

ROCHESTER INSTITUTE OF TECHNOLOGY

A Thesis Submitted to the Faculty of
The College of Imaging Arts & Sciences
in Candidacy for the Degree of
MASTER OF FINE ARTS

English-Spanish-American Sign Language Translation Program

By:

Janise Maria Negrón

Date: February 1, 1995

Approvals

Adviser: Professor Jim Ver Hague

Date: 3.16.95

Associate Adviser: Professor Robert Keough

Date: 3-16-95

Associate Adviser: Professor Nancy Ciolek

Date: 3.16.95

Department Chairperson:

Date: 3-17-95

I, Janise Negrón, prefer to be contacted each time a request for production is made.
I can be reached at the following address:

400 Main Dt, Apt. D-3
East Rochester, NY 14445

Date: February 1, 1995

TABLE OF CONTENTS

| | |
|--|----|
| ACKNOWLEDGMENTS | ii |
| Chapter | |
| 1. INTRODUCTION | 1 |
| Statement of the Problem | |
| Significance of the Problem | |
| Assumptions | |
| 2. REVIEW OF THE RELATED LITERATURE | 6 |
| <u>A Basic Vocabulary</u> | 6 |
| <u>Learning to See</u> | 7 |
| <u>Signed Language Interpreting</u> | 10 |
| “History of Sign Language and Finger-Spelling” | 11 |
| “Computers in Foreign Language Teaching and Research” | 13 |
| “Computers in Foreign Language Teaching and Research” (part 2) | 15 |
| <u>Principles of Interactive Computer Graphics</u> | 17 |
| <u>Interactive Computer Graphics Systems</u> | 18 |
| <u>Patterns of Spanish Pronunciation</u> | 19 |
| <u>The Spanish Language</u> | 20 |
| 3. PROCEDURE | 21 |
| 4. RESULTS | 24 |
| 5. SUMMARY | 26 |
| Recommendations | |
| Conclusions | |
| BIBLIOGRAPHY | 28 |
| APPENDIX | 29 |

ACKNOWLEDGMENTS

I wish to express my gratitude to Professor Jim Ver Hague, Professor Bob Keough, Professor Nancy Ciolek, and Professor Mark Collien for all the advice in developing the English/ Spanish/ASL translation Program.

Thanks to Scott Pinkoski and Mary Therese McCann, whose contribution was essential in creating the translation program.

Special thanks to my parents, Jose Ernesto Negrón and Dulce Maria Negrón for the good example, education, inspiration and motivation to make the Translation Program come true.

CHAPTER 1

INTRODUCTION

STATEMENT OF THE PROBLEM

The creation of a more individualized, memorable, appealing, attractive, interesting and effective method of language education has become a necessity in the competitive world.

SIGNIFICANCE OF THE PROBLEM

Every man and woman of intelligence realizes the imperative need of having command of a foreign language. Whether in professional, diplomatic, social or commercial life, a sound and sure knowledge of our fellow man's language is the great essential of understanding among people and nations of the world.

It has become more and more important to understand other languages in order to succeed not only throughout our careers, but also through everyday life. The current fight for survival in this competitive world has made people recognize the importance of the acquisition of a second language. With increasing trade between Latin America and the English-speaking world, a knowledge of the Spanish language has become a real necessity in business. Travel, too has become more frequent to the southern hemisphere and to the rest of the world. Most companies nowadays require that their employees possess the knowledge of a second language, and in a very increasing way, the American Sign Language. More and more people find that they can advance in their professional goals, expand their social and cultural horizons, and travel with assurance when they have a command of a second language, especially Spanish and American Sign Language. The interest among the United States population in enriching their lives by learning these two languages has consequently created great demand for the development of more effective language education.

The present methods of language education needs much improvement. After experiencing how people are educated into learning the Spanish and the American Sign Language, especially through cassettes or videocassettes, I acknowledge the great need of a more memorable and appealing method. The language students are not receiving an individualized instruction, making

him/her lose attention and interest in the offered education. These students, as all students, differ widely in their abilities. They work at different rates and with different levels of accuracy and comprehension. For obvious reasons, language schools cannot offer courses of instruction tailored to meet the needs of each individual student. The student's freedom is limited to take control over the sequence of events and the rate of progress in the learning process.

Current language education has not made much attempt to increase the student's interest by the inclusion of humorous and challenging items, like games or interactive media, in the instructional materials. The inclusion of these items would not only reinforce the language education, but would make it more memorable.

I think that every effort should be made concerning this problem of language education through research of its methods and effectivity. This way we could make the world more accessible, closer and with less barriers.

ASSUMPTIONS

I understand that a possible solution to the problem of language education, specifically of the Spanish and the American Sign Languages, can be an interactive computer translation program. When the innovative technology of interaction is placed in an educational context like this, it can provide powerful help and motivation in the limitations of the learning process. Through this program, I could put together all the elements of effective education, including aesthetics, individualization, simulation and entertainment.

I find that the interactive computer technology is a clear way to offer the opportunity of attractive and meaningful learning experience to very large numbers of persons. This technology, while simultaneously handling many students, can allow each to proceed at one's own pace and level of achievement. The interactive computer program would demand the attention of the student during the entire session, just as would an individual tutor.

Entertainment has proven to be one of the most effective ways to make information memorable. This explains why I will include a game at the end of the interactive computer translation program. This game will definitely reinforce the theory knowledge of the program. Games can also be extremely effective when it is necessary to simulate situations of great complexity.

I am certain that because of the complex and extensive procedures required to develop the proposed computer translation program, I will overcome memory limitations. As a consequence, these limitations will bring other problems to confront, such as speed and quality. Furthermore, and because of this, the list of translated words will have to be restrained to a minimum quantity.

In addition to this, the ASL QuickTime movies will have to be maintained small in

size. I recognize that as this new technology progresses, most of these limitations will diminish significantly, making possible the creation of computer programs, like the Translation Program, that will represent a beneficial step towards the quality of language education.

CHAPTER 2

REVIEW OF THE RELATED LITERATURE

A BASIC VOCABULARY¹

This book primarily elevates the importance of communication, of language, and specifically of the American Sign Language. Its author, Terrence J. O'Rourke, defines communication as a basic human right. He explains that communication as a basic human right is the means by which we learn and relate to the larger society of which we are a part.

As for language, it is a master tool with which all other tools are created. Language is our way of symbolizing, sharing experiences and passing on knowledge from one generation to the next. O'Rourke adds that "without language, the mind must be forever imprisoned in the immediate unreasoned present; with language, the mind is free to explore past and future."

American Sign Language is identified as an important tool for enabling communication to occur. It also provides for expression of needs, wants and feelings. O'Rourke adds that American Sign Language lays a foundation for forging bridges between human beings, hearing and deaf. It has developed in the hands and for the eyes. Finally O'Rourke mentions that researchers have found, rather to their surprise, that the sign language of the deaf is a fully developed language, with a complex grammar, with its own rules of construction, and its way of incorporating semantic information into the basic sign.

¹Terrence J. O'Rourke, A Basic Vocabulary, (Silver Spring, Md.: T. J. Publishers, 1978), 200-228.

LEARNING TO SEE²

After going through this book, I learned of the history, characteristics and popularity of American Sign Language (ASL). I also read of its demographics and of how computer technology has to improve to provide better education to the deaf population.

Sherman and Phyllis Wilcox start out by explaining an event that occurred in 1965 that was to change the history of a language and its people. William C. Stokoe, Dorothy Casterline and Carl Croneberg published their Dictionary of American Sign Language on Linguistic Principles. At the time, few people paid attention because few hearing Americans knew that ASL existed, but it has shown progress throughout the years. As a result, in the present time it has reached an all time high and shows no sign of declining. S. and P. Wilcox express in relation to this: "Any language teacher has to feel heartened by such popularity and acceptance of a previously neglected language, especially when it is a language in our very midst."

In the next chapters, S. and P. Wilcox describe the American Sign Language as the visual and gestural language that serves as the primary means of communication of deaf people in the United States and parts of Canada. At the time this book was written, the estimates were that between 100,000 and 500,000 people use ASL. It is explained that ASL is a true human language with all the features and characteristics of other human languages. It is a fully developed natural language, one of the world's many signed languages. It is a complete language with its own grammar. It is not a derivative of English; ASL contains structures and processes that English does not. Neither is it a simplified language.

²Sherman Wilcox, Learning to See, (Englewood Cliffs, N.J.: Prentice Hall Regents, 1991), 85-134.

ASL does seem to exhibit a high degree of iconicity. ASL words often seem to resemble features of their referent. The evolution of ASL over the last 75 to 100 years however, is such that the degree of iconicity is elevating.

The book's authors mention the interesting fact that most people assume that sign language is universal. Perhaps this is because many people wrongly assume that sign language is based on universal emotional expressions or body language. This is not the case. Research on young deaf children make a clear distinction between the use of facial expressions to convey emotions and facial expressions to convey grammatical features of the language.

Another thing people assume is that ASL is not a naturally-occurring language but was instead devised by hearing people to help deaf people understand and acquire language. These people wondered why people would devise more than one signed language. The answer, of course, is that no one invented ASL; it is a naturally-occurring language.

When people learn that ASL is not universal they often remark that it would be nice if deaf people all over the world could communicate with each other. It would also be nice if hearing people all over the world could break language barriers. The fact is that people everywhere, including deaf people, use different languages.

In relation to what computers have to offer to the future of ASL education, Wilcox mention in the last chapters of their book that most of the current computer-designed signed and finger-spelling programs have been a disappointment. Teachers complain of the lack of resolution of the signing movements. There is an artificial quality to sign movements and transitions between signed words. On the horizon, however, is one new technology with tremendous potential for use in second language - interactive media. Although interactive media and multimedia

technology have been explored in the teaching of spoken foreign language, until recently, it has remained largely untapped for use in teaching ASL.

This is surprising because this technology is suited for visual presentations and learning by doing. A few pioneer projects are geared toward bringing this innovative and exciting new resource to the field of ASL instruction.

SIGNED LANGUAGE INTERPRETING³

In the introduction of her book, Solow emphasizes how challenging it is for sign language interpreters to create the necessary bridges between hearing and hearing-impaired people. She explains that this is caused by differences, not in the language, but in culture. She mentions: "As interpreters, we must function in a very real way as the ears of one person and the eyes of the other. Beyond this, we must serve as cultural bridges as well."

Later on, Solow defines how important it is to improve the environment where the ASL interpreters and deaf students interact. For example, one of the details we should pay attention to is the background. This relates to the visibility and ease in watching for the deaf person. Background pertains both to the interpreter's clothing and to the background behind the interpreter. The interpreter's clothing should offer a plain, solid color that contrasts with their skin. The interpreter should also attempt to arrange the physical environment so that he or she signs in front of a contrasting wall or backdrops.

³Sharon Neumann Solow, Signed Language Interpreting, (Silver Spring, Md.: National Association of the Deaf, 1981), 50-83.

HISTORY OF SIGN LANGUAGE AND FINGER-SPELLING⁴

The Sign Language used by the United States population came originally from France in the 19th century. Dr. Mason Cogswell was among a group of men in Hartford, Connecticut who became interested in deaf education. Dr. Cogswell's deaf daughter was taught on an experimental basis by a young minister, Dr. Thomas Hopkins Gallaudet.

As a result, Dr. Gallaudet was sent to England and later to a school in Paris where Mr. Abbe Sicard, the inventor of the sign language, taught him his sign system and his method of educating.

Dr. Gallaudet returned to America with Laurent Clerc, a young deaf instructor from the French school. Together they enlarged and modified the French sign language and afterwards established the first American School of Sign Language.

The first permanent school for the deaf was established in Hartford, Connecticut in 1817. Dr. Gallaudet had envisioned the establishment of a college for the deaf. This dream was passed on to his son, Edward Minor Gallaudet, who was responsible for establishing Gallaudet College, the world's first and only college for deaf students, located in Washington D.C.

Finger-spelling, the use of hand positions to represent the letters of the alphabet is much older than the language of signs. The positions of the fingers of the hand do, to some extent, resemble the printed letters of the alphabet. Illustrations of the manual alphabet have been found to exist early in the Christian era. There is evidence that finger-spelling was used as a means of communication during the Middle Ages. Most of the European countries use a single handed alphabet, while the English alphabet requires the use of two hands. Today

⁴Donald J. Bowen, "History of Sign Language and Finger-spelling," New York Times Magazine, 20 October 1985, 6-7.

each country that has a manual alphabet uses its own version which is therefore understood only by users of that particular system.

The question is often asked whether sign language is universal. Each country has developed its own standard system of sign language. In recent years, an international sign language has been developed that crosses national barriers and permits communication between deaf persons of many countries. This has proven very helpful for international events such as conferences and Olympic Games for the Deaf.

Sign language is looked upon by some as a new art form, and is being used in drama and musical performances. Both deaf and hearing people are enjoying new experiences through communicating in the language of signs, making it possible for them to live together with true understanding and mutual enrichment.

COMPUTERS IN FOREIGN LANGUAGE TEACHING AND RESEARCH:
A NEW HUMANISM (PART 1)⁵

The authors of this magazine article present the potential roles of the computer and its allied technology—interactive media. They explain that the new technology can support and enhance a far broader range of activities of foreign language teachers and learners than is generally recognized. The new technology also makes possible access to entirely new sources of authentic language data: audio and video allow the scholar to analyze and interpret new aspects of language and communication. The computer's technology can bridge traditional gaps between teaching and research and language and literature. The computer also bridges disciplinary and cultural divisions.

The article includes a list of the computer's technical features that govern storage, manipulation and retrieval of text both in memory and on-screen. These come together to make the interactive language education more efficient. Some of them are the language characters, the printing capabilities, the graphics, the animation and the interfaces with audio, video or CDs. Some computer programs offer simulations, games or problem-solving activities in the foreign language. Student's paths through such materials can be truly open and under their own control, or branching options can be strictly controlled.

More and more directly relevant materials are already available and this rapid expansion of computer technology is attracting strong interest. But teachers are still frustrated by the limited availability and high cost of the necessary massive storage capacity. They also complain because the technology is almost totally unfamiliar to most foreign language teachers.

⁵Nina Garrett, James Noblitt and Frank Dominguez, "Computers in Foreign Language Teaching and Research : A New Humanism: Part 1," Educom Review, Spring 1990, 38-48.

The development of machine-readable dictionaries has led to the recognition of the important role that technology-based lexicography can play in supporting natural language understanding, text generation and dictionary design. As yet, little of this work has been brought to bear on foreign language education, but the potential is there.

Foreign language enrollments are increasing, and the need for foreign language competence in business, industry and government is increasing even more rapidly. Educational reform movements are putting pressure on educational institutions at every level to introduce or expand foreign language offerings at more advanced levels and in less commonly taught languages. Meeting those demands will be impossible without a massive increase in the use of technology, and that will require an increase in funding for developing materials and training teachers.

COMPUTERS IN FOREIGN LANGUAGE TEACHING AND RESEARCH (PART 2)⁶

The second part of this article defines how all language skills can be technologically explored now that the integration of audio and video with the computer can be taken for granted. The interest here is in the computer's ability to interact with learners, while they are in the act of using the foreign language in some meaningful activity, in order to find out how their foreign language thinking reflects the language input. The capabilities of the computer permit it to keep track of every move a learner makes and provide feedback on input. Computers can also make the data directly available to students, give them the opportunity to browse and explore, and structure an environment within which they can organize and interpret the data for themselves. Knowledge so acquired is not a set of items or facts but a process, a way of thinking or making connections, a dynamic and flexible structure of relationships.

The computer has the ability to elicit, collect, and analyze masses of data automatically, objectively, consistently and rapidly, and to track a large number of details at once and analyze the relationships. Another of the computer's abilities is its potential for interacting directly with the learner in the act of producing language, in addition to its ability to respond specifically to learners' input.

Computer software offers the opportunity to collect bits of knowledge to be fitted into a linear pattern. The information could also be structured as a network of related ideas about the primary data, in which the learner is helped to develop the information-processing mode of thought that characterizes the teacher-scholar's own approach.

Since any language system consists of its vocabulary and its grammar, the

⁶Nina Garrett, James Noblitt and Frank Dominguez, "Computers in Foreign Language Teaching and Research : Part 2," Educom Review, Summer 1990, 39-45.

learning of these two components is obviously essential to the development of the traditional four skills: speaking, listening, reading and writing. Research in cognitive psychology and first language acquisition suggests the importance of a multi-media environment including audio, video or graphic representation of word-meaning relationships.

Technically inexperienced teacher-scholars who are asked how the computer can further contribute their education methods will at first respond only with tasks that are already familiar with. Only when new possibilities are demonstrated to them in the conceptual framework of their own discipline will they begin to expand their own ideas as a basis for new users. Consequently, they should learn the new technology before they are able to suggest more complex research and teaching development. After acquiring the basic concepts of the new technology, teacher-scholars will become better able to articulate their particular needs to the computer vendors and to insist to their peers and their campus administrators that using technology enhances the values of discipline. It is essential for the currently emerging and the new generations of teacher-scholars to be sophisticated users of technology-based materials and technological tools in all aspects of their professional lives.

A computer assisted research on second language acquisition agenda cannot be planned without putting together the knowledge of those who develop the literary, linguistic or language acquisition theories and those who design the computer software for either research or teaching. This combination should be supported by disciplinary recognition, promotion and tenure.

PRINCIPLES OF INTERACTIVE COMPUTER GRAPHICS⁷

Newman begins by describing that Interactive Computer graphics is a topic of rapidly growing importance in the computer field. It is an extremely effective medium for communication between man and computer. The human eye can absorb the information in the monitor of a computer much faster than in other means of communication. All of this has been known for some years, but the high cost of computer graphics technology has prevented its widespread use. Now the cost is dropping rapidly, and interactive computer graphics is becoming available to more and more people.

Interactive computer graphics involves two-way communication between computer and user. The computer, upon receiving signals from the input device, can modify the displayed picture appropriately. To the user it appears as if the picture is changing instantaneously in response to his commands. When the user gives a series of commands to the computer, each one generates a graphical response from the computer. In this way he maintains a conversation or dialogue, with the computer.

⁷William M. Newman, Principles of Interactive Computer Graphics, (New York: McGraw-Hill, 1979), 23-51.

INTERACTIVE COMPUTER GRAPHIC SYSTEMS⁸

This book made me comprehend the capabilities of the interactive computer graphics, and how it has progressed through the years. The author represents computer-oriented interactive graphics as the combination of a computer and a graphics output and input. This is described as a medium by which a user manipulates visual information. These computer graphics systems condense, code and display information in comprehensible form, allowing users to have more complete and timely information than with conventional systems. Information is presented in a more easily grasped form, trends are presented clearly, deviations are highlighted and questions are answered more easily. Another of the computer graphics systems' capabilities is described as related to the human brain by the author House who mentions, "The computer, which is a supreme construction of the left hemisphere, teaches us pattern recognition, which is a characteristic function of the right hemisphere."

House explains that with hardware costs declining, and more software becoming available, the popularity of computer graphics is increasing rapidly. Three changes that have fostered the increased usage of graphic devices in almost all industries is the availability of its application packages, its capabilities, and the abundance of documentation.

⁸William C. House, Interactive Computer Graphic Systems, (Princeton, N.J.; New York: Petrocelli Books, 1982), 103-184.

PATTERNS OF SPANISH PRONUNCIATION⁹

Bowen and Stockwell acknowledge how troublesome it could be for English language speakers to speak and pronounce Spanish language correctly. This is because Spanish sounds are different from those of English. They express, "We do not feel that correct pronunciation is just a convenient social grace. We assume, as many competent language teachers and well motivated students assume, that fluent and accurate pronunciation is fundamental to linguistic accomplishment."

The rest of the book covers most of the essential aspects any English speaking student should know to learn the Spanish language. Between these are intonation, inflection and pitch.

⁹Donald J. Bowen, Patterns of Spanish Pronunciation, (Chicago: University of Chicago Press, 1960), 10-40.

THE SPANISH LANGUAGE¹⁰

The author of this book describes the historic traces of how the Spanish language was born. He explains that Spanish, the most harmonious, elegant, and expressive language, is an immigrant of the unique great language of the Basque of Spain. The expansion of the Spanish was principally the work of the great discoverers who followed Columbus to America. Expansion and colonization are characteristic marks of the Spanish language history.

Spain occupied, with her arms and her language, parts of South and Central America. The book's author mentions the countries that employ Spanish as their official language nowadays. Some of them are Paraguay, Peru, Uruguay, Guatemala, Venezuela, Argentina, Bolivia, Chile, Colombia, Ecuador, the islands of the West Indies (Cuba, Puerto Rico, Santo Domingo), and the Philippine Islands.

The historic Spanish claim was thinly asserted over a much wider area, and the spread ran far enough upward to North America. We can have evidence of this by the Spanish names given to a number of western states and cities of U.S.A. as Nevada, Texas, California, Santa Fe, Sacramento, etc.

At the time this book was written, the author provides a rough estimate of at least 85 million people who habitually speak Spanish as their first or second tongue, and about 100 million in its penumbra. These quantities are followed at a considerable distance by French and Italian.

¹⁰William James Entwistle, The Spanish Language, 2d ed. (London: Faber & Faber, 1962), 5-17.

CHAPTER 3

PROCEDURE

The first step taken in this computer graphic design program was its creative process. Starting with drawn thumbnail sketches and rough layouts, I was able to compose a practical design which brings together the basic elements of the English/Spanish/ASL translation program. The design includes bright yellow, red, blue and violet colored graphics and typography. In order to encourage the viewer's interest, I chose to use an informal, optimistic and humorous style language to identify the different categories of the program. Because of its simplicity and legibility, I chose to use the Avant Garde font throughout the translation program.

Having experienced different computer programs, I was able to chose the most appropriate means of presenting my translation program. Aldus SuperCard 1.6, which has authoring environments and hypermedia system capabilities, was chosen as the primary program for the translation project. SuperCard offers the opportunity to include color, sounds, animation and external resources like movies. To complement SuperCard, I chose Adobe Photoshop because of its great paint-draw attributes. The animation program Macromind Director was used to make a short animated introduction. QuickTime Movie and SoundEdit were two essential computer programs used to accomplish the movies and sounds included throughout the translation program. The versatile combination of the five programs, SuperCard, Photoshop, Director, QuickTime and SoundEdit, provided the most efficient features necessary to accomplish the overall translation program.

Combining the paint-draw benefits of the Photoshop program and the

authoring capabilities of the SuperCard program, I was ready to start creating the computer layout design for the English-Spanish, ASL Dictionary. SuperCard provided the paint and draw tools to create both the background design for the windows of each category, and foreground objects for each card. The design elements were basic polygons colored with the CLUT (color look-up table) palette of the SuperCard program. Other more detailed elements, like the program's logo, were imported from Photoshop., which enabled color blends, manipulation, precision type and other advanced painting techniques. By zooming in all the design elements, I was able to retouch them precisely pixel by pixel.

The format of the dictionary consists of a window divided into 3 parts. One part pertains to the English language words, the second to Spanish language words, and the third to small movies representing ASL words. The most emphasized and largest area would be dedicated to the movies, which can be viewed with the movie operations buttons including play, step rewind, step forward and stop.

Seven basic topics were first selected because of their everyday common use: "Courtesies", "Everyday Stuff", "Are You Hungry?", "All Natural...", "Home Sweet Home", "Which Way?" and "Let's Get Wild!". Seven words for each topic were then selected for their simplicity. A total of 49 translated words were more than enough to communicate the basic concept of the program and to make each word memorable to the program's viewer. The viewer can go at its own pace and order to view the translated words throughout the seven topic categories of the dictionary. Furthermore, if the viewer wants to find a certain word, there is a button that will take him/her to the card they want without having to go through the whole dictionary to find it.

The second section of the program consists of two games: the English-ASL game and the English-Spanish game. Both games have a very similar composition.

The only difference is the presence of an ASL movie for the ASL game and a presented Spanish word for the Spanish game. The format for both games have a centered square with simulated stairs. The viewer's objective is to go up these challenging steps, in a limited time, and reach the graduation hat in order to win the game. A series of questions concerning the studied words in the ASL and the Spanish language ought to be answered correctly to jump up each step.

Three game categories are available for each of the two games: easy, easier and easiest. These are easily distinguished for their blue, red and violet background colors. The correct answer to the questions would be indicated if the viewer had it wrong. Moreover, different positive or negative humorous feedbacks will be presented to the player. These feedbacks will be seen and heard. The most complicated category has more steps, while the less complicated has the fewer steps. If the viewer decides to go back to the dictionary and review the words, there is a button that will let the viewer review the dictionary again. Another button in the dictionary will bring you to the games as well, making both the dictionary and the games accessible at any time of the translation program.

I was able to record the movies of translated ASL words used in the two sections of the translation program with an automatic Canon video camera. This movie was later transferred from analog to digital information using a media-grabber provided from the QuickTime computer program. This movie, which consumed 26 megabytes of computer memory and about 10 minutes, was edited and separated into individual words of only 1-3 seconds using the MoviePlayer feature of the QuickTime program. Through scripting and the usage of external commands, I was able to bring the edited small movies into my SuperCard program. A pathname of the movie's location is required in the script to make the program capable of opening the movie file.

CHAPTER 4

RESULTS

Having tested and presented the English/Spanish/ASL Translation Program to its target market, I reaffirmed its efficiency as an educational tool for languages. The persons who interacted with this program proved their involvement, not only with the testing games, but also with the dictionary. The general English speaking public seemed very interested in learning the Spanish and American Sign languages. During the initial presentation of the language program, there was no instance in which the viewer's seats were empty. Therefore, it appeared appropriate to run the program on two computers simultaneously.

Approximately 50 persons, experienced and not experienced with computer programs, ages 7 and up, were able to go through the translation program. I realized that within the persons having no computer experience, the youngest seemed to be less scared to use the program. The major problem with the persons with no computer experience was their limitations in manipulating the computer mouse, and this affected most of them in losing the time limited games.

I believe certain aspects contributed to the viewer's interest of this program. The usage of bright colors and graphic designs, which changed within categories, definitely attracted the viewer's interest throughout the computer program. The participation of different ASL interpreters intrigued the viewer's curiosity to continue to the next card. Moreover, the tridimensional feeling given by the interactive buttons made the learning process more appealing. Both hearing and hearing impaired viewers reacted humorously towards the program's visual and

audio feedbacks and the way the program greeted the individuals personally. Showing the viewer's name on the screen proved to be a winner. I noticed great curiosity with the "Let's Get Wild" category and great involvement in the games. It filled me with satisfaction to see that these aspects worked into bringing the viewer's interest in the translation program.

One of the later presentations of the language program was directed for 5 and 6 year old children. I recognized the language enriching lesson these children experienced that day. They were learning extremely fast as they applied their new knowledge in the English/ASL and English/Spanish games. The time limitations in these games were extended to adjust to the young age of the children. I was very pleased to observe the enthusiasm of all the children as they went through the program's dictionary and clicked anxiously into the games. It filled me with satisfaction to see these young students have fun absorbing a language lesson they won't forget for a long time.

The positive reactions towards the English/Spanish/ASL Translation Program during multiple presentations attracted the communications media, including television and newspaper. The expressed and written publications from the media emphasized how innovative and suitable the program was into language instruction. As a result of these positive reactions, I have been led into considering a marketing possibility for the translation program. It would make me very happy to share this language experience to an extended population.

CHAPTER 5

SUMMARY

RECOMMENDATIONS

After concluding the dictionary part of the English-Spanish-American Sign Language, I consider that it could include a longer list of words and/or categories. In addition, it could be extended into other languages. Depending on the particular needs of the audience, a combination of no more than three languages could be presented simultaneously. I also believe that a printed piece of the dictionary could help support the learning process intended through this project. Nevertheless, I still think that the inclusion of the small ASL movies and the audio pronunciation of the Spanish words are essential in the learning process, making the printed piece not as effective as the computer program.

CONCLUSIONS

I can conclude that the usage of interactive media combined with humorous and challenging items has proven to be the key to make language education as effective as it can be. Given the opportunity to allow the student to proceed at one's own pace and level of achievement, individualized education can be more appealing, attractive, interesting and memorable.

BIBLIOGRAPHY

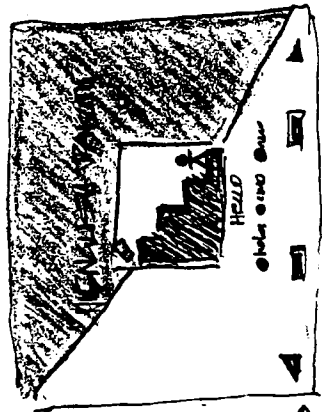
- Bowen, Donald J. "History of Sign Language and Finger-spelling."
New York Times Magazine 20 October 1985.
- _____. Patterns of Spanish Pronunciation. Chicago: University of Chicago Press, 1960.
- Entwistle, William James. The Spanish Language. 2d ed. London: Faber & Faber, 1962.
- Garrett, Nina. "Computers in Foreign Language Teaching and Research."
Educom Review Spring 1990.
- House, William C. Interactive Computer Graphic Systems. Princeton, N.J.; New York: Petrocelli Books, 1982.
- Newman, William M. Principles of Interactive Computer Graphics. New York: Mc Graw-Hill, 1979.
- O'Rourke, Terrence J. A Basic Vocabulary. Silver Spring, Md.: T.J. Publishers, 1978.
- Solow, Sharon Neumann. Signed Language Interpreting. Silver Spring, Md: National Association of the Deaf, 1981.
- Wilcox, Sherman. Learning to See. Englewood Cliffs, N.J.: Prentice Hall Regents, 1991.

APPENDICES

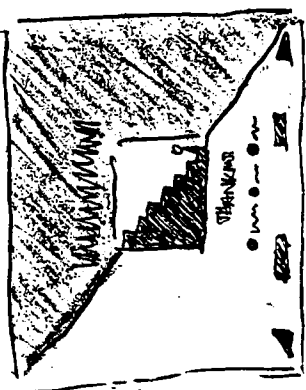
The following appendices present information and other material that documents the development process of creating the English/Spanish/ASL Translation Program. I am including rough layouts, a diagram of the program, the computer scripts used to make the program work efficiently, information regarding the interpreters who collaborated in the project, answered questionnaires given to the persons who tested the program, a printout of the program showing the words the tester should review, the Democrat & Chronicle newspaper article explaining the program, and finally, color printouts of the program's designs.

ROUGH LAYOUTS

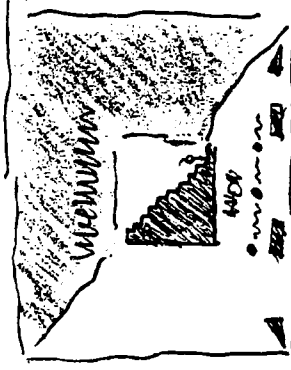
English / Spanish game



SE (SE)



ES (ES)

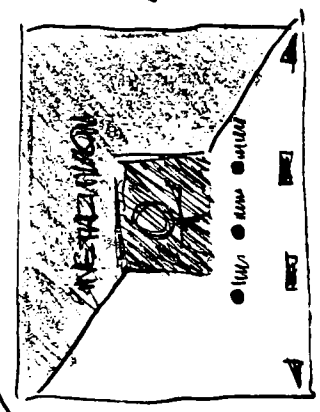


Easy (Mixed)

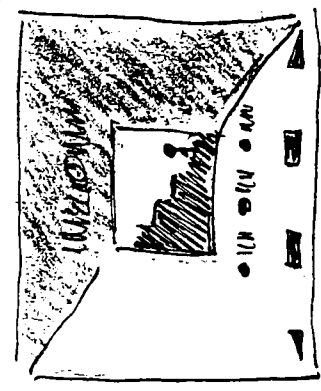
SEOW SECTION

a) English-Spanish game

b) English-AsL game





SE (SE)



(ex. of easiest category)

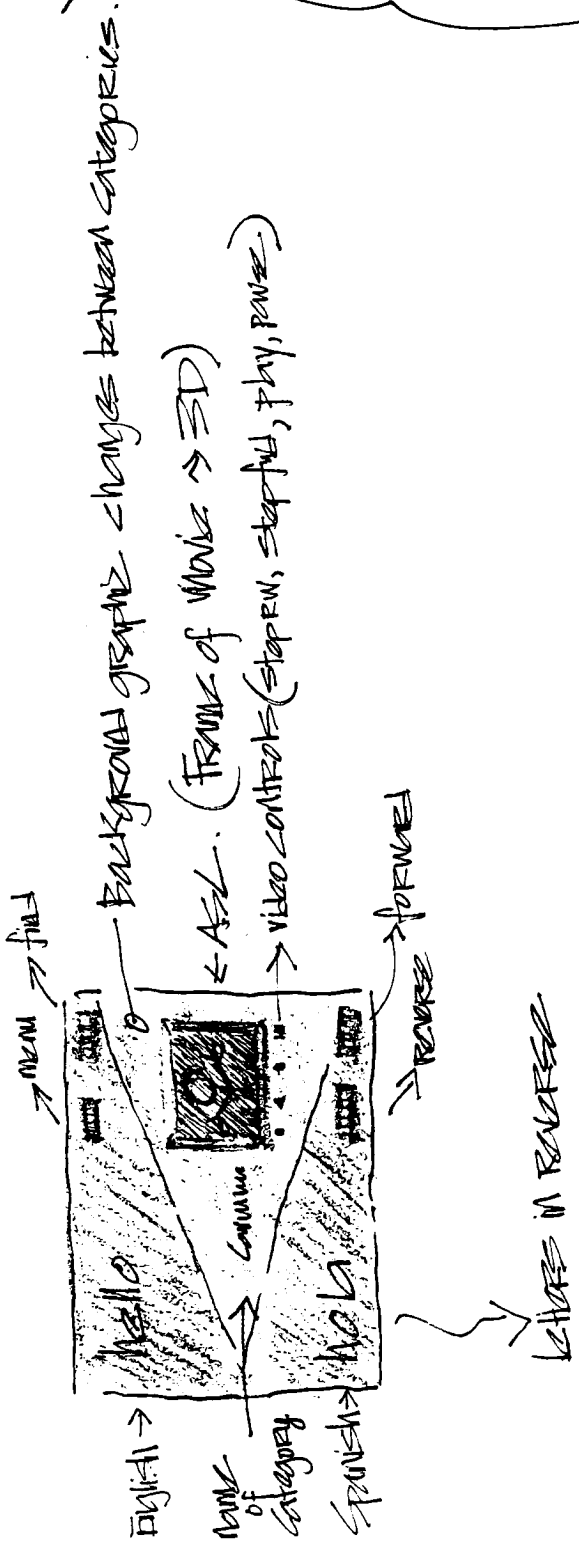
The same middle square will play a move and later updates the position on the stairs.

- * Mike would be playing during the game time.
- * Time limitation  or a line: 
- * Sound effects: feedback when you lose or win.

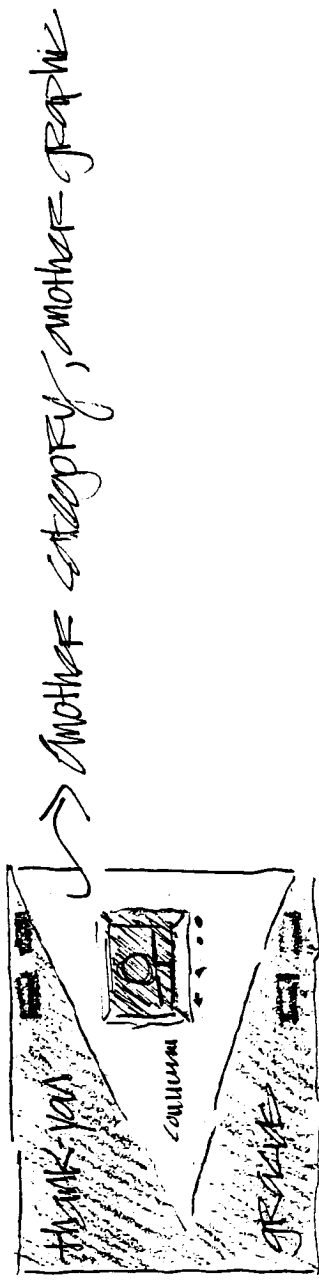
actions:
forward
reverse
wheel
fill

First section:

English/Spanish/AE
dictionary:



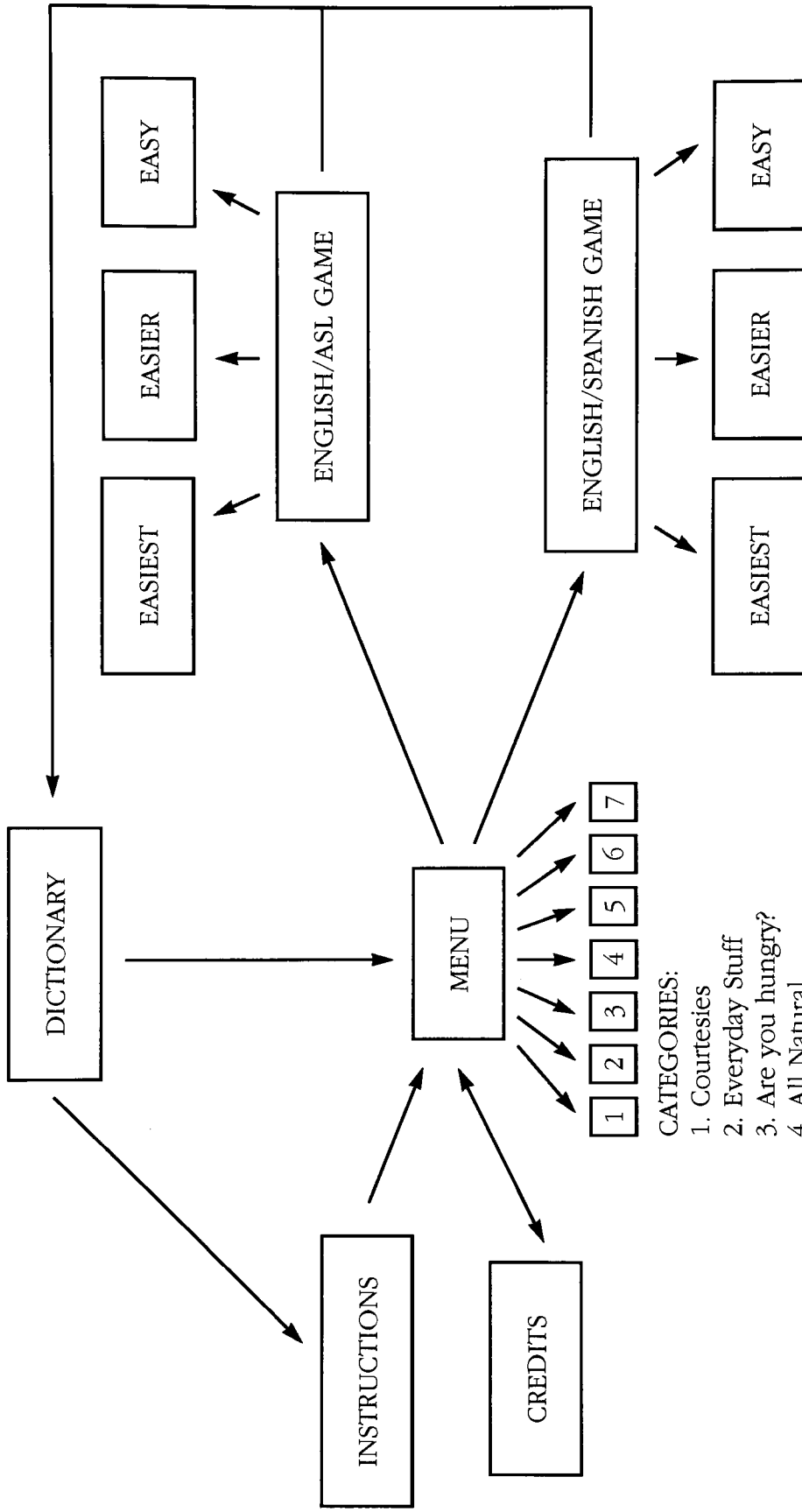
Background graphic changes between categories.
← Ask. (Frame of movie → 3D)
→ video controls (stepen, stepful, play, pause)



→ ANOTHER CATEGORY, ANOTHER FRAME

DIAGRAM OF TRANSLATION PROGRAM

DIAGRAM OF THE ENGLISH/SPANISH/ASL TRANSLATION PROGRAM



PROGRAM SCRIPTS

```
on openCard
  global movieID
  QTMovie Direct, movieID, Dispose
  QTMovie OpenMovie, Direct, "1992-93:MOVIES:hello", "419,174",mute
  put the result into movieID
  QTMovie Direct, movieID, Pause
end openCard
```

```
on closeCard
  hide cd fld "hola."
  hide bg fld wait
end closeCard
```



```
on mouseDown
  set the ink of me to Blend
end mouseDown
```

```
on mouseUp
  set the ink of me to Mask
  global movieID
  QTMovie Direct, movieID, Dispose
  QTMovie OpenMovie, Direct, "1992-93:MOVIES:hello", "419,174",mute
  put the result into movieID
  QTMovie Direct, movieID, play
end mouseUp
```

```
on startUp
  editor full
end startUp

on openProject
  global userName
  hide menuBar

  ask "What is your name?"
  if it is empty then
    exit openProject
  else
    put it into userName
    put "Hello"&&userName&return&"Welcome to the English/ASL game."into bg fld feedk
    wait 5 seconds
    put empty into bg fld feedback
  end if
end openProject

on idle
  global movieID
  if movieID is not empty then
    QTMovie Direct, movieID, idle
  end if
end idle

on setUp buttons
  set hilite of cd btn hello of cd hello of window easiest to false
  set hilite of cd btn "thank-you" of cd hello of window easiest to false
  set hilite of cd btn "good-bye" of cd hello of window easiest to false
  set hilite of cd btn food of cd food of window easiest to false
  set hilite of cd btn kiss of cd food of window easiest to false
  set hilite of cd btn fork of cd food of window easiest to false
  set hilite of cd btn tree of cd tree of window easiest to false
  set hilite of cd btn flower of cd tree of window easiest to false
  set hilite of cd btn hand of cd tree of window easiest to false
  set hilite of cd btn house of cd house of window easiest to false
  set hilite of cd btn triangle of cd house of window easiest to false
  set hilite of cd btn bird of cd house of window easiest to false
  set hilite of cd btn dog of cd dog of window easiest to false
  set hilite of cd btn fast of cd dog of window easiest to false
  set hilite of cd btn music of cd dog of window easiest to false
  set hilite of cd btn bed of cd bed of window easiest to false
  set hilite of cd btn sleep of cd bed of window easiest to false
  set hilite of cd btn please of cd bed of window easiest to false
  set hilite of cd btn milk of cd milk of window easiest to false
  set hilite of cd btn squeeze of cd milk of window easiest to false
  set hilite of cd btn hand of cd milk of window easiest to false
  set hilite of cd btn horse of cd horse of window easiest to false
  set hilite of cd btn old of cd horse of window easiest to false
  set hilite of cd btn bee of cd horse of window easiest to false

  set hilite of cd btn welcome of cd welcome of window easier to false
  set hilite of cd btn day of cd welcome of window easier to false
  set hilite of cd btn circle of cd welcome of window easier to false
  set hilite of cd btn hungry of cd hungry of window easier to false
```

set hilite of cd btn down of cd hungry of window easier to false
set hilite of cd btn me of cd hungry of window easier to false
set hilite of cd btn flower of cd flower of window easier to false
set hilite of cd btn nose of cd flower of window easier to false
set hilite of cd btn smell of cd flower of window easier to false
set hilite of cd btn cat of cd cat of window easier to false
set hilite of cd btn mustache of cd cat of window easier to false
set hilite of cd btn men of cd cat of window easier to false
set hilite of cd btn happy of cd happy of window easier to false
set hilite of cd btn heart of cd happy of window easier to false
set hilite of cd btn breath of cd happy of window easier to false
set hilite of cd btn yes of cd yes of window easier to false
set hilite of cd btn now of cd yes of window easier to false
set hilite of cd btn finger of cd yes of window easier to false
set hilite of cd btn window of cd window of window easier to false
set hilite of cd btn open of cd window of window easier to false
set hilite of cd btn up of cd window of window easier to false
set hilite of cd btn sorry of cd sorry of window easier to false
set hilite of cd btn love of cd sorry of window easier to false
set hilite of cd btn sad of cd sorry of window easier to false
set hilite of cd btn forest of cd forest of window easier to false
set hilite of cd btn dance of cd forest of window easier to false
set hilite of cd btn elbow of cd forest of window easier to false
set hilite of cd btn "left" of cd "left" of window easier to false
set hilite of cd btn away of cd "left" of window easier to false
set hilite of cd btn go of cd "left" of window easier to false
set hilite of cd btn fruit of cd fruit of window easier to false
set hilite of cd btn eat of cd fruit of window easier to false
set hilite of cd btn tooth of cd fruit of window easier to false

set hilite of cd btn "How are you?" of cd "How are you?" of window easy to false
set hilite of cd btn "Can you go?" of cd "How are you?" of window easy to false
set hilite of cd btn "I like you" of cd "How are you?" of window easy to false
set hilite of cd btn "Happy Birthday" of cd "Happy Birthday" of window easy to false
set hilite of cd btn taste of cd "Happy Birthday" of window easy to false
set hilite of cd btn feelings of cd "Happy Birthday" of window easy to false
set hilite of cd btn dinner of cd dinner of window easy to false
set hilite of cd btn thin of cd dinner of window easy to false
set hilite of cd btn quick of cd dinner of window easy to false
set hilite of cd btn bird of cd bird of window easy to false
set hilite of cd btn fish of cd bird of window easy to false
set hilite of cd btn you of cd bird of window easy to false
set hilite of cd btn door of cd door of window easy to false
set hilite of cd btn window of cd door of window easy to false
set hilite of cd btn open of cd door of window easy to false
set hilite of cd btn sleep of cd night of window easy to false
set hilite of cd btn night of cd night of window easy to false
set hilite of cd btn fall of cd night of window easy to false
set hilite of cd btn congratulations of cd congratulations of window easy to false
set hilite of cd btn clap of cd congratulations of window easy to false
set hilite of cd btn "wake up" of cd congratulations of window easy to false
set hilite of cd btn bad of cd bad of window easy to false
set hilite of cd btn bed of cd bad of window easy to false
set hilite of cd btn lay of cd bad of window easy to false
set hilite of cd btn mountain of cd mountain of window easy to false
set hilite of cd btn high of cd mountain of window easy to false
set hilite of cd btn jump of cd mountain of window easy to false
set hilite of cd btn table of cd table of window easy to false
set hilite of cd btn down of cd table of window easy to false
set hilite of cd btn baby of cd table of window easy to false

```
set hilite of cd btn breakfast of cd breakfast of window easy to false
set hilite of cd btn quiet of cd breakfast of window easy to false
set hilite of cd btn straight of cd breakfast of window easy to false
set hilite of cd btn "thank-you" of cd "thank-you" of window easy to false
set hilite of cd btn you of cd "thank-you" of window easy to false
set hilite of cd btn tomorrow of cd "thank-you" of window easy to false
set hilite of cd btn entrance of cd entrance of window easy to false
set hilite of cd btn under of cd entrance of window easy to false
set hilite of cd btn open of cd entrance of window easy to false
set hilite of cd btn "mouse" of cd "mouse" of window easy to false
set hilite of cd btn cheese of cd "mouse" of window easy to false
set hilite of cd btn nose of cd "mouse" of window easy to false
set hilite of cd btn lake of cd "lake" of window easy to false
set hilite of cd btn square of cd "lake" of window easy to false
set hilite of cd btn fat of cd "lake" of window easy to false
end setUp buttons

on closeProject
  setUp buttons
  put empty into bg fld wrong of cd wrong of window wrong
end closeProject
```

on openWindow

```
global step1, step2, step3, step4, step5, startSeconds  
put "381,292" into step1  
put "350,268" into step2  
put "318,246" into step3  
put "286,221" into step4  
put "254,199" into step5  
put the seconds into startSeconds
```

end openWindow

```
on openCard
  show bg fld push
  global movieID
  QTMovie Direct, movieID, Dispose
  QTMovie OpenMovie, Direct, "1992-93:MOVIES:hello", "238,185", mute
  put the result into movieID
  QTMovie Direct, movieID, Pause

  hide bg grc "stairs1"
  hide bg grc "human easiest"
  hide bg grc "cap1"
  set the loc of bg grc "human easiest" to 381,292
end openCard
```

```
on mouseUp
  Play "alright"
  global userName, step1, step2, step3, step4, step5, correctAnswer
  put "Right"&&userName&&"!" into fld feedback
  wait 2 seconds
  put empty into fld feedback

  lock screen
  set the loc of bg grc "human easiest" to step1 --381,292
  show bg graphic "stairs1"
  show bg grc "human easiest"
  show bg grc "cap1"
  unlock screen with visual dissolve fast

  add 1 to correctAnswer
  if correctAnswer = 1 then
    set the loc of bg grc "human easiest" to step2 --350,269
  end if
  if correctAnswer = 2 then
    set the loc of bg grc "human easiest" to step3 --318,248
  end if
  if correctAnswer = 3 then
    set the loc of bg grc "human easiest" to step4 --286,221
  end if
  if correctAnswer = 4 then
    lock screen
    hide bg grc "human easiest"
    hide bg grc "cap1"
    show bg grc "human win" at loc 254,198
    unlock screen with dissolve fast
    wait 1 tick
    set the loc of cd grc "human win" to 254,198
    wait 1 tick
    set the loc of cd grc "human win": to 254,200
  end if

  beep

  lock screen
  hide bg graphic stairs1
  hide bg grc "human easiest"
  hide bg grc "cap1"
  go next cd
  unlock screen with visual dissolve fast

end mouseUp
```

```
on mouseUp
  Play "Wrong"
  global userName
  put "Wrong, "&&userName&&. Maybe next time..."into bg fld feedback
  show cd grc correct
  wait 4 seconds

  put empty into bg fld feedback
  hide cd grc correct
  visual dissolve fast
  go to next card
end mouseUp
```

```
on mouseDown
  global wrongAnswer
  put "hello"&return after wrongAnswer
  put wrongAnswer into bg fld wrong of window wrong
end mouseDown
```


PARTICIPATING INTERPRETERS

Hi! My name is Janise Negrón, and I would like to know if you are interested in taking part in an English-Spanish-American Sign Language translation computer program which I'll be preparing for my thesis.

To participate in this project for the Computer Graphics Program, you will only have to translate one or more English words or phrases into American sign language in front of the video camera. These pieces of recorded film will integrate an interactive computer program which will also translate English into Spanish.

Please indicate your name and where can I reach you if you wish to contribute today in this project. Your name will appear on the thesis's credits. Further on I would get in touch with you to indicate the date of the thesis's presentation. Thank-you for your attention.

- 1 JAV RICHARD GATES x4276 (TDD)
- 2 Sean Michael Paper x4276 (TDD) "Paper Kid"
- 3 Ethan Michael Simutt 442-4433
- 4 ~~MARIA~~ GARCIA x 4654 !!!
- 5 Tracey Washington 292-7063 TTY
- 6 DAVID RINK 475-4242 TTY
- 7 ALBERTO ROSARIO 475-3462 TDD
- 9 ~~B~~ Shannon Colindiammer 475-4111 TDD
- 8 ~~B~~ RINK WATERMAN 475-4644 TTY V
- 10 NOMMA BLOWL x 4309 (V)
- 11 _____
- 12 _____
- 13 _____
- 14 _____
- 15 _____
- 16 _____
- 17 _____
- 18 _____
- 19 _____
- 20 _____

Hi! My name is Janise Negrón, and I would like to know if you are interested in taking part in an English-Spanish-American Sign Language translation computer program which I'll be preparing for my thesis.

To participate in this project for the Computer