

Specifically, this study sought to answer the following research question: “What is the effect of the meaningful presentation of language with image by gradual, step-by-step sequencing on vocabulary acquisition, as measured by tests of vocabulary recall and retention?”

The vocabulary items in the presentation followed the patterns and sequences of I.A. Richards, who, in his books, began with pronouns and simple sentence structures. The learners were exposed to these new language elements multiple times, since repeated
exposure helps learners to refine vocabulary meanings, and gradually, to avoid cognitive overload. In theory, the material in the presentation covered ten chapters of material, as outlined by the program designer.

Moreover, the use of images as a part of this instructional technique was to aid learners in creating crucial relationships between perception and comprehension. The principles associated with the use of images are that images assist in vocabulary recall, connection formation among words, and impressions in memory. In the presentation of meaningful language accompanied with image, images were used to allow learners to associate and to cognitively process the meaning of the image with the Arabic script and sound that were presented. These images followed the artistic design of I.A. Richards in that they were simple, line drawings. The audio presentation was to enable the learners to acquire the sounds of the language.

**Overview of study**

The research for this study began with a pilot study that was carried out with student volunteers in the Brigham Young University (BYU) community. The pilot study consisted of two treatments for Arabic language acquisition: a meaningful presentation of language accompanied by image by gradual, step-by-step sequencing and paired-associate learning, also known as rote instruction. The two presentations were administered as fifteen-minute power point presentations, with each presentation projected onto a wall in a classroom-type setting. The presentations showed Arabic pronouns individually and comparatively (side-by-side) with either images or literal English translations. Sound accompanied the two presentations. Presentations were
similar except that one group received images and the other English translations. Following the treatment, each group completed a brief questionnaire assessing their language learning experience, as well as a twelve-question vocabulary test on the Arabic pronouns, which was included in the power point presentation.

Seven months after the pilot study, the actual experiment for this study was carried out with volunteers from the BYU language community, who were recruited and paid for their participation. It should be noted that the actual experiment was not identical to the pilot study, but rather an extension of the pilot study. All participants reported to a computer lab, where first they completed a preliminary questionnaire assessing their language skills. Once this questionnaire was completed, students were randomly assigned by the computer software to one of two groups: the experimental group of a meaningful presentation of language or the control group of paired-associate learning. Like the pilot study, the two treatments were similar, save that those learners with a meaningful presentation of language received images as a part of instruction, and those learners with paired associate learning received English translations. Following treatment, the two groups completed a post-test with 37 test items of varying type and level that tested the students’ ability to recognize and correctly indicate the meanings of each vocabulary item. These participants also completed a feedback questionnaire. One week later, learners completed the same post-test.

_Pilot Study_

In the pilot study, participants were randomly assigned to either a meaningful presentation of language accompanied with image or paired-associate learning. The
student volunteers in the pilot study could be considered representative of a population of language learners. The first group was comprised of 19 learners—6 male, 13 female—ages 17 to 28, with the majority aged from 17 to 24. Seventeen of these learners had studied a language previously. Group two consisted of 18 learners—8 male, 10 female—ages 17 to 32, with the majority, again, in the 17 to 24 age bracket. As with group one, seventeen of these learners had studied a language previously. Group one, however, reported familiarity with more languages than Group two.

The post-test scores from this pilot study showed that the group that received meaningful language with image by gradual, step-by-step sequencing had a lower mean vocabulary score and more variation than the group with paired-associate, or rote, instruction. In a statistical analysis, however, there was no difference between these two instructional methods.

Because the statistical analysis of the test scores from the pilot study did not show any difference between the two methods of instruction as was anticipated, changes were made to prepare for actual testing. The first change was to lengthen the testing instrument. I.A. Richards presented language that moved from words to connections of words; this pilot study presented five pronouns, nothing more. Since the pilot study did not follow this basic principle of moving from simple to more complex structures, the presentation was not true to what constitutes a meaningful presentation of vocabulary accompanied by image in gradual, step-by-step sequencing. In short, the presentation was simply a variation of the presentation of paired-associate learning.

Other necessary changes to the presentation were to make images more distinctive and to speed up the slide timing. As to making images more distinctive, learners reported
in a feedback questionnaire that there needed to be a greater distinction between the pronouns *you* and *he*, or at least a slide comparing the two pronouns for the learners to notice the difference between the directions of the man’s face. Also, learners suggested shortening the presentation of each slide from 25 seconds to 17 seconds.

*The Actual Experiment*

*Subjects.* The experimental design for the final research in this study involved student volunteers recruited from language courses at BYU as well as volunteers from among the general BYU population. In total, there were 90 participants of varying backgrounds; 34 were male, 52 were female, and 4 are unknown. Of these participants, 82 indicated that they had previous language experience. Ages ranged from 18 to 58, with the majority of participants in the 18 to 25 age bracket. Participants included in the study completed the treatment, immediate post-test, and delayed post-test, as well as a feedback questionnaire. Those familiar with Arabic were excluded from the study. Participants were compensated for their participation in this study.

*Instruments and Materials.* Building upon the pilot study, the researcher in conjunction with BYU experts of Arabic and computer-based instructional technology designed a lengthened version of this technological instrument to implement this novel approach of a meaningful presentation of language accompanied with image by gradual, step-by-step sequencing for the introduction of new vocabulary. The presentation, along with the presentation of paired-associate instruction, was administered through a timed power point presentation converted to Flash and accessed online. Following the
presentations, learners completed a post-test and feedback questionnaire, and one week later, a delayed post-test, identical to the initial post-test.

The instructional materials were specifically designed for learners in their earliest moments of instruction and introduced students to basic vocabulary and simple phrases in Modern Standard Arabic (MSA), beginning with pronouns and ending with phrases such as “The woman is there” and “The sun is behind the mountain.” On every slide, the Arabic script for each word or phrase appeared first at the bottom of the screen and was followed by the script pronunciation. Then, with the method of a meaningful presentation of language with image, a simple line drawing appeared above the Arabic script and sound icon to indicate the meaning of the given word or phrase. For example, when the Arabic script “أنا” appeared on the computer screen, it was followed by a male voice saying “Ana” and a line drawing of a male pointing to himself to indicate I or me (see Appendix A). Because this presentation started with basic language and built to simple sentences and more complex phrases, “أنا” later appears as the initial word to the Arabic phrases “I am a man” and “I am here.”

And so, with this instructional method of a meaningful presentation of language with image, language, image, and sound are presented together with new language elements introduced gradually to the learner. This approach allowed learners to make connections between new language elements and familiar concepts, following the I. A. Richards method of language learning. This instrument varied in its organization from that presented in Arabic courses at BYU. Moreover, sound, as recorded by native Arabic speakers, was added as an additional dimension to this instrument.
Those learners who viewed the presentation with paired-associate learning had a similar language experience to those with meaningful presentation, save that they saw literal English translations to indicate meaning instead of line drawings. Thus, with paired-associate learning, when the word “أَنَا” appeared, the pronunciation of this script was given (“Ana”), and then was followed by the English translation *I (masculine)*, which appeared above the Arabic script and sound icon to indicate meaning (see Appendix B).

The immediate and delayed post-tests were the same test, administered one week apart. Students were allowed to complete the delayed post-test on their own time, given that they came in within the time allotted. As shown in Appendix C, the test consisted of 37 questions that varied in both question type and level. Levels indicate chapter markings or sections, as set forth by the Arabic program designer. Difficulty is determined by what level or chapter the questions were drawn from for testing. Students were asked to recognize and to correctly indicate the meanings of vocabulary items and phrases. Sixteen of the questions included English, and fourteen questions included images. Thus, learners who did not see English during their presentation nevertheless answered some English-based questions on definitions, and learners who did not see images answered some image-based questions on definitions. Twenty-eight of the questions included sound.

Questions were given in this order: Two questions asked students to identify whether an Arabic word was masculine or feminine. All the remaining question types were seven questions of each type, and they asked students to match Arabic script to English, Arabic sound to English, Arabic sound to Arabic script, Arabic sound to image,
and image to Arabic sound and script. Of these questions, two questions were a level one difficulty, nine were level two and three difficulty, six were level four, seven were level five and six, five were level seven, five were level eight, and three were level nine and ten.

Procedures. Prior to the administration of each presentation, students completed a computerized personal questionnaire about their age, gender, and language experience and skill. The purpose of this information was to determine whether self-assessment marks would correlate with post-test and delayed post-test scores of this study. On a scale of one to ten, with ten being the best, learners responded to the statement, “I consider myself to be a good language learner.” In addition, learners finished the following statement: “When I take language courses, I usually expect to receive the grade of ____.” Seventy-one percent of learners classified themselves in the highest bracket as a language learner with an expectation to receive an A when taking a language course.

Once the questionnaire was completed, the computer software randomly assigned students to the treatment or control groups, and the presentations began. In the experimentation, the two groups viewed presentations that showed Arabic words and phrases individually and comparatively (side-by-side) with either images or literal English translations. The Arabic text always appeared first, the sound followed (which in this case was the Arabic pronunciation of the displayed Arabic script), and then finally, a simple line drawing or an English translation to indicate meaning was given. Presentations were similar save that one group received images for each Arabic word, and the other received English translations.
In total, 90 students participated in part one of this study, which included the questionnaire, the presentation, the post-test, and the feedback questionnaire. Out of the initial 90 participants, 83 participants returned to complete part two of the study, or the delayed post-test. Thus, 53 participants received the experimental treatment as administered by the computer, whereas 33 received conventional instruction using paired-associate learning. Combined with the immediate post test, the treatment (or part one) lasted no more than ninety minutes, with the treatment at 52 minutes and the post test taking no more than fifteen minutes. The ages of the participants ranged from 18 to 58; 52 of these participants were female and 34 were male. Part two, the delayed post-test, also lasted no more than fifteen minutes.

The feedback questionnaire, administered after the initial post-test, took five to ten minutes to complete. This questionnaire asked learners what they noticed about the software, whether they found the presentation speed to be too fast or too slow, and what suggestions for improvement they had for the presentations.

As soon as information from the questionnaires and the two post-tests had been completed, analyses of the results from the data began. In addition to the analyses of the results from the two tests, an analysis of the reliability of the post-test was conducted. Because of the low test averages, the post-test analysis was conducted to measure each test question, or item, to ascertain whether or not the post-test was a dependable instrument for accurately gauging learner retention and recall of vocabulary.
The Post-Test

Before beginning the actual treatment of this experiment, participants completed a personal background questionnaire that asked participants to provide language experience and a personal assessment of their language skills. Following the completion of the questionnaire, computer software randomly assigned participants to one of two groups, that of a meaningful presentation of language or that of rote instruction. In these two presentations, learners viewed Arabic script, heard a recording by a native speaker pronouncing the given Arabic script, and then viewed either an image or an English translation that indicated meaning of the Arabic provided.

After viewing either the meaningful or rote presentations, students completed a post-test and feedback questionnaire, and one week later, a delayed post-test. The delayed post-test is the same as the initial post-test. The post-test consisted of 37 questions of various types and levels, covering what the material in the presentations. These questions were formulated by the software creator and then randomly selected by the researcher to be used in testing.

Item Facility. An item facility analysis was carried out in order to determine the level of difficulty of each test item. Using the results from the initial post-test, the results from this analysis revealed that five questions were what would be labeled ‘easy’; the item facility for these questions was 0.8 and above, with one of those questions at 0.9. Because these questions asked learners to identify whether an Arabic word was masculine or feminine, or to identify the meaning of an Arabic word or simple phrase, most learners were answered these questions correctly. Six questions had facility values at about 0.4,
which means that most learners answered these questions incorrectly because of their difficulty. All of these difficult questions included sound and were of the same style, asking learners to match Arabic script, English words, or images to an Arabic sound. The remaining test questions were of a moderate level of difficulty.

The results from an item facility analysis from the delayed post-test mirror the results from the initial post-test in regards to those questions which were easier but the results do show a slight drop in percentages levels. Overall, the results from the item facility analysis for the delayed post-test indicate that most questions became more difficult for learners to answer. These results indicate that the questions that were once moderately difficult became difficult, and the questions that were difficult became almost impossible for learners to answer correctly. For example, the analysis of one question with a facility value of 0.41 lowered to a value of 0.28 by the following week.

*Item Discrimination.* Following the item facility analysis, an item discrimination index was taken to assess whether each test item was a good test item or not. Using the University of Wisconsin Oshkosh testing levels (2005) as the standard for categorizing good questions, the item discrimination indices revealed one test item to be a bad test item or unacceptable, with an index of -0.04 on the initial post-test and -0.09 on the delayed post-test. These indices match what the item facility analysis revealed for this test item; this question was difficult to answer (0.41 and 0.40 item facility). This question required learners to match the correct Arabic script and sound with a given image.

Moreover, the item discrimination analysis categorized two questions as “usually unacceptable”—that number increasing to three items with the delayed post-test.
Although the questions that asked learners to identify whether an Arabic word was masculine or feminine were easy (with high facility values), they were not good questions per the testing level standards. With the scores from the initial post-test, nine of the test items fall under the category “good” test items, leaving 25 questions as “excellent” test items. It should be noted, though, that not one of the “excellent” test questions exceeds 0.71 in its discrimination index. The delayed post-test is similar: seven items are categorized as “good” items and 26 questions are “excellent,” and once again, the indices are at moderate levels with one exception at 0.82.

Feedback Questionnaire

Following the initial post-test, each participant completed a feedback questionnaire. This questionnaire asked learners what they noticed about the software, whether they thought the presentation was too fast or too slow, and what suggestions for improvement they had for the presentation they were administered.

The responses from the feedback questionnaire indicated that learners noticed the same general qualities about the software for both presentations. Twenty-six percent of participants commented that the software was designed well and functioned smoothly. Nine percent of participants, however, reported a sound dropout the last few minutes of presentation. Fourteen percent of all participants found the software simple or easy to use, and 19 percent noticed the repetitive nature of the programs.

One individual commented, “It was very formatted so that I could sort of guess what was coming next, which was helpful.”
Another individual stated: “I liked the comparisons and use of context. I liked getting to guess the meaning before it was given—made me feel successful.”

“I liked how it would show the word, wait a second, and then show the picture. If it had done both at the same time, I probably would have been overwhelmed. I also liked how they used two different voices.”

In regards to the second question, as to whether learners found the presentation to be too fast or too slow, 66 percent of participants reported that they were bored because they found the presentation to be too slow. The remaining 34 percent, though, thought the speed was just right or a good pace. Among the learner responses were the following comments:

“It was a good speed but when there was a blank screen it seemed to take forever, so then it was too slow.”

“Good pace. I liked the speed so that I could guess/infer.”

“I thought it was a little slow at the beginning, but by the end I was glad it was slow so I could look longer.”

“Well, it definitely wasn’t too fast. I think it could have been just a little faster, but not by much because your brain’s trying to take it all in.”

“It started to get fast when prepositions were added.”

As to the last question of the survey, suggestions for improvement, two to 11 percent of learners suggested at least one of the following: learner control, more distinct pictures, review sessions, interaction, or more sound repetition.
Research Design and Data Analysis

A regression and Cell Means model were used to compare the two methods of presentation between experimental and control groups on vocabulary acquisition with a self-assessment of language ability on a Lickert scale and with ACT verbal scores. The regression assessed whether there was a causal relationship between the independent variable of treatment type and the dependent variable of vocabulary acquisition, as measured by vocabulary scores on tests of retention and recall. Following the regression analysis, a Cell Means model was used to analyze differences and interaction effects between the variables in the data. The null hypothesis “There is no difference between the means achieved by subjects in each of the two treatment groups” was formulated to answer the research question of this study, “What is the effect of a meaningful presentation of language (defined as gradual, step-by-step sequencing of language elements illustrated with images) on vocabulary acquisition, as measured by tests of vocabulary recall and retention?”
Chapter 4: Results

This study investigated how an instructional technique affected vocabulary acquisition in the initial stages of language learning. In order to investigate the affects of this technique—a meaningful presentation of language with image by gradual, step-by-step sequencing—this study compared this instructional technique to another instructional technique, that of paired-associate learning. The specific research question addressed was: What is the effect of the meaningful presentation of language (defined as gradual, step-by-step sequencing of language elements illustrated with images) on vocabulary acquisition, as measured by tests of vocabulary recall and retention?

This research took place with volunteers, almost all of whom were students at Brigham Young University who were recruited and paid for their participation. Subjects reported to a computer lab and completed a questionnaire before being randomly assigned by the computer software to one of two groups: one that received a meaningful presentation of language or one that engaged in classic paired associate learning. The computer administered the two treatments. Participants, who received partially-contextualized instruction or a meaningful presentation of language, were given images as a part of instruction, whereas those learners with paired associate learning received English translations. This chapter will present the analyses of the results from this study, including background information.

Descriptive Statistics

Upon first encounter with the materials the software randomly assigned 53 participants to the experimental treatment and 33 participants to the control group, or rote
instruction. The discrepancy in the number of participants assigned to each group can be attributed to nothing other than that the computer software randomly assigned participants this way. Due to technical difficulties, four presentation types assigned to learners are unknown.

The software recorded the test scores as a decimal number, meaning 0.6 indicated 60 percent correct, and testing times were recorded in minutes. Table 1 shows the mean test scores and times for the initial and delayed post-tests.

Table 1
Mean Test Scores and Times for All Participants

<table>
<thead>
<tr>
<th></th>
<th>Score (Percentage)</th>
<th>Time (Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Post-test</td>
<td>0.62</td>
<td>6.92</td>
</tr>
<tr>
<td>Delayed Post-test</td>
<td>0.54</td>
<td>6.15</td>
</tr>
</tbody>
</table>

Table 2 presents mean test scores for the initial and delayed post-test by treatment type, meaning meaningful or paired-associate presentation.

Table 2
Mean Test Scores by Treatment Type

<table>
<thead>
<tr>
<th></th>
<th>Initial Post-test</th>
<th>Delayed Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaningful Presentation</td>
<td>0.60</td>
<td>0.53</td>
</tr>
<tr>
<td>Paired-Associate Instruction</td>
<td>0.62</td>
<td>0.56</td>
</tr>
</tbody>
</table>
The analysis uses average test scores, or the mean of test one and test two, and average test times, or the mean of time one and time two, to capture the correct effect of the scores and the times.

**Inferential Statistics**

The analysis consisted of both a regression and a Cell Means model in order to assess the impact of the type of presentation on testing scores. Other variables, such as ACT reading and English scores, language learning self-assessment rating, and testing times, were included in the assessment to measure their influence on testing outcomes. Because the analysis used the mean of test one and test two and the mean of time one and time two, learners who failed to return for part two of the treatment or whose presentation type was unknown were removed from the analysis. Whereas the study initially included the data of 90 participants, the exclusion of these participants left 80 total observations in the analysis.

A regression is a statistical procedure that can be used to model a causal relationship between independent and dependent variables. For this study, the type of video presentation and ACT scores were the independent variables, and the test scores represented a dependent variable. The null hypothesis for this analysis was “There is no difference between the means achieved by subjects in each of the two treatment groups,” or in other words, the two video methods have the same effect on test scores. The results observed from the regression indicated that treatment type had no significant impact on learner testing outcomes. The results observed probably could not have occurred by chance, thus the null hypothesis was accepted.
Following the regression analysis, a Cell Means Model was used to further analyze the results. A Cell Means Model is a statistical method used to analyze differences between cells, or between variables in data, and “it is the only means for clearly and coherently formulating the interaction effects in the case of planned comparisons for main effects” (van den Berken & Voeten, 2005, p.94). The Cell Means was divided into two parts (to represent each presentation type).

Since the null hypothesis was accepted, an F-test, or a component of the Cell Means model that compares two estimators (like types of presentation) was then used to further analyze the data. Although the group who received a meaningful presentation of language had 20 more participants than the group who received paired-associate instruction, the two groups were treated as equally weighted in the statistical analysis. The alpha level was set at 0.05. The F-test gave a value of 0.469, which indicated once again, that there is no significant difference between presentation types on the outcome on the post-test. The two treatments, on average, had the same effects on testing outcomes; one presentation was not better than the other.

Although treatment type had no effect on test outcomes, the Cell Means Model and subsequent F-test revealed that ACT English scores and testing times did have a significant impact on the outcome of post-test scores. This means basically that the higher the ACT English score and the more amount of time to complete each test, the better the average test score. Table 3 shows the variable estimates associated with the Cell Means model and F-test analyses. Once again, the analyses included the mean scores of the initial post-test and the delayed post-test and the mean times from the two tests.
Table 3

Variable Estimates

|                | Estimate | Standard Error | t value | Pr(>|t|) |
|----------------|----------|----------------|---------|----------|
| Video:         | -0.256558| 0.174867       | -1.47   | 0.149136 |
| Meaningful     |          |                |         |          |
| Video: Rote    | -0.258264| 0.181793       | -1.42   | 0.162161 |
| Gender: Male   | 0.068060 | 0.045426       | 1.50    | 0.140897 |
| ACT English    | 0.019833 | 0.005489       | 3.61    | 0.000746 |
| Mean Test Time | 0.040241 | 0.011932       | 3.37    | 0.001519 |

Chapter Summary

The statistical analyses performed on the data collected from this study indicate that there is no difference between the experimental and control groups. In other words, the two presentations, on average, had the same effect on the initial and delayed post-test scores. Two other factors, however, did affect outcomes: ACT English scores and testing times. The higher an ACT English score and the longer the testing time, the better a learner’s performance on the initial and delayed post-tests.

Upon closer examination, an item facility and item discrimination analysis of the post-test revealed that the post-test was not without its flaws. Some questions were too easy, others too hard. The analysis indicated that one question was completely unacceptable.
Chapter 5: Conclusions and Recommendations

Overview of Study

This thesis documents how a presentation of language, image, and sound affect vocabulary acquisition in the initial stages of language learning, namely how learners can more easily connect new vocabulary to what they already know. This study implemented a particular instructional technique—that of meaningful presentation of language with images in gradual, step-by-step sequencing. The software used in this study was designed to enable the learner to connect with mental processes and to make vocabulary more accessible than the results that would be anticipated with paired-associate learning.

Specifically this study sought to answer the following research question:

What is the effect of the meaningful presentation of language (defined as gradual, step-by-step sequencing of language elements illustrated with images) on vocabulary acquisition, as measured by tests of vocabulary recall and retention?

This research was carried out with volunteers from the BYU language community, most of whom were students. Participants were randomly assigned to one of two groups: the experimental treatment group that experienced the experimental treatment, as administered by the computer, or the control group that used paired associate learning, also administered by the computer.

The instructional materials were specifically designed for learners in their earliest moments of instruction and introduced students to basic vocabulary and phrases in Modern Standard Arabic (MSA). Language and images were presented together, with new language elements introduced gradually to the learner. In theory, the organization of this presentation was such that new elements would be more easily connected to that
which is already familiar to learners. The purpose of the images was to help ensure that the presentation was meaningful and the audio presentation was to enable the learners to acquire the sounds of the language. Learners assigned to the paired associate learning group were given a similar presentation, with English translations substituting for images.

Once students had completed their respective presentations, they were given an online test on the new language elements. The test consisted of 37 questions of varying types and levels, which tested the students’ ability to recognize and correctly indicate the meanings of each vocabulary item. In order to test longer term recall, one week later, the students took a delayed post-test that was identical to the initial post-test.

**Summary of Results**

Using an Analysis of Variance, specifically an F-Test and a Cell Means Model, to analyze the results from the methods of presentation on the two tests, the analyses revealed that there was no significant difference between the two methods of presentation. In fact, the two presentations had similar effects on the average test scores, thereby indicating that neither method of presentation was better than the other. Two other factors, however, were significant in their affect upon testing outcomes: ACT English scores and testing times. Learners with higher ACT English scores and learners who took more time to complete the initial and delayed post-tests performed better on the two tests.

The post-test was not an ideal indicator of vocabulary retention and recall. One question can be completely eliminated and about 10-12 others can be improved. The most difficult questions all involve matching Arabic script, meaning, or image to Arabic
sound; the presentation did not draw attention to sound, but rather to the Arabic script. In each slide of both presentations, the script appeared first and was followed by sound and meaning.

**Limitations**

It is important to note that the present study was not without its limitations. First, this study was limited in technology. During the last two or three minutes of both presentations, some students reported a complete sound drop out. Other students had the software stop in the middle of their presentation or their computer locked up. In regards to the post-tests, the software displayed the Arabic script as individual letters rather than as a connected script, the former occurring no where in either presentation. Initially, if students input a user name instead of an identification number (without hyphens), the program did not allow thirty learners to take the delayed post-test without re-entering information. With this issue, most of the data was recovered, but not all, hence the four unknowns in regards to the type of presentation (meaningful or rote) in the data set.

Second, learners varied in their motivation in coming to participate in this study. Although by observation it was evident that some learners truly interested in learning Arabic participated in this study, there were also learners participating who were motivated by money. This second motivation was evident as I observed seven to ten of these learners find a way to skip quickly through the presentation or distract themselves by logging onto the Internet, watch other peoples’ presentations, or attempt communication with others. Because these learners didn’t understand the *why* of this study, they simply could not *do* this study.
A third limitation of this thesis was that of focus. In a feedback questionnaire, a few learners reported a split focus in regards to the presentation—a dividing of their time between mastering sound, Arabic script, and meaning. For those participants who had images, they focused on differentiating between pictures. As for the two videos administered in both the meaningful and rote presentations, the focus was more on helping learners read Arabic script than to pronounce it.

Finally, the length of presentation was a limitation of this study. Given my experience as I was recruiting, I feel as though more students may have come to participate, and perhaps there would have been less attrition, had the presentation been shorter than the advertised one and a half hours for Part one of treatment.

Discussion

Despite the limitations of this study, this study was designed to conform to the principles put forth by I. A. Richards. For example, the presentations were basic and repetitive; they followed a step-by-step pattern of presentation that allowed learners to compare and to contrast Arabic script, sounds, and meanings. The presentations were formatted to help learners make connections to previously-acquired knowledge and thus to be able to infer what would come next, leading to more cognitive processing. The script appeared before the image or definition that was designed to help the learner derive meaning and before the sound, in an effort to direct learner focus toward Arabic script. The pace was set to aid learners to take what was presented and internalize it, so as to help in later recall. The images were simple, not distracting with excessive detail. In the experimental group, no English was used, allowing even the non-English speaking person
the opportunity to learn Arabic. It is interesting to note that learners did acquire some Arabic with this presentation, as evidenced in that they did as well as learners who received literal English translations.

Moreover, sound was added as an element to presentation. The recordings for the pronunciation of the Arabic script, which included masculine and feminine words, were recorded by native Arabic speakers. The male voice was used with masculine items and the female voice for feminine items.

The reasons why this instructional method of a meaningful presentation of language with image by gradual, step-by-step sequencing did not work better than that of paired-associate learning stem from my review of the literature. In the literature review I discussed relating new information to known information, but I did not account for the possibility of paired-associate learning, or a native English translation, to connect to experience as well as a meaningful presentation. Native translations do help with learner comprehension because they put new vocabulary in terms of what a learner understands, thereby complying with the principles embedded in memory and organization of relating new information to known. My other reasons why the experimental instructional technique did not do as well as the other coincide with my suggestions for future research.

Suggestions for Future Research

Because vocabulary test scores for both presentations averaged 60 percent, I would offer a few suggestions before replicating or expanding upon this study. Among such suggestions would be, first, to shorten the presentation. At the moment, each
presentation is 52 minutes, with neither pauses or breaks nor learner control. Learners view 180 slides that are presented automatically, with each slide remaining on the screen 17 seconds. The presentation was formatted to present script, meaning, and sound continuously to allow learners the opportunity to process language and remit it to memory. The presentation, however, is too long. In a feedback survey, administered after initial treatment, 66 percent of students reported that they were bored. Perhaps this issue of boredom could be resolved by having the first half of the presentation move faster because it presents words and short phrases, by separating the presentation into increments, or by making the software learner-controlled. If the software is learner-controlled, learners can then move at what they assess to be a good pace.

Another suggestion for future research would be to make the software with interactive features. Software cannot just be designed well; software must be able to hold learner attention. If Richards were here, I think he would take advantage of the wide variety of technological possibilities that are available today. Making the software interactive would engage the learner and thus help maintain learner concentration. There are several ways to accomplish this. One way, for example, would be to give learners the option of clicking on script, image, and sound to repeat that item as many times as they would like. Another interactive feature could be a section that introduces the Arabic alphabet. Or, perhaps, software could be interactive by simply adding language exercises. These exercises could be of varying type and style, and they could follow sections of material in the presentation to serve as a review to learners or to ensure that learning is taking place.
Moreover, pictures need to be clearer and more consistent. Some students reported difficulty in understanding picture meaning and in differentiating between certain pictures. In order for this software to be better for understanding the learning process, students must be able to make a distinction between the images of man and boy or woman and girl. Also, some drawings have thicker lines than other ones; drawings need to be consistent from one slide to another.

Other possible suggestions for future research would be to use different recordings of the same words, so that learners may hear how different natives pronounce the same word. Also, another suggestion would be to include formal and informal Arabic in the presentation. In addition, for future research, the post-test could be shortened or lengthened, or the question types could be changed to something different.

To provide more qualitative insights into what is going on learners’ minds, researchers may create a think-aloud protocol to accompany treatment.

As for statistical analyses, future researchers could run sub-scales on individual test items for further insight and discrimination between the impacts of the two presentation types on vocabulary test scores.

Acting upon these suggestions may lead to improvement in learner comprehension, as measured by scores on vocabulary tests of retention and recall.

Conclusion

This study was designed to investigate how a specific instructional technique would impact vocabulary acquisition, with the hope that outcomes from this study would contribute to improvements in language learning instruction. Although statistical analyses
indicate that a meaningful presentation of language by gradual, step-by-step sequencing was not significantly better in terms of vocabulary retention and recall, I believe that this study has contributed to the field of language learning in that it has provided some insight into how coordinated language, image, and sound can impact vocabulary acquisition. Because of the testing outcomes, this study also provides some inferences about how the mind deals with language; learners had to make some connections between the language, image, and sounds in memory in order to answer vocabulary test questions correctly.

Understanding how a learner uses an instructional method to acquire vocabulary opens up opportunities for more instructional opportunities to help individuals acquire language, potentially helping to significantly increase the national language capacity in less commonly known languages in particular. Such improvements would be especially helpful in Arabic, with the increasing demands for skills since September 11, 2001.
References


Vocabulary; Bringing Research to Practice (pp. 27-44). Mahwah, New Jersey: Lawrence Erlbaum Associates.


Appendixes

Appendix A: Sample screen shots from the Experimental Treatment: A Meaningful Presentation of Language with Image by Gradual, Step-by-Step Sequencing
أنا هنا
المرأة هناك
Appendix B: Sample screen shots from the Control Group: Paired-Associate Learning

1
(masculine)

أنا

We are men.

نحن رجال
I am here. The woman is there.

المرأة هناك أنا هنا
### Appendix C: The Post Test

<table>
<thead>
<tr>
<th>Question 1</th>
<th>Question 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>أنت</strong></td>
<td><strong>أولاد</strong></td>
</tr>
<tr>
<td>Identify whether the following word is masculine or feminine.</td>
<td>Identify what the following Arabic words/phrases mean.</td>
</tr>
<tr>
<td>☐ masculine</td>
<td>☐ boy</td>
</tr>
<tr>
<td>☐ feminine</td>
<td>☐ boy</td>
</tr>
<tr>
<td>☐ man</td>
<td>☐ man</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 2</th>
<th>Question 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>أنت</strong></td>
<td><strong>هذا البيت صغير</strong></td>
</tr>
<tr>
<td>Identify whether the following word is masculine or feminine.</td>
<td>Identify what the following Arabic words/phrases mean.</td>
</tr>
<tr>
<td>☐ masculine</td>
<td>☐ This cat is big.</td>
</tr>
<tr>
<td>☐ feminine</td>
<td>☐ This house is small.</td>
</tr>
<tr>
<td>☐ man</td>
<td>☐ The cat is on the house.</td>
</tr>
<tr>
<td>☐ woman</td>
<td>☐ The man is behind the cat.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 3</th>
<th>Question 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>انا بنت</strong></td>
<td><strong>الشمس</strong></td>
</tr>
<tr>
<td>Identify what the following Arabic words/phrases mean.</td>
<td>Identify what the following Arabic words/phrases mean.</td>
</tr>
<tr>
<td>☐ I am a girl.</td>
<td>☐ house</td>
</tr>
<tr>
<td>☐ I am a boy.</td>
<td>☐ mountain</td>
</tr>
<tr>
<td>☐ I am a woman.</td>
<td>☐ sky</td>
</tr>
<tr>
<td>☐ I am a man.</td>
<td>☐ sun</td>
</tr>
</tbody>
</table>
Question 7

Identify what the following Arabic words/ phrases mean.

- The house is there.
- The woman is there.
- I am here.
- I am in the house.

Submit Response

Question 10

Listen to the audio. Choose the appropriate English translation.

- They (masculine)
- They (feminine)
- You (masculine)
- You (feminine)

Submit Response

Question 8

Identify what the following Arabic words/ phrases mean.

- The girl is short.
- The girl is tall.
- The boy is short.
- The boy is tall.

Submit Response

Question 11

Listen to the audio. Choose the appropriate English translation.

- He is a man.
- She is a woman.
- He is a boy.
- She is a girl.

Submit Response

Question 9

Identify what the following Arabic words/ phrases mean.

- In
- In
- House
- Cat

Submit Response

Question 12

Listen to the audio. Choose the appropriate English translation.

- You are a man.
- You are a woman.
- You are a boy.
- You are a girl.
Question 13

Listen to the audio. Choose the appropriate English translation.

- This cat is big.
- This cat is small.
- This house is big.
- This house is small.

Submit Response

Question 16

Listen to the audio. Choose the appropriate English translation.

- This cat is big.
- This cat is small.
- This house is big.
- This house is small.

Submit Response

Question 14

Listen to the audio. Choose the appropriate English translation.

- The man is behind the house.
- The man is beneath the cat.
- The man is in front of the house.
- The man is in the house.

Submit Response

Question 17

Match the audio with the corresponding Arabic script.

- هذه البيت قصيرة
- هذه البيت طويلة
- هذا الولد قصير
- هذا الولد طويل

Submit Response

Question 15

Listen to the audio. Choose the appropriate English translation.

- You are girls.
- You are women.
- We are girls.
- We are women.

Submit Response

Question 18

Match the audio with the corresponding Arabic script.

- البيت
- في
- هذا
- الخض

Submit Response
Question 19

Match the audio with the corresponding Arabic script.

- ولد
- أُولاد
- رجل
- رجل

Submit Response

Question 20

Match the audio with the corresponding Arabic script.

- بنت
- رجل
- إمرأة
- ولد

Submit Response

Question 21

Match the audio with the corresponding Arabic script.

- هم
- فه
- أنتم
- أنتم

Submit Response

Question 22

Match the audio with the corresponding Arabic script.

- بنت
- إمرأة
- رجل
- ولد

Submit Response

Question 23

Listen to the Arabic word or phrase. Choose the image that corresponds with what you hear.

Submit Response

Question 24
Question 37

Choose the Arabic script and sound that corresponds with the image.

- أنت
- هو
- نحن
- أنتم