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The effects of media on vocabulary acquisition in a web-based environment

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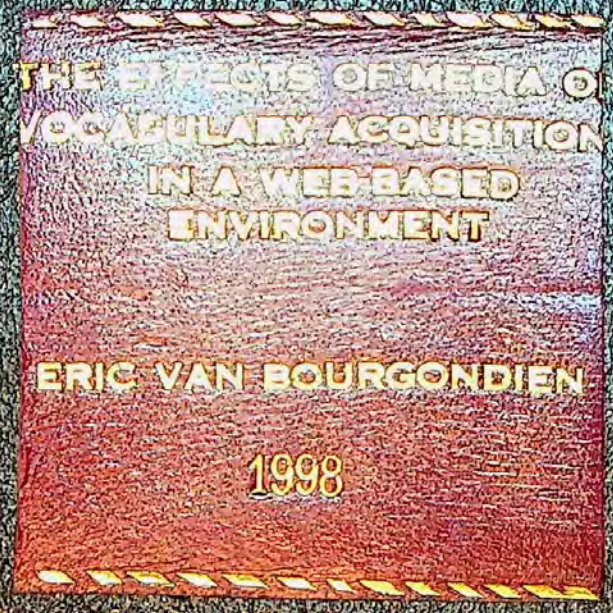
The American University in Cairo AUC



The American University in Cairo

School of Humanities and Social Sciences

The Effects of Media on Vocabulary Acquisition in a Web-Based Environment

A Thesis Submitted by

Eric Van Bourgondien

to the

Teaching English as a Foreign Language Program,
The English Language Institute

in partial fulfillment of the requirements for
the degree of Master of Arts

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ACKNOWLEDGMENTS

A large number people have contributed to my thesis. For everyone who helped, thank you very much. All of you have made this process an enjoyable one.

First, I would like to express a hearty thank you to my Thesis Committee, Dr. Amira Agameya, Dr. Fred Perry, and Dr. Paul Stevens, for all of your support and contributions over the period of this project. Each one of you have made this experience worthwhile.

I also would like to thank Nader Nabeel Ishak for allowing me to invade your territory and helping me whenever I needed it. Thank you. I would also like to thank Tom Farkas for giving me permission to work with the students in the English Language Institute. And I would like to thank the Academic Computing Services for giving access and an unlimited amount of space on their server.

I would also like to thank all of the teachers who granted me permission to work with their students: Rania Jabr, Linda Bennett, Katinka Proudfoot and Karen Park. In addition to these teachers, I would like to thank all of the students that participated in the study. Without your help, I could not have completed my thesis.

I would also like to thank the fourth *ghost* reader of my thesis committee: Stacey Anne Hoyle. You have been a part of this project from the beginning giving support, positive feedback, and encouragement the entire time. Stacey you're the greatest!

Finally, I would like to thank my Mom and Dad for all of their love and support...Thanks.

ABSTRACT

The present study investigates the effectiveness of different types of media, pictures and video, for teaching vocabulary on the Web. The previous research in this area reported conflicting results. Through the use of a rigorous research design the study examines which type of media better assisted second language learners to acquire vocabulary: pictures or video.

The study used 38 subjects studying in the Intensive English Program at the American University in Cairo. All of the subjects were taken from the same English level. They all received a pretest, treatment and posttest. The treatment consisted of the students viewing web pages which contained a still picture or video representing the target vocabulary item. All of the subjects viewed eight pictures and eight videos. The 38 subjects were split into two groups, one group viewed eight pictures and eight videos of the target items while the second group viewed the exact opposite type of media for the same target items. All of the target vocabulary items used in the study were concrete items and a large majority were concrete nouns.

The study examined the data collected from the posttest and found that overall there was no significant difference between the pictures and the videos used in the study. However, when further examination of individual items was explored there appeared to be a significant difference for one of the target vocabulary items. In addition, a significant increase between the pretest and posttest indicates that the use of pictures and videos was an effective means of teaching vocabulary. More generally the study also found that the use of the Web as a tool for displaying pictures and videos was an effective platform.

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Chapter 1

Introduction

Computer Assisted Language Learning (CALL) is an area within applied linguistics that has experienced enormous growth in the past few years. The use of CALL is appealing to both teachers and students. The CALL environment increases the motivation of the students through the use of new and exciting technologies and software available, for instance, the CD-ROM technology that is continually improving and allowing for larger multimedia programs to be quickly accessed. This enables the students to interact with programs without pauses in the learning. CALL also encourages the students to become independent learners through immediate feedback and explanations designed into the software programs. The students have the freedom to access lessons anytime, day or night, while working at their own pace.

The CALL lab also has expanded its territory into the area of web-based learning because of its ability to gain access to the World Wide Web (WWW or the Web) and the Internet. Universities around the world have developed web pages that assist both the language learner and teacher. The English Language Institute (ELI) at American University in Cairo (AUC), for example, has a web site that provides such resources for both students and teachers (http://acs.auc.eun.eg/www/eli/elihome.html). Web-based learning has many of the same advantages as CALL, such as immediate feedback and promoting independent learning. In addition, it provides the language learner direct access to real language in the form of text, sound and video. The Web learner can read newspapers from around the world through the help of web sites like Newspapers On-line, a site that provides the Uniform Resource Locator (URL) addresses to newspapers around the world (http://www.newspapers.com). Or the learner can listen to radio stations via the Internet. This can be both a language learning experience and a cultural experience at the same time. For instance, KQRS, a Minnesota-based radio station, broadcasts live over the Internet and the Minneapolis area (http://www.92kqrs.com). The students who listen to the "KQRS Morning Crew" radio broadcast, for instance,

would not only get an opportunity to practice their English skills through exposure to authentic English but also get an understanding of the culture by knowing what the people of Minnesota are interested, in such as the local sports teams and their love for Sven and Olie jokes. The student also has the ability to access video via the Internet. For instance, a student can visit a virtual zoo and see videos of animals that they may never have known existed at the San Diego Zoo web site (http://www.sandiegozoo .org). Or a student can watch video clips of news items from web sites like CNN's web site (http://cnn.com).

The WWW is growing everyday and the amount of real language offered via the Internet is overwhelming. This growth makes it a rich and exciting resource for the language learner and teacher. In order to use the WWW to its full potential, it is important that research be done to study how to best utilize the WWW. Research should be conducted to see what makes a good web site and to find which resources on the Web can best be used to teach English as a Foreign Language (EFL).

In the present study, the use of web pages was chosen over using a CALL authoring tool like HyperCard for a number of reasons. The HyperCard format lacks a nice interface whereas the web page can incorporate many colors and graphics, which is appealing to the learner. In addition, the HyperCard program with video and pictures would have to be loaded on the computers used in the study. The use of web pages allows the video and pictures used in this study to be on an external server which the ELI CALL lab has direct access to via the AUC intranet. (An intranet differs from the Internet basically in size. The Internet is a large network of computers connected together all over the world.) The AUC intranet is the network found on the AUC campus and it is also connected to the Internet. This connection to the Internet leads to another reason why the web site was chosen over the HyperCard CALL program. The site is able to be posted on the ELI web site and is be a good resource for EFL learners around the world.

The study also aims to make a number of contributions to the field of EFL. First, the results will be useful in designing future EFL web sites. All of the pictures and videos used in the study were taken directly from the WWW, thus the results should help guide developers of EFL web-based sites on how to build, e.g., a good vocabulary web site. Not everything on the Web has value and this study is trying to locate sources that do have value for EFL web sites. Second, since the study analyzes the use of videos and pictures as tools for teaching vocabulary, the results will be useful for both web-based learning and also CALL multimedia applications. Third, the study sheds light on how EFL learners acquire vocabulary in a web-based learning environment.

A. The problem and its setting

The combination of the computer and its software in a CALL environment has been an area of enormous expansion. There have been a number of position papers which discuss the possible applications of computers and software in a CALL environment (e.g., Chun & Brandl, 1992; Hoffman, 1995; Sciarone & Meijer, 1993; Thomas & Chesters, 1992). However, there appears to be a lack of studies that examine the effectiveness of media-driven software that is designed to teach vocabulary in a CALL environment.

One study that led to the research question was completed by Chun and Plass (1996a). Their study analyzed the use of video and still pictures to teach reading and vocabulary, while also analyzing whether text and pictures or text and video led to better vocabulary acquisition. The target words used in the study were a combination of words referring to human action, nonhuman action, concrete, abstract, human behavior and nonhuman behavior. Chun and Plass found that within hypertext programs containing still pictures and videos, the videos were less effective at teaching vocabulary than still pictures. They produced evidence which showed text and picture programs were better

at teaching vocabulary than text and video programs. Chun and Plass (1996b) reported contradictory results in a second study which found that text and videos were more effective at teaching vocabulary than text and pictures. These two studies have led to the development of the research question.

B. Research question

The research question which the present study attempts to answer was first triggered by the Chun and Plass studies: Which is a more effective tool in teaching English vocabulary: text and pictures or text and videos?

C. Delimitations

One variable that was not included into the study is sound. No sound tracks were attached to the still pictures or the video clips. Another variable that was not examined was the effect of long video clips versus short video clips. The length of all video clips was strictly controlled to ensure they were the same length. A third variable that was not examined was the effect of large pictures or videos versus small pictures or videos. They were all the same size. If these preceding variables had been included in the study, it would have become too large to complete in the limited time that was available.

D. The definitions of terms/abbreviations

American University in Cairo (AUC).

Computer Assisted Language Learning (CALL): The combination of computers and software technologies used to help in the acquisition of language (Paramskas, 1993).

English as a Foreign Language (EFL).

English Language Institute (ELI).

Hypertext Markup Language (HTML): A flexible computer language that enables non-computer programmers to create web pages that contain a hierarchical linkage of text, graphics, audio, video and any other type of information in any sequence (Schwartz, 1995; Shin, Schallert & Savenye, 1994).

World Wide Web (WWW).

E. Importance of the study

Far from being a mere fun exercise of building and displaying a web site full of pictures and videos, the study strives to help understand which is a more effective tool of teaching and learning vocabulary: pictures or videos or both. The main impetus of the study is to explore the WWW as a tool for vocabulary acquisition. In addition, the study analyzed the feasibility of displaying these two types of media in a Web environment. The rapid growth of the Internet and the inclusion of this resource into many EFL classrooms is another reason why this and other studies should be conducted in the area of web-based language learning. The present research study attempts to add to the existing knowledge on the web as a resource of ESL/EFL language learner. It is hoped that the results of this study will contribute knowledge that other researchers in related fields could build upon.

Chapter 2

Literature review

The development of this study has led to a review of the literature covering three separate areas: CALL, web-based learning, and second language vocabulary acquisition. Each of these divisions contains literature that has led to the research question being asked. The three major components of the literature review were developed for a number of reasons. The use of pictures and videos in the language classroom spans a number of areas. These different types of media are found in CALL programs and web sites in addition to being used in the classroom as audio visual tools. The inclusion of a section on vocabulary acquisition only seems logical since this is the whole point of the present study.

A. The pedagogical value of CALL

There is an abundance of literature that has been written relating to CALL. The literature can be divided into two separate types: position papers and empirical studies. The position papers all helped lead to the development of this study (e.g., Chun & Brandl, 1992; Hoffman, 1995; Sciarone & Meijer, 1993; Thompson & Chesters, 1992). For instance, Thompson and Chesters (1992) described CALL as a significant field which should be included into every modern language course. In their article, they examined the different types of CALL programs such as the traditional programs that presented simple language drills as compared to newer, complex CD-ROM applications and multimedia programs. The CALL lab was able to provide the language learner a variety of creative applications, thereby enabling the student to learn the language more easily and at a faster rate.

1. Position papers

Position papers mainly emphasized the pedagogical value of CALL. Topics include motivation, developing autonomous learners, and program development. One study by Chun and Brandl (1992) stated that the power of a hypertext program lies in the fact

that it could incorporate audio, pictures and video into a useful software package for teaching vocabulary. The use of multimedia in a computer program is important at many levels. First, the use of pictures and video can be a valuable tool in teaching new vocabulary. The multimedia program incorporates text, pictures or video all at the same time, enabling the learner to get a deeper understanding of the foreign vocabulary item. Second, multimedia computer programs are highly motivational. The students can enjoy a lesson that includes any combination of audio, pictures and video while being cognitively involved in a language learning experience. If the students do not understand a vocabulary item they can rerun the program, which is another strength of using such programs since the learner is in command of the process until learning occurs.

Another study that emphasized the motivational value in hypermedia programs was Holmes and Keffer (1995). Their study examined the effectiveness of using a computer program designed using HyperCard to teach Latin and Greek root words. In the concluding remarks, they suggested that computer programs should have the feel of a video game to inspire students to interact with the program. Holmes and Keffer stated that students' motivation level increases when a CALL program is used, although it should be noted that the study did not show any statistically significant results.

Scott (1997) observed positive attributes of using video in a study about the use of hypermedia in developing scaffolding within an educational environment. According to Scott, scaffolding is a teaching technique in which the students are given support to help decrease the gap between the knowledge already acquired and some desired goal. In this technique, the student enters a conversation about which his/her knowledge is nonexistent, and through interaction the learner gradually builds on what is said to him/her. The positive features of using video included the student's ability to stop and replay the video until the concept being taught was understood by the student. In other words, replaying the situation replaces the effect of interaction in conversation. In

addition, the video can have an audio track attached to it to give further information regarding the concept.

The positive attributes of video in a CALL environment were affirmed by Diadori (1989) in an article about the use of authentic texts in language teaching. The authentic texts that Diadori used were songs by famous rock musicians. It was argued that video within computer-guided exercises could be quite useful in the language classroom. Some of the positive aspects of this combination is that the students are highly motivated to work with computers and popular music. Also the teacher can select and present the materials deemed appropriate by the teacher. Finally, the use of computers allows for immediate feedback for the students. It would appear from these two studies that video within a hypermedia environment is receiving high accolades from people using video in education.

In addition to a sound pedagogical foundation, software programs must be designed such that a number of considerations are taken care of. Hoffman (1995) explained that a successful computer program in the CALL environment should be user friendly. Hoffman maintained that no matter how pedagogically sound the program is, it is of little value if the student cannot run the program. Hoffman also stated that a program should not bore or overwhelm the students. She noted that it is quite tempting to use an authoring program like HyperCard to fill the program with as much information as possible. However, the student may not be able to handle all of the information given and this breakdown does not benefit the language learner.

Rieber (1990), by contrast, believed that additional research should focus on the design of multimedia computer programs and the use of words and pictures. He stated that the use of animation in multimedia is generally used to impress instead of being used to teach. According to Rieber, designers must use multimedia when it is appropriate and resist their desire to use multimedia when no rationale exists. Yang (1996) confirms

the importance of well designed hypermedia programs. Yang emphasized that designing instructional software is a multifaceted task. The software must come from sound pedagogy which strives to bring together the student, teacher and the base of information. Applications that achieve this interaction add to the success of any curriculum.

Despite the general agreement in the literature on the importance of using CALL in the ESL/EFL classroom, some studies have cautioned about excessive use of CALL. Thompson and Chesters (1992), for instance, concluded that additional research and development should be made into CALL software and courseware. They believed that current research was not convincing enough to show its effectiveness. They also stated that the theoretical work being done should be studied and tested in the classroom both in areas of CALL software development and courseware development. Most of their article described the uses of CALL and although Thompson and Chesters believed that CALL was valuable, they wanted future research to give empirical data to support their opinions.

The position papers, as evident from the review above, explained a number of the strengths of using the computer in the EFL classroom. These studies stressed the importance of future scientific research in the area of CALL. In a review of the literature available, there appear to be more opinions than scientific data. This strengthens the rationale for examining the research problem of the present study since, by using a rigorous research design, it will be one step closer to providing empirical data analyzing CALL and web-based instruction.

2. Empirical research

The opinions stated in the aforementioned articles have inspired scientific research to be conducted in a wide range of CALL-related topics. Basena and Jamieson (1996), for example, conducted a study that analyzed a number of studies that had been conducted

in the field of CALL between the years of 1990-1994. They categorized the different types of CALL research conducted within that period, so future research could utilize information on related research design and methodology. Their study identified a few noteworthy pieces of information. First, the number of different types of scientific studies is so vast that to identify a coherent agenda in the field of CALL would be impossible. Second, 50% of the 67 articles analyzed in their study used statistical procedures such as counts, percentages, means, standard deviations and lacked any inferential statistics. And a majority of these studies had a sample size of 30 or less subjects. These findings from Basena and Jamieson illustrate three major weaknesses in the field of CALL. First, the field lacks a coherent agenda. Second, the statistical analysis procedures used in previous studies were weak and incomplete. Whenever possible, researchers should go beyond simple descriptive statistics when analyzing their data. Finally, the sample sizes are too small to arrive at any statistically significant or any generalizable results. In the present study, it is hoped that the weaknesses found by Basena and Jamieson are overcome by strengthening the research design.

A study that took place after the time frame of Basena and Jamieson's study was conducted by Chun and Plass (1996a). Their study was based on two previous studies (Chun & Plass 1993; Chun & Plass, 1995) which they conducted about a CALL program they designed entitled *CyberBuch*. *CyberBuch* is a multimedia program designed to teach German reading comprehension to university students learning German in California (http://humanitas.ucsb.edu/depts/german/CyberBuch.html). It uses German passages that contain annotations in the form of text, pictures and video to help with unknown vocabulary items. The students read a German short story and are expected to look up the vocabulary items using the provided annotations. Chun and Plass's study found that the most effective way to teach vocabulary was through the use of pictures and text as compared to text and video. They suggested that future research should explore the reasons why pictures were found to be more effective in teaching vocabulary than video.

Chun and Plass (1996b) conducted another study that strongly influenced the present study. In this study, they again used their *CyberBuch* program and were analyzing reading comprehension. Specifically they were examining top-down processing and bottom-up processing. However, as a part of this study they briefly reported some findings related to vocabulary acquisition and the different types of media they used. They concluded that video was more effective than still pictures. This contradicted the previous study (1996a) that they conducted on vocabulary acquisition. An explanation for these different results could be threefold. First, *CyberBuch* is a reading comprehension program that has a passage on the right hand side of the screen and a space on the left for annotations to appear. The annotations appear only if they are requested by the subjects. As the student reads the passage they see words that have a symbol (°) next to them indicating that they are annotated words. There is a possibility that the subjects did not view the media. Since both studies use this program and the subjects are not required to view the annotations Chun and Plass may be making an assumption that the students are viewing all of the media when, in fact, they are not. This could have influenced their results. Second, another explanation for the difference between the findings of the studies is the possibility that the physical forms of the media vary. For instance, the size of the videos could be of varying lengths and heights. Or the pictures could be varying in size in comparison with other pictures and videos. This type of information is not reported in the two studies or in their web site about *CyberBuch*. Third, the sample size may have also been a factor between the two studies. Chun and Plass (1996a) based their results on data collected from 103 subjects whereas the Chun and Plass (1996b) study based results on 36 subjects. These contradictory results between the two studies by Chun and Plass is the primary force driving the present study.

B. Developments in web-based learning

With the rapid expansion and interest in the WWW has come the development of web pages designed for ESL/EFL learners. The appeal that cyberspace has for EFL learners is great. They are able to be transported around the globe in the comfort and safety of their own computer terminal. They can investigate their individual interests in the target language of English. Quite realistically any subject or topic they have an interest in can be found on the Web. As a result, web-based learning has become a popular topic in the academic journals recently and has also been reported in mainstream media. For instance, CNN reported a web-based learning project that was run by the company PTK Interactive (Hill, 1997). They set up a web site that displayed real time video of marine life found off the coast of Santa Barbara, California. Students from secondary schools were invited to ask live questions via a text chat system which the diver could answer orally using a microphone in his mask.

Universities and English language programs around the world have been quick to explore the possibility of web-based learning by setting up their own web sites. Ohio University and the University of Illinois are two larger universities that have massive home pages which are designed for the ESL/EFL learners. At the Ohio University CALL Lab English Resources Page, resources can be found covering topics such as grammar, vocabulary, listening, writing and speaking (e.g., http://www.tcom. ohiou.edu/OU_ Language/lang-english.html). The site is interactive and allows the student to practice each of the skills directly on the web (Knobel & Lankshear, 1997). Other universities with fewer resources, such as the English Language Institute at the American University in Cairo, have set up smaller web sites that provide links to web sites like the one at Ohio University. Whether the web sites are large or small, the general goal is to allow the students an opportunity to practice their English skills. In addition to university programs, the WWW has a number of other resources that are available but are privately operated and usually are trying to sell a product. One such site is Dave's ESL Cafe (http://www.eslcafe.com). It is a large site designed for both

the ESL learner and teacher. It provides explanations and practice in areas such as grammar, vocabulary, writing, and listening. In addition, it has a chat room for students to gather and practice their English skills. Dates for chat sessions are announced and students from around the world can gather and practice their English skills. Since this is a privately owned site, the user is constantly reminded to buy a book written by the web page designer. However, the variety and quality of web sites differ from location to location and the number of scientific studies that have been designed to study web-based learning are far outweighed by the number of articles expressing the potential of the WWW for the English learner.

The majority of the articles found in academic ESL journals focus on using the Web as an EFL learning tool. These articles can be categorized into two groups. The first category provides information on web-based learning and home page development (Levine, 1993; Underwood, 1995/96). For instance, Levine (1993) produced an on-line article that provided a lengthy description of how to build an interactive educational web page. The second type of article that exists in the academic journals describes projects that language learners can do on the WWW (e.g., Hanson-Smith, 1996; Hanson-Smith, 1997; Knobel & Lankshear, 1997; Magoto, 1995; Robb, 1995/96). For instance, Magoto (1995) provided a list of ESL web sites found on the Internet that are available for the ESL learner and teacher. There are a number of activities that an EFL learner can do according to Magoto. One listening comprehension activity included visiting the White House web site, listening to inaugural speeches given by President Clinton, and having the students compare these different speeches (http://www.whitehouse.gov). Magoto also suggested that EFL students could visit the Ohio University web site and correspond with other students studying in an intensive English program. Knobel and Lankshear (1997) further suggested that EFL students could visit The Weekly Idiom Index and learn about other ways the English language can be used (http://www.comenius.com/idiom/index.html). The amount of

activities available via the Internet appears to only be limited by the EFL instructors' imagination.

Since the interest in the WWW as a teaching tool is new, the number of empirical studies available is limited. Keeping this in mind, the studies that do exist appear to have similar weaknesses as previously mentioned about research conducted regarding CALL. Soltesz (1996) examined the effectiveness of teaching writing through building web pages. Soltesz's study could only be described as scientific under the loosest of terms. The sample size was unidentified and a self assessment survey was used to collect information on whether the students believed that building a web page improved their English skills, computer skills, and helped them to better understand an engineering topic. Based on simple percentages reported on affirmative results found from the survey, Soltesz concluded that writing web pages was a successful teaching technique. It was also determined that the Web possesses great potential, especially with new types of web pages that have the ability to display interactive multimedia, 3D graphics, and virtual reality.

Underwood (1995/96) conducted another study which examined the effectiveness of using the Internet as a data collection tool. Underwood's study used web pages to collect information about the similarities and differences of letters found in American Sign Language finger spelling alphabet and the Japanese Katakana syllabary. Underwood concluded that using the Internet saved time and enabled her to survey a more diverse population. The data collected and reported in Underwood's study consisted of simple counts. Both Underwood's study and Soltesz's (1996) study expressed enthusiasm about the potential of web-based learning. However, the research design utilized in each study must be strengthened in future studies concerning web-based learning.

In closing, web-based learning is an issue that has seen growth in many disciplines. Future empirical studies are necessary in order to successfully develop the potential of web-based learning. This review of the literature has examined both CALL and web-based learning as two separate but related areas. However, technology is developing at such a quick rate that the two areas are moving closer to one another. For instance, a new program called *SuperCard* (http://www.supercard.com), available for the Apple Macintosh operating system, allows for the development of CALL-based programs, but it also has the ability to post the programs into a web page and vice versa. Similar programs are becoming available for the IBM operating system. The web page or the CALL application has the potential of displaying still pictures and videos. In order to make the web page or CALL application a strong tool for teaching vocabulary, research should be conducted into what makes an effective still picture or video. The data gathered from the present study can then be used to improve future CALL programs and web pages.

C. Research in L2 vocabulary acquisition

There has been a great deal of research on L2 vocabulary acquisition (e.g., Duquette & Painchaud, 1996; Qian, 1996) and specifically in the area of incidental vocabulary acquisition, where the learner's attention is on a different activity and acquisition of words occurs as a by-product of involvement in that activity. In incidental vocabulary learning, no classroom time is designated to learning vocabulary. For instance, the students acquire vocabulary indirectly through reading a book and using the contextual clues found in the reading to infer the meaning of target language words. Direct vocabulary acquisition takes place through more direct teaching methods such as learning lists of words, learning the meaning of prefixes and affixes, and doing vocabulary-learning exercises. Since the present study employs a direct vocabulary activity using definitions with media, it would seem logical to describe it as direct vocabulary instruction.

There is a debate about whether learning vocabulary in context or decontextualizing the vocabulary leads to better vocabulary acquisition. Qian (1996) stated that previous studies have reported conflicting results as to which is a more effective way of acquiring vocabulary. In his study, Qian found that Chinese university students learned more vocabulary through a decontextualized method with feedback as compared to a contextualized method with feedback. However, these results were not supported in a study by Zimmerman (1997). Zimmerman used 44 ESL students participating in a 10-week English for academic purposes program at an American university. Zimmerman reported that students who learned vocabulary in a highly contextualized manner acquired the vocabulary at a significantly higher level than students who learned their vocabulary from more direct ways. It would appear from Zimmerman's study that the best way to teach vocabulary is through the use of contextualized vocabulary instruction.

In the present study, the use of a more direct technique of teaching vocabulary items with a definition while also including still pictures and video clips for context is a melding of both contextualized and decontextualized methods. The context is the medium used. The medium is actual video or pictures found on the Web. But since it is essentially an isolated vocabulary exercise using vocabulary items and their definitions, it could also be described as decontextualized. The media used in the study provides the students with a richer, visual rather than textual, context that may help them acquire the meaning at a deeper level by associating the target word with the relevant object.

The design of the content of CALL lessons as related to the acquisition of vocabulary has been discussed in a number of articles. For instance, Goodfellow and Laurillard (1990) stated that CALL applications should work to present vocabulary in an interesting context that allows the learner to discover the meaning of a vocabulary item. According to the authors, this can be done through grouping words that have

similarities, such as their meaning or their structure together, so the students can make some generalizations.

Rollinghoff (1993) reported a similar view that words should be grouped together in an article exposing the positive and negative attributes of programming tools like HyperCard and Authorware. Rollinghoff expressed the belief that the higher the quality of the interaction between the vocabulary item and the learner, the more the learner would store into his/her memory. By grouping similar words the interaction between the learner and the CALL program would result in a positive interaction. Thus, if the interaction is of a high quality, then the learner will learn the unknown vocabulary item quickly. If the interaction is of a low quality, then the student will need to interact with the vocabulary item a number of times in order to learn the item. The difference between high and low quality was measured by the number of times the student needed to interact with the vocabulary item in order to learn its meaning. According to Rollinghoff, if the interaction between the student and the vocabulary item was of a high quality then only a few interactions were necessary for the student to learn the vocabulary item. Unfortunately, Rollinghoff does not present any empirical research to support his opinions presented in his study. The information gathered from the present study, by contrast, allows for a better understanding of how to improve the interaction between the language learner and the media used to teach vocabulary items. If the present study, for instance, finds results that pictures are a stronger media at teaching vocabulary then pictures could be used in the future. The use of pictures should then help to make the interaction between the learner a better one, thus assisting in the acquisition of the vocabulary items with fewer interactions. These types of findings may provide some empirical evidence to either support or reject some of Rollinghoff's opinions.

Omaggio (1979) stated that there was little empirical evidence illustrating that language learners benefit from the use of visual aids. However, since that time, a number

studies have shown a great deal of evidence that the use of visual aids such as pictures and video in the language classroom can be an effective tool (Chun & Plass, 1996; Hanley, Herron & Cole, 1995; Price & Finkelstein, 1994; Polette, 1989; Pouwels, 1992; Snyder & Colon, 1988). The visual aids utilized to teach vocabulary can take many forms. Polette (1989) stated that using ABC picture books were effective tools to teach secondary school English students new vocabulary items. Polette endorsed the use of these types of pictures for students who were considered low achievers about to enter universities. These beliefs were based on his teaching experience and evidence provided through anecdotes. Price and Finkelstein (1994) reported that using pictures from magazines as visual aids for vocabulary items improved long term memory of SAT vocabulary items. In their study they took a list of SAT vocabulary items and presented half of the list to a class with pictures and the other half of the list without pictures. It was reported that the vocabulary items that had pictures received significantly higher scores than the items without pictures.

Snyder and Colon (1988) reached similar results in a study they conducted using audio-visual (AV) aids. Second-year high school Spanish students who had had the treatment with the AV aids did better on a vocabulary and listening test than students without the aids. They reported, however, that they found no significant results in the grammar scores between groups. To further investigate the role of AV aids, Pouwels (1992) conducted a study which analyzed the effectiveness of pictures in vocabulary acquisition. A sample of 79 first-year university Spanish students was broken down into three separate treatment groups: a picture group, a text group, and a picture and text group. The study used simple picture flash cards with vocabulary items written in Swahili. The study indicated that the students who were given only the pictures had a higher vocabulary score than the two other groups. The research, thus, appears to indicate that the use of visual aids in the form of still pictures can help in the acquisition of new vocabulary.

Current research also indicates that the use of video as a visual aid can be an effective tool in the language classroom. Secules, Herron and Tomasello (1992) observed that the use of video in the adult foreign language classroom produced positive results in the scores of listening comprehension tests. Herron and Hanley (1992) found that showing a video about a foreign culture to elementary students helped the students to understand a reading passage better than students that were not shown the video. They concluded that videos are good advance organizers in a foreign language classroom. Hanley, Herron, and Cole (1995) built on these results by comparing the two visual aids of videos and pictures as advance organizers for students at the same level. Their study found that video was a stronger advance organizer than pictures for introducing students to new readings. It also appears that the use of video in a foreign language classroom can be an effective visual aid.

The present study examines the role of video and pictures. There are very few empirical studies that examine and compare the effectiveness of these two forms of media. There are, however, a couple of studies that explore animation as opposed to still pictures found within the media used as visual aids to determine possible variables which distract the learner. The amount of current research being done in this specific area is almost nonexistent. In fact, a review of current literature found only two studies that examined what makes a good visual aid. Both studies were conducted in the psychology department at the University of California, Santa Barbara. First, Mayer and Anderson (1992) conducted a study that examined what made a good animation for teaching problem solving to college-level students. In their study, they had five separate groups trying to learn the mechanics of a tire pump. The groups consisted of narration followed by an animation, narration and animation at the same time, only narration, only animation, and no instruction. Their study found that the students that had the narration and animation at the same time were able to complete a problem solving test at a higher level than any other treatment group. The results from this study have led to putting the text with the media used in the present study. A similar

study by Mayer, Bove, Bryman, Mars, and Tapangco (1996) examined the effectiveness of text and simple illustrations designed to teach science. They compared a 600-word lecture based on a scientific concept to a written summary of a lecture with pictures. They found that the students who had the summary with pictures did better on a test than did the students who had the lecture. Furthermore, they found that the groups that had a multimedia summary that contained a small amount of text versus a large amount of text did best on the test. These two studies represent a start to understanding what makes an effective piece of multimedia. The present study strives to build on these results, in addition to adding to the research completed by Chun and Plass (1996a & 1996b).

In summary, numerous elements from a variety of sources have led to the development of the present study. A number of opinions have been expressed about the importance of CALL, but very little research has been completed on the development of CALL software. Invariably, these studies about CALL conclude that more research has to be done in the field of software development (e.g., Paramskas, 1993; Schwartz, 1995; Shin, Schallert & Savenye, 1994). The present study was developed as a result of this need for more CALL research. In addition, it aims to add to the research being done in the fields of web-based learning and multimedia design and development, particularly in relation to the role web-based learning in aiding vocabulary acquisition. Specifically, it tries to identify what is a strong piece of multimedia and it builds on the work that was started by Chun and Plass (1996a, 1996b). If the present study can establish that one medium is more effective than the other and identify which is a better type of media, then this type of media can be used in future visual aids. The present study also helps explore the potential of vocabulary acquisition through web-based learning and provides insight into how to develop an effective EFL web site. The area of CALL and the Web have become popular subjects in the research journals but it is important to conduct research that helps utilize these two tools to their best potential.

Chapter 3

The Study

A. Methodology

The methodology was inspired by research studies that used hypertext CALL programs as a medium for teaching language (e.g., Chun & Plass, 1996a; Sciarone & Meijer, 1993). The general method used in these studies was to give a pretest to the subjects, conduct the treatment by having the subjects run the hypertext CALL program and then take a posttest after a specified period of time. It was suggested that the HTML environment might make designing the study easier. The pilot study illustrated that using HTML allowed for the easy development of the research study (more information about the pilot study is in Chapter 3 under the heading *A. Pilot study*).

B. The definitions of the independent and dependent variables

The independent variables (IV) will be movement in a visual stimulus. The dependent variable (DV) in the study will be acquisition of the target vocabulary words. No moderating variables will be examined in the study.

C. The definitions of constructs and operational definitions of the independent variables and dependent variables

1. The main independent variable in the study is movement. The definition of movement is a sequence of photographs moved with sufficient rapidity as to create the illusion of motion and continuity. The operational definition is the use of video clips or still pictures. The video clips contain a large number of frames that play in succession to give the illusion of movement. The still pictures will be selected from one of the frames found in the video clips.

2. The main dependent variable in the study is vocabulary acquisition. It is defined as words that are learned in the L2. The target vocabulary in the study consisted of concrete words which were evenly divided between the still pictures and the videos.

An example of a concrete word is the vocabulary item *emu*. It is a solid item that can be seen in a picture or a video. The study does not have any abstract words.

D. Pilot study

The present study was designed after a successful completion of a pilot study that took place in the Spring of 1997. The pilot study examined the feasibility of using web pages to teach vocabulary. The web site was entitled the Creatures Workshop (http://sas.auc.eun.eg/tefl/creaturesmp.html). It contained 10 pictures and 10 video clips of 20 different and unusual animals. The sample size of the pilot study was 15 students from the ELI at the English 99 level. They were given a pretest to try to identify whether they had knowledge of the animals found in the web site. They all scored below 25 percent, which was below the guessing probability. They were then allowed to visit the Creatures Workshop and view the pictures and videos of the 20 animals. Four days after viewing the web pages the subjects were given the posttest. The results of the posttest were analyzed using a t-test to see if there was any significant difference between the two types of media used in the web site. The pilot study found no significant difference between the pictures and the videos. It was assumed that the small sample size was the main reason for the results. However, the study did illustrate that web pages made an excellent environment to teach vocabulary using pictures and video. The web pages were easy to create and organize. They were also an aesthetically pleasing environment because of the interesting colors and layout. The web page environment was also easy for the subjects to use and understand since most of them had experience using the Internet. The results of the pilot study helped to create the present study.

E. Assumptions

A number of assumptions have been made which have led to the development of the research problem. First, it is assumed that the students are able to operate both the computer and the software. Second, an assumption is that there are both pictures and

videos available to incorporate into web pages for teaching vocabulary. Third, using the Web is an appropriate environment to teach vocabulary. Fourth, the pretest and posttest are both valid and reliable.

F. Subjects and treatment

The subjects were selected from the English Language Institute (ELI) at the American University in Cairo. The original sample consisted of 75 subjects from five sections in the ELI's 99 level English class. Limitations placed on using subjects from the ELI meant that entire sections had to be used, but in order to achieve a partial random selection the five sections were randomly selected from a possible seven sections. Four of the five sections were given the pretest, treatment, and posttest and the fifth group was given the treatment and posttest. This was done to see if there was pretest effect. The fifth group contained 10 subjects leaving 65 subjects to take the pretest. The 99 level was chosen as the pool to select from because of the large number of students that were enrolled during the Spring term. In addition, the flexibility built into the ELI's class schedule and the number of computers in their CALL laboratory with an Internet connection also allowed for such a large sample size.

G. Materials

The present study used web pages designed through Netscape Gold and operated as a web site on the American University's on-campus intranet and is also accessible through the World Wide Web (WWW). The web pages were divided into two types. One type of web page had text and pictures while the second part included text and video clips. The text was a definition of the vocabulary word located beneath the picture or the video. The definition was taken from the Longman Dictionary. The definitions were taken from this source because this is the dictionary that the ELI students are required to purchase. The vocabulary items, pictures and videos were selected from current news items found at the CNN Interactive web site. The ELI vocabulary teachers often use news articles to teach the vocabulary in context. Thus,

the vocabulary items for the study were selected from vocabulary items found at CNN Interactive. For instance, one vocabulary item was the word *skinhead.* Part of CNN's Interactive web site is a video archive. This archive contains videos related to stories published at the web site. CNN recently posted a video of a group of *skinheads* protesting. The video appeared on a web page with the definition written below the video (see appendix A). CNN allows the use of their video clips and pictures for educational purposes. One current example of CNN's resources being used for educational purposes can be seen at a vocabulary and grammar web site designed for ESL/EFL learners (http://lc.byuh.edu/CNN_N/CNN-N_Page.html). It uses CNN news stories as cloze passages for teaching vocabulary and grammar. All videos and pictures were taken from CNN Interactive and cited on the web site as to give credit to CNN.

All of the video clips were edited to the same length of approximately 10 seconds long. This was done to avoid the length of the video being an extraneous variable affecting the results. In addition, all of the media were the same size. The video clips and pictures were all of the same size at 160 pixels by 200. Over a period of three months, 23 video clips were downloaded from CNN Interactive. These 23 clips were eventually decreased based on the information gathered from the pretest.

H. Development of the web site

The pretest had a dual function. First, it was used to identify subjects who had no prior knowledge of the study's vocabulary. The subjects who scored 25 percent or below on the pretest were considered acceptable for the study. Selecting 25 percent was based on the assumption that it is possible to guess and receive 25 percent on a multiple choice test that has four possible answers. Out of the 65 students who took the pretest, 38 received scores that matched this description. The second function of the pretest was to determine whether any of the vocabulary items should not be used in the treatment part of the study. Each vocabulary item was analyzed to see which items should not be

used for the treatment part of the study. Table 1 shows the percentage of the 38 subjects who correctly answered the multiple choice questions related to the vocabulary items. The reported percentages are from the subjects who received a score of 25 percent or below on the pretest

Table 1- The Percentage of Correct Answers on the Pretest (N=38)

Item Number	Target Word	Percent Correct
1	Swarm	5.3%
2	Skinhead	13.2%
3	Blizzard	7.9%
4	Erosion	15.8%
5	Detonation	10.5%
6	Gusty	10.5%
7	Hail	13.2%
8	Hazing	2.6%
9	Hatch	7.9%
10	Mass	10.5%
11	Survey	5.3%
12	Launched	15.8%
13	Tuba	13.2%
14	Down	2.6%
15	Plunge	18.4%
16	Exorcism	10.5%
17	Tornado	71.1%
18	Embrace	44.7%
19	Demolition	44.7%
20	Bald	65.8%
21	Obese	68.4%
22	Terrain	55.3%
23	Migration	89.5%
24	Bluff	34.2%
25	Barge	47.4%

1. Percentages have been rounded off to the nearest tenth.

Before the pretest had been administered, 18 web pages were created for item numbers 1-18 found in Table 1. Items 19-25 were included in the pretest only as a distraction to counter the pretest effect. Any item that received a percentage of 25 percent or above was considered to be known by the students and was not used in the treatment. Since the two target words *embrace* and *tornado* received scores higher than 25 percent, it was decided to remove these items from the treatment. These web pages were then immediately removed from the web site (A list of the target vocabulary items and their corresponding definitions can be found in Appendix D). The two functions of the pretest were beneficial in providing a good population of subjects and an effective web site.

After the pretest was administered the web site was developed into its final form. The 16 videos which were related to 16 target vocabulary items that were unknown by the sample were placed into the web site. In addition, the 16 still pictures were taken from the video clips. A single frame that was considered most related to the target vocabulary item was removed from the video clip and saved in a format that could be viewed on a web page. The result was 16 video clips and 16 still pictures for the 16 vocabulary items. Two web sites were then created: Group A and Group B. Group A contained pictures and definitions for the following target vocabulary items: plunged, hazing, gusty, swarm, blizzard, mass, detonation, and tuba. It also had video clips and definitions for the following target vocabulary items: hail, survey, exorcism, erosion, launched, hatch, down and skinheads. Group B was the exact opposite of Group A. It had pictures and definitions for the following target vocabulary items: hail, survey, exorcism, erosion, launched, hatch, down and skinheads. It contained the video clips and definitions for the following vocabulary items: plunged, hazing, gusty, swarm, blizzard, mass, detonation, and tuba. Both groups were displayed in a random order using a Java script that all of the web pages used as their guide.

I. Instrument of measurement

A pretest and a posttest (a copy of the pretest is located in Appendix B and a copy of the posttest is located in Appendix C) were the two instruments used in the study. The pretest determined whether the students were suitable for the study and identified vocabulary items that were already known by the sample. The pretest and posttest were multiple choice tests in parallel forms. In the multiple choice test, a sentence was given with the target vocabulary item missing. The subject had to select the answer that best suited the context of the sentence from the list of four possible choices. If the subjects scored well on the pretest, 25 percent or above, then they were not allowed to participate in the study. 25 percent was selected as the cut-off point because this is the guessing probability on a standard multiple choose test with four possible answers. In order to control for pretest effect, nine other vocabulary items not included in the web pages were on the pretest and posttest. In addition, the posttest used different sentences than the pretest, but the meanings of both sentences used were parallel with one another. A final control for pretest effect involved giving the posttest to an additional section which consisted of ten subjects to determine if there was a pretest effect.

Since the pretest and posttest were parallel forms it was assumed that a check of the pretest would be sufficient in determining the reliability of both the pretest and posttest. A draft of the pretest was given to two groups of people unrelated to the study. The first group contained 15 American native speakers of English. They were given 20 minutes to complete the exam and they all received perfect scores. This was done to see if the test had any problems. The second group was a group of 10 students from the ELI at the same English level as the subjects used in the study. The results of the exam were analyzed using the Kuder-Richardson method for determining internal consistency. The internal reliability of the exam was estimated at 0.68. The result was lower than expected so a distracter analysis was completed on the pretest. The analysis indicated that some of the distractors were not being used and also some students who

scored high on the pretest were selecting distractors that were too close to the meaning of the correct answer. These items were changed to make the final draft of the pretest. Since both the pretest and posttest were in parallel forms, the estimation of internal reliability was only calculated on the pretest. The scores of the pretest from the 65 subjects were again analyzed using the Kuder-Richardson method and the internal reliability was calculated at 0.81.

J. Procedures

The first step of the study was requesting the permission of the teachers and students. The subjects were informed that participation in the study was completely voluntary and that at any time they wished to quit they would suffer no negative repercussions from the researcher or their class teacher. In addition, they were informed that their performance would not affect their teacher's evaluation. In order to keep their performance confidential, the five sections were all assigned code names. A separate code name list was given to each class and each with different themes. The five themes were super heroes, rock stars, famous actors, nicknames and colors. The master sheet was kept with the researcher for the duration of the study in case the subject forgot his/her code name. The researcher knew the subjects only by their code name for the duration of the study.

After the 65 subjects selected their code name, they were administered the pretest to determine if they were suitable for the study and to identify whether some of the vocabulary words were already known to the subjects. They were allowed 20 minutes to complete the test, but they all completed the test in approximately 10 minutes. After correcting the pretest, the original population of subjects decreased from 65 to 38 students because they received scores of 25 percent or below on the pretest. After correcting the pretest, the results of each item was analyzed to see how many of the items the students answered correctly. Based on this analysis, the vocabulary items used in the treatment were selected.

Four days after taking the pretest, the 38 subjects and the 10 subjects who did not take the pretest went to the CALL lab to view the web pages. The students were randomly assigned to view either the Group A or the Group B web pages. The students were given a brief tutorial on how to operate the web site and what to expect using a still picture of a *buffalo* and video of a *jellyfish* taken from the pilot study's Creatures Workshop. After the two-minute tutorial the subjects began viewing the web pages. It took approximately ten minutes for the students to view the 16 vocabulary web pages. After they completed viewing the pages, the students were thanked for their time and allowed to leave the lab. After all of students saw the web pages they were removed from the server so no one could view the pages. Some of the students asked for the web site's URL, but they were told that the web site would be removed. During the treatment, the subjects did not take any notes. They simply viewed the media and read the definitions related to the media.

One week after the treatment, all 48 subjects were given the posttest. They were again allowed 20 minutes to complete the test, but they all completed the test in approximately 10 minutes. After completing the posttest, the subjects were thanked for their time and given a thank you card and a piece of candy in appreciation of their time.

Chapter 4

Results

A. Introduction

The first section of this chapter explores the possibility of a pretest effect. If it appears that there is a pretest effect then the results will be significantly affected. The second section analyzes the data needed to answer the research question. Within this section a number of subsections explore issues such as: results directly related to the differences between pictures and videos and results related to vocabulary acquisition.

B. Pretest effect

In order to determine if there was a pretest effect the sample of 48 subjects was divided into two groups. The first group of 38 subjects received the pretest, treatment and posttest. The second group consisted of 10 students who did not have the pretest, but did have the treatment and the posttest. The descriptive statistics for both groups are in Table 2.

Table 2- Descriptive Statistics for the Pretest/Posttest Group and Posttest Only Group

	Pretest/Posttest Group	Posttest Only Group
Number	38	10
Mean	9.58	6.50
Standard Deviation	2.56	3.17

1. Values have been rounded off to the nearest hundredth.

The two groups' results on the media from the posttests were compared using an independent t-test. The significance level was set at $p< 0.05$ in order to avoid a Type I error. The pretest/posttest group received a score significantly higher compared to the posttest only group; t (46) 3.21, $p< .002$. This significant difference indicates that there was a pretest effect.

The results also indicate that there was a treatment effect in addition to the pretest effect. When the results from pretest of pretest/posttest group were compared with the posttest only group, it appears as though a pretest effect may not be the only force behind the acquisition of the target vocabulary. The descriptive statistics for each group are in Table 3.

Table 3- *Descriptive Statistics for the Pretest/Posttest Group's Score on the Pretest and Posttest Only Group's Score on the Posttest*

	Pretest/Posttest Group	**Posttest Only Group**
Number	38	10
Mean	1.63	6.50
Standard Deviation	1.10	3.17

1. Values have been rounded off to the nearest hundredth.

An independent t-test was conducted to explore if the difference between the pretest/posttest group and the posttest only group on the treatment items was significant. The significance level was set at $p < 0.05$ in order to avoid a Type I error. The t-test indicated that the posttest only group scored significant higher when compared with the pretest/posttest group; $t(46) = -7.99$, $p < 0.000$. The posttest only group's significantly higher performance on the posttest in comparison with the pretest/posttest group's lower performance on the pretest appears to indicate that the treatment did help the students to acquire the vocabulary. However, the decision to use only the data collected from the 38 subjects to answer the research question is based on the fact that the comparisons made in this subsection are partially made using a small sample size of 10 subjects. The comparisons made may have had a greater strength had the two groups were the same size.

C. Research question: Which is a more effective tool in teaching vocabulary: text and pictures or text and videos?

1. The difference between the pictures and videos

The results of the posttest were divided into two sections: pictures and videos. The descriptive statistics from the posttest can be found in Table 4.

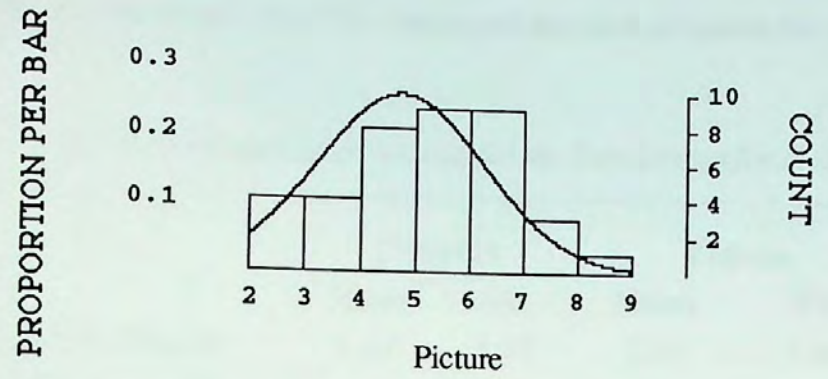
Table 4- Descriptive Statistics of Pictures and Videos (N=38)

	Picture	Video
Minimum Score	2	2
Maximum Score	8	8
Mean	4.74	4.84
Standard Deviation	1.54	1.52
Median	5	5

1. Values have been rounded off to the nearest hundredth.

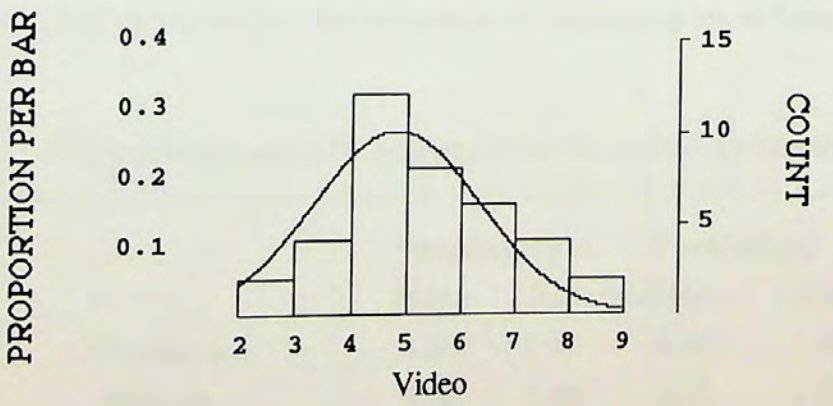
The descriptive statistics indicate that there appears to be little difference between the results of the two media. The distributions of the two media in Figure 1 and Figure 2 also appear to be similar in respect to their unimodal shape. In both figures a normal bell curve has been included to help illustrate the shape of both of the distributions.

Figure 1- *Distribution of Pictures (N=38)*



Although Figure 1 appears to have a unimodal distribution, it has a mode that is spread out over 6 and 7. This is quite different from the mode in the video distribution in Figure 2. The video distribution has a very distinct mode that rises high above the distribution.

Figure 2- *Distribution of Videos (N=38)*



The distributions found in Figures 1 and 2 illustrate the descriptive statistics found in Table 4 that the two media are similar. The group of 38 subjects was divided into two groups of 19. One group viewed 8 pictures and 8 videos of the 16 target items while the other group viewed the same amount of media but the video and pictures were reversed for the 16 vocabulary items. Since there were subgroups with in the original

sample of 38 a two-way ANOVA was used to explore differences between the two factors: order and media. The two-way ANOVA explored the possibility of significant differences between media types. Also it examines if there was an interaction between the vocabulary and the media type. The means and standard deviations for media are in Table 5.

Table 5- Means and Standard Deviations for the Two Groups for Media by Order

	Pictures		Videos	
	Mean	**SD**	**Mean**	**SD**
Order 1 (N=19)	4.63	1.57	5.11	1.66
Order 2 (N=19)	4.84	1.54	4.58	1.35

1. Values have been rounded off to the nearest hundredth.

The two-way ANOVA found that main effect for order was not statistically significant ($F(1, 38) = 0.141$; $p = 0.710$). It was also found that media between the two groups of pictures and videos was not significant different between the two types of media ($F(1, 38) = 0.157$; $p = 0.69$). The two-way ANOVA examined the interaction of the means and standard deviations of the vocabulary when compared with the media. The means and standard deviations for the two groups of vocabulary are in Table 6.

Table 6- Means and Standard Deviations for the Vocabulary by Media

	Vocabulary 1		Vocabulary 2	
	Mean	**SD**	**Mean**	**SD**
Pictures	4.63	1.57	4.84	1.54
Videos	4.58	1.66	5.11	1.35

1. Values have been rounded off to the nearest hundredth.

The interaction was not significant ($F(1, 38) = 1.926$; $p = 0.174$. The interaction indicates that between the subgroups within the data such as: similar media types, order and interaction between the media types, and the sets of vocabulary are not statistically

different. The statistics produced by the two-way ANOVA indicates that there was no significant difference between the pictures and videos.

A further analysis was conducted examining each target vocabulary item to identify if there may be a significant difference between the pictures and videos. In order to explore this, 16 separate paired t-test were performed. Multiple comparisons forced the p value to be set at a conservative level of $p<.0025$ in order to avoid a Type I error. Out of the 16 t-tests that were conducted only *plunge* was statistically significant. The *plunge* video ($M= 4.84$, $SD= 2.36$) was significantly more effective than the *plunge* picture ($M= 0.79$, $SD= 0.42$); $t(18) = 11.44$, $p< .0000$. The other 15 comparisons were found to be not statistically significant.

2. Vocabulary acquisition

Implied within the research question is whether acquisition of the 16 target words took place. Two separate approaches were taken to examine whether the subjects acquired the target words. First, inspection of the correct scores on the individual treatment items from the pretest and the posttest were examined and then a paired t-test was run on the scores from pretest and the posttest to examine if the difference between the scores was significant. Table 7 reports the correct scores for both the pretest and posttest for each of the target items and it also reports the total increase between the pretest and posttest for each target item.

Table 7- *Correct Scores for Each Target Vocabulary Item and the Increase between the Two Tests (N=38)*

Target Word	Pretest	Posttest	Increase
Launched	6	35	29
Tuba	5	30	25
Skinhead	5	28	23
Swarm	2	24	22
Exorcism	4	26	22
Plunge	7	28	21
Hatch	3	23	20
Erosion	6	26	20
Survey	2	22	20
Blizzard	3	22	19
Mass	4	21	17
Detonation	4	19	15
Hazing	1	16	15
Hail	5	20	15
Gusty	4	15	11
Down	1	6	5

In every case, the score for each target word increased. The increase for each target item is explored in the Discussion chapter. To further explore this issue of acquisition, a paired t-test was conducted on the treatment items from the pretest and posttest to see if the increase was significant. The significance level was set at $p< 0.05$ in order to avoid a Type I error. The difference between the pretest ($M=1.63$, $SD= 1.10$) and the posttest ($M= 9.58$, $SD=2.56$) was significant, $t (37) = -16.03992$, $p< 0.00$.

In order to explore which of the target items were significant, 16 separate paired t-test were performed. Multiple comparisons forced the p value to be set a very conservative level of $p < .0025$ in order to avoid a Type I error. The results of these multiple t-test are as follows indicated that all but two showed a statistically significant increase between the pretest and posttest. The two items that did not have a statistically significant increase were: The *gusty* pretest ($M = 0.11$, $SD = 0.31$) did not show significant difference when compared to the *gusty* posttest ($M = 0.40$, $SD = 0.50$); $t(37) = -3.15$, $p = .0031$. The *down* pretest ($M = 0.03$, $SD = 0.16$) did not show a significant difference when compared to the *down* posttest ($M = 0.16$, $SD = 0.37$); $t(37) = -2.37$, $p = .0232$.

Chapter 5

Discussion

The discussion begins with the present study's research, using the data presented in the results chapter. The second section of this chapter compares these results with the findings of previous studies that were the main influence in the present study. The third section analyzes the results related to the acquisition of the 16 treatment items. The next section examines the implications for teaching. The fifth section discusses the limitations of the study while the sixth section makes some suggestions for future research. The final section contains some closing remarks.

A. Research question: Which is a more effective tool in teaching vocabulary items: text and pictures or text and videos?

The results chapter indicates that there is no significant difference between the use of text and pictures and text and videos in teaching the present study's target vocabulary. The acquisition of target items was assisted by the use of the pretest, which probably alerted the subjects to the impending treatment. However, the pretest effect was not the only factor that contributed to the subjects' acquisition of the vocabulary. There was also a treatment effect that led to the acquisition of the target vocabulary.

The results chapter also appears to illustrate that the use of web pages was an effective means of assisting the subjects to acquire the vocabulary items. This acquisition was illustrated through the increase of the scores from the pretest to the posttest and the significant difference detected by the t-test between the pretest and posttest means and standard deviations.

The results from the inferential statistics found no significant difference between the two types of media of pictures and video. However, when the individual target items are examined for differences between the pictures and videos, it appears that the video

for *plunge* was significantly more effective than the picture. This may be due to the meaning of the word. Since *plunge* is a verb and the video was able to demonstrate the complete action in progress, this may be the reason for the video being a stronger medium than the still picture. The still picture illustrated the action while it was in progress, but it was only able to show part of the complete action. The meaning embedded into the picture *plunge* may not have been as clear as the video, and as reported in the results chapter, *plunge* was the only target vocabulary item that showed a statistically significant difference between the pictures and the videos. The other verb in the study, *launch*, did not show a significant difference between the two types of media used. Unlike *plunge* the meaning *launch* does not need to have the complete action demonstrated through a video. It can be demonstrated effectively through the use of a static picture. This may be the reason behind why *launch* did not show a significant difference between the picture and the video.

B. Relation with previous studies

The Chun and Plass studies (1996a, 1996b) which inspired the present study reported contradictory findings related to which medium taught vocabulary more effectively. The present study's results contradict the findings in Chun and Plass (1996b). In their study, they found video to be a better tool than pictures for teaching vocabulary. The results also contradict Chun and Plass (1996a) where they claimed that pictures were a better tool for teaching vocabulary than video. It would appear from the current study that pictures and video are equally effective at teaching vocabulary. There are a few explanations for the differences between the two studies done by Chun and Plass and the present study.

The focus of the study conducted by Chun and Plass (1996b) was on reading comprehension. Their study utilized a CALL reading comprehension program called *CyberBuch* which was developed by them. It was reported that the authors were using the study to not only study reading comprehension, but also to improve their CALL

program. Although they were primarily interested in studying reading comprehension, they briefly examined the effectiveness of pictures and videos as a means for teaching vocabulary. In both of the studies by Chun and Plass (1996a, 1996b), they examined the effectiveness of the two types of media as a secondary issue, it is possible that they did not control for as many of the extraneous variables that were controlled for in the present study. For instance, the subjects while reading a passage were able to look-up the annotations if they needed assistance. The subject would see a symbol (°) next to a word that had an annotation. The subject could just click on the symbol and either a definition, picture and definition, or a video and definition would appear. There was a possibility that subjects would ignore videos and pictures if they felt as though they already knew the word. This was not the case in the present study. All of the subjects viewed all of the pictures and videos. In addition, it was not reported in the Chun and Plass studies if they controlled for the size and length of the different pieces of media. In the present study, all of the pictures and videos were the same size and all of the videos were the same length. The Chun and Plass studies used different pictures and videos and based their conclusions on different types of media. For instance, in their 1996a study, they used pictures for the following words: *sprengen* (to explode), *auftauen* (to thaw), *drohen* (to threaten), *fang* (catch), *Fischschwarme* (school of fish), *Fischermütze* (fisherman's cap), *ärmlich* (poor, poorly), and *besorgt* (anxious). They then used videos the following words: *sich aufrichten* (to sit up), *kopfschutteln* (shaking of one's head), *sich recken* (to stretch), *Wellenkämme* (white caps), *Münder* (mouths), *Hubschrauber* (helicopter), *betrubt* (sad), and *feindselig* (hostile). The Chun and Plass 1996b study also had similar pictures and videos since they used the same CALL program. In the present study, for every video there was a still picture made from the video. The comparisons were then made on two items that were almost identical with the exception of the variable of movement. Finally, the present study also did not have a reading passage acting as an extraneous variable. Since the hypermedia program *CyberBuch* was a reading comprehension program this may have had an effect on the acquisition of the vocabulary items in both of the Chun and Plass

studies. The present study, however, only provided the subjects with a picture or video and a definition. The Chun and Plass (1996a, 1996b) research design was not as rigorous as the present study and this may explain why the present study attained different results compared to the two previous studies.

C. Acquisition of the treatment items

Table 7 indicates an increase in the overall acquisition of the 16 treatment vocabulary items and upon conducting a paired t-test this increase was found to be statistically significant. This is a positive finding for the study. It appears that using web pages which have pictures and videos plus definitions for unknown vocabulary items can help vocabulary acquisition. The pretest also appears to have had an effect on this acquisition. It would appear that in order for acquisition to occur at such a significant level the subjects need a pretest to make them sensitive to the impending treatment.

An interesting result appears once the individual target items are examined using paired t-tests. The two target words of *gusty* and *down* do not show a significant increase between the pretest and the posttest. And as Table 7 illustrates, these two items come in last when the 16 target items are listed in order from largest correct score increase to smallest correct score increase. The position of *Down* in Table 7 raises the question of why some of the target items experienced a larger increase in their scores while others did not. In the case of *down* it may be related to a couple of factors. First, the video and picture was of a baby penguin with an extremely light coat of feathers. It could be that the subjects did not notice the feathers on the bird or it could be related to the unusual semantic meaning of the word. The subjects are used to *down* being a preposition and the use of *down* as a noun may have led to confusion. In addition, the subjects are familiar with the synonym *feathers*. It could be that learning a new word that denotes a referent is easier to remember than learning a new word denoting something which they already have word for. Another explanation could be related to

the fact that *down* is a mass noun, something that contradicts what they already know about *feathers*, which is a count noun.

The target word *gusty* also showed no significant increase between the pretest and the posttest. The video and picture were considered a perfect example of the word in action and it was surprising to see such a low increase. There was only one difference between *gusty* and the other target items, it was an adjective. However, it is unclear why this may have add an effect on its overall acquisition. One possible explanation is that the subjects may be familiar with the word *windy* and learning a synonym is more difficult than learning a new word with a referent.

The remaining 14 target vocabulary items were found to have a statistically significant increase between the pretest and the posttest. A number of reasons could have attributed to this statistically significant increase. For instance, concrete nouns like *tuba* and *hatch* which are physical objects can be seen easily in both a picture or a video. This probably helped the subjects to acquire and recall these words more easily than less physically obvious objects like *Mass* and *blizzard.*

The two verbs in the study produced some interesting results worth mentioning. First as stated earlier, the target word *plunge* produced results which appeared to indicate that video helped in the acquisition of the word compared to a picture. And according to Table 7 *launched* had the largest overall increase in a raw score between the pretest and the posttest. However, *launched* did not indicate a significant difference when examining differences between the pictures and the videos. A close examination, however, of the action involved in both verbs can provide an explanation for lack of significant difference in the case of *launch.* A partial movement of a craft in the right direction can illustrate *launching*, either in a still picture or a video. In the case of *plunge*, by contrast, partial movement cannot achieve the same effect. For the learner

to understand the meaning of the verb, the whole action must be seen, which explains why the video was significantly more effective in the case of *plunge* than *launch.*

Table 7 also indicates that the target item *exorcism* had a dramatic increase between the pretest and posttest. This increase is not surprising. During the treatment it was observed that a couple of the subjects covered their faces and shrieked when they viewed the video for *exorcism.* This reaction indicates that the subjects were familiar with the notion but probably did not have knowledge of the English words for it. It was thought that such a powerful video might result in a significant difference between the pictures and the videos, however this did not occur.

Generally, the results related to acquisition of the target vocabulary were considered positive. It was hoped that the results may have indicated which type of medium would teach what type of word better. However, the results do not help to support too many specific conclusions about what types of media should be used with different types of words.

D. Limitations

The study has a number of limitations, a few of which have already been discussed. First, the types of vocabulary used in the treatment is probably the major limitation. The study examined concrete vocabulary items, most of which did not require movement to illustrate the meaning of the word. The vocabulary selected for the study was based on the videos downloaded from the CNN video archive and all of the video downloaded were related to vocabulary items that were classified as concrete. Out of the 16 target items there was only one adjective, two verbs and 13 nouns. Since the majority of the target words were nouns this again limits the ability to generalize the results to parts of speech other than nouns. Hence, the results can only be generalized to pictures and videos used to teach concrete nouns. Another limitation of the study is related to the uniqueness of the 16 target items. Some of the meanings of the

vocabulary items such as *down* and *hazing*, as mentioned earlier in this chapter, are quite unique and this may have impacted the findings of the present study. This could also be interpreted as a strength, the students were unable to acquire the target word *down* from the medium and definition provided. Hence, not all of the words can be taught using this method. The next major limitation of the study is related to the size of the sample. The study started with 65 subjects and through the pretest the number of subjects was lowered to 38. The present findings would have more power if the study had been conducted on a larger sample.

E. Implications for teaching

The implications for teaching go beyond the environment where the study was conducted. The use of still pictures and videos has been reported as a useful tool in CALL applications (Chun & Brandl, 1992; Chun & Plass, 1996a; Chun & Plass 1996b). Based on the present study's results these CALL applications can interchange video and pictures when the goal is to teach concrete vocabulary items, specifically concrete nouns. In addition, web masters at institutions like Ohio University or AUC interested in developing vocabulary web sites can build these sites using video and pictures with the same limitations as the CALL software designers. Furthermore, the results of the study give support to studies conducted on vocabulary acquisition and AV aids (Price & Finkelstein, 1994; Snyder & Colon, 1988). The present study's results endorse the notion that both the pictures and videos work as AV aids and help acquisition of unknown vocabulary items. Another implication is based on the conclusion that this teaching technique does not work with all vocabulary items. The role of the EFL instructor is crucial in facilitating acquisition of these more difficult vocabulary items. More generally, the web has proved to be a very effective means of teaching vocabulary.

F. Future research

The possibilities for future research in this area of study are quite large. The most obvious area that should be explored is to examine if there are any differences between pictures and videos when abstract words are used as the target vocabulary. The future studies could also examine the differences between the two different types of media and abstract and concrete. Is it possible that video teaches abstract words better than concrete words or do pictures teach abstract words better? Also the different types of media could be examined based on different types of words such as nouns and verbs. Future research may want to examine different types words in the relation of motion and the media. For instance, the word *mountain* has no motion in its meaning. This could be compared to *acceleration* which has motion in its meaning. It would be interesting to see if pictures or videos teach these types of words more effectively. In the future, it would be advisable to allow for a greater time span between giving the pretest and the treatment. This may eliminate the pretest effect that occurred during the present study. Also, it would be interesting to give two posttests, one immediately after the treatment and one after a longer period time to explore the differences of long-term versus short-term acquisition of the vocabulary in relation to the media.

G. Advice to teachers

I would strongly recommend the future use of the Web environment, especially when displaying video and pictures on an intranet or on the Internet. The ability to store large quantities of video on a remote server versus storing them on every computer needed for the study was an advantage that is highly recommended. The intranet was so fast that the video was able to load onto the page faster than it was playing. There was never a time when the subjects were left waiting for a video to load. In addition, using the Netscape browser as the main application for viewing the site is also recommended. The Apple computers used in the study were a number of years old and by using a version of Netscape that had been tested and shown to be solid, the study was able to be completed without a single computer crashing.

Researchers should know that the Web environment is easy to use and has the capability for many other experiments other then the one presented in this study. It is now possible to display pictures, animation, movies, sound, and text. Related to these possibilities, it is also feasible to use a common gateway interface (CGI) to place instruments such as pretests and posttests directly on the Web. This allows not only the researcher flexibility, but also the subjects. It is not necessary for the subjects to come to the laboratory in which the study is being conducted. The researcher can come directly to the subjects' personal computers via the Web.

The EFL instructor in the field should consider adding a web site similar to the present study for a number of important reasons. First, it is an easy tool to create. All of the software needed to create a web site similar to the presents study's is freely available on the Internet. Second, the subjects who participated in the study enjoyed the experience. The feedback received from them was overwhelmingly positive. I believe incorporating these pictures and videos with reading passages plus some follow-up in class activities would make the experience an effective reading and vocabulary task. I do not believe that this type of task is the way all reading and vocabulary should be taught. It would, however, make an nice change for the students who are bored of reading passage after passage in the class. The possibilities of using this environment are only limited to the EFL's imagination.

H. Conclusion

The Web is growing in sophistication and popularity and I believe that the future will see fewer CALL applications and more web-based language learning. Language learners will be able to visit language learning web sites. If they desire a more authentic language experience, they also have the flexibility to explore the Internet to experience real language. In addition, the Web is not limited to the English language, it is possible to find and view languages from around the world. It is important that the language

classroom keep up with this valuable resource and use it to its fullest potential which can only be done through research similar to the present study.

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Appendix A:

Vocabulary Item 1:

Skin-Head

SKIN-HEAD: (n) A young man who has hair that is cut very short, especially one who behaves violently.

APPENDIX B
Pretest

Vocabulary Inventory I

Directions: In the following sentences choose the *one* vocabulary word that best suits the meaning of the sentence. Then on your answer sheet, find the number of the question and blacken the space that corresponds to the letter you have chosen so that the letter cannot be seen. [25 Points]

Example:

1. The _____ was used to travel across the sea.

A. boat
B. car
C. bike
D. cart

1. a b c d

---

1. The _____ man was happy that he never needed to use a comb.

A. bearded
B. shaggy
C. bald
D. prickly

2. The violent _____ spun around the town destroying everything in its narrow path.

A. monsoon
B. tornado
C. hurricane
D. tempest

3. The _____ of bees looked like a dark cloud.

A. flock
B. herd
C. swarm
D. brood

4. The aggressive behavior of the protesting _____ frightened the bystanders.

A. eggheads
B. skinheads
C. skinflints
D. acidheads

5. The 300 kilogram person was best described as _____.

A. slender
B. obese
C. thick
D. compact

6. The winter _____ dropped so much snow so quickly that the commuters were stranded on the roads.

A. downpour
B. monsoon
C. blizzard
D. drizzle

7. The _____ of the old building took only seconds because it was done with explosives.

A. demolition
B. eradication
C. erection
D. deconstruction

8. The four wheel drive truck is known for being able to drive on any type of _____.

A. terrain
B. street
C. rock
D. sand

9. The daughter _____ her father at the airport because she had not seen him for six months.

A. restrained
B. squeezed
C. embraced
D. saluted

10. The process of _____ turned the rough, jagged stone into smooth stone.

A. destruction
B. corrosion
C. dissolution
D. erosion

11. The _____ of the atomic bomb caused a shock wave felt around the world.

A. perpetuation
B. desperation
C. penetration
D. detonation

12. The _____ wind of the sand storm tore the branches from the trees.

A. drafty
B. breezy
C. airy
D. gusty

13. The big rain drops turned into _____ as they came down because of the cold temperatures.

A. hail
B. ice
C. frost
D. drizzle

14. _____ new students at the military school by senior students is a dangerous tradition.

A. Hazing
B. Hassling
C. Teasing
D. Ridiculing

15. After the space shuttle landed, the astronauts opened the _____ and exited the ship.

A. door
B. shutter
C. hatch
D. gate

16. The annual _____ of birds from the north to the south is weather related.

A. desertion
B. migration
C. regression
D. crusade

17. _____ begins at 11:00 am sharp every Sunday morning at St. Paul's Cathedral.

A. Funeral
B. Mass
C. Confession
D. Baptism

18. After the engineer's _____ of the land was completed, the construction workers began to build the road.

A. scaling
B. ranking
C. calculation
D. survey

19. The car drove off the _____ and fell a hundred meters into the canyon.

A. bluff
B. carrier
C. tarmac
D. ramp

20. The next mission of the spaceship is scheduled to be _____ on Friday.

A. discharged
B. released
C. flung
D. launched

21. The _____ is the largest instrument in the orchestra and it also makes the deepest sounding music.

A. trumpet
B. piccolo
C. clarinet
D. tuba

22. The _____ was used to carry large amounts of grain down the river.

A. lifeboat
B. rowboat
C. yacht
D. barge

23. Grandmother's bed always had two fluffy _____ pillows.

A. fleece
B. down
C. hairy
D. furry

24. When the whale _____ into the water it made an enormous splash.

A. plunged
B. sprinted
C. hovered
D. surged

25. The _____ was performed over the woman's body to release the evil spirits.

A. exorcism
B. anachronism
C. mysticism
D. ventriloquism

APPENDIX C
Posttest

Vocabulary Inventory II

Directions: In the following sentences choose the *one* vocabulary word that best suits the meaning of the sentence. Then on your answer sheet, find the number of the question and blacken the space that corresponds to the letter you have chosen so that the letter cannot be seen. [25 Points]

Example:

1. The _____ was used to travel across the sea.

A. boat
B. car
C. bike
D. cart

1. a b c d

---

1. We studied the _____ of animals in science.

A. regression
B. migration
C. desertion
D. crusade

2. The logs were loaded onto the _____ to be delivered downstream.

A. barge
B. yacht
C. rowboat
D. lifeboat

3. The impact of the _____ put dents into the new car's body.

A. ice
B. hail
C. frost
D. drizzle

4. The swimmers _____ into the lake making a tremendous splash.

A. surged
B. hovered
C. sprinted
D. plunged

5. The car leaned to one side because the passenger was _____.

A. thick
B. obese
C. slender
D. compact

6. Seniors were suspended from the military school for participating in _____ rituals that put the new students in danger.

A. ridiculing
B. hassling
C. teasing
D. hazing

7. The _____ of the old hotel allowed for the construction of a new hospital.

A. demolition
B. eradication
C. erection
D. deconstruction

8. Part of a geologist's work includes a thorough _____ of the rock to be studied.

A. scaling
B. ranking
C. survey
D. calculation

9. The _____ of the house removed all of the ghosts.

A. ventriloquism
B. anachronism
C. mysticism
D. exorcism

10. The marble statue of the woman had suffered from years of _____ that had worn away the details of her face.

A. destruction
B. dissolution
C. erosion
D. corrosion

11. The rocket was _____ after a ten second countdown.

A. released
B. discharged
C. launched
D. flung

12. The house's rooftop was peeled off by the _____ weather.

A. drafty
B. breezy
C. gusty
D. airy

13. The _____ of insects covered the carcass of the freshly killed deer.

A. flock
B. swarm
C. brood
D. herd

14. The trees were covered with snow after the _____.

A. blizzard
B. drizzle
C. downpour
D. monsoon

15. Once the _____ of the rocket was opened the astronauts appeared.

A. shutter
B. door
C. gate
D. hatch

16. Grandfather never needs to go to the barber because he is _____.

A. bald
B. shaggy
C. bearded
D. prickly

17. The woman regularly attended _____ every Sunday at St. Mary's church.

A. baptism
B. funeral
C. mass
D. confession

18. The rough _____ caused many problems for the hikers.

A. terrain
B. street
C. rock
D. sand

19. Building the house on the _____ made for a wonderful view of the ocean.

A. pad
B. bluff
C. tarmac
D. carrier

20. _____ of the missile began on impact.

A. Perpetuation
B. Penetration
C. Desperation
D. Detonation

21. The bass produced by the _____ was so deep that the audience could feel it.

A. trumpet
B. tuba
C. clarinet
D. piccolo

22. The _____ touched down tearing apart everything in its way.

A. tornado
B. tempest
C. monsoon
D. hurricane

23. The _____ lining of the nest kept the baby birds warm.

A. fleece
B. furry
C. hairy
D. down

24. The group of _____ marched down the street waving flags and yelling bad words.

A. eggheads
B. acidheads
C. skinflints
D. skinheads

25. The mother _____ her new born baby.

A. embraced
B. squeezed
C. saluted
D. restrained

Appendix D: The definitions used for each target vocabulary item.

1. Tuba: A very large musical instrument, consisting of a curved metal tube.

2. Skinhead: A young person who has hair that is cut very short, especially one who behaves very violently.

3. Hazing: To play tricks on a person as part of the ceremony of joining a club.

4. Exorcism: To force evil spirits to leave someone's body by using special words and ceremonies.

5. Hatch: A door that covers a hole in a ship or aircraft.

6. Plunge: Dive or jump into water.

7. Erosion: the process of being slowly destroyed by rain, wind, and or the sea.

8. Gusty: with the wind blowing in strong sudden movements.

9. Survey: an examination of an area of land in order to make a map of it.

10. Detonation: an explosion or the action of making a bomb explode.

11. Launch: to send an aircraft into space.

12. Mass: the main weekly ceremony in some Christian churches.

13. Down: the soft fine feathers of a bird.

14. Blizzard: a severe snow storm.

15. Hail: frozen rain drops that fall as hard balls of ice.

16. Swarm: a large group of insects; especially bees.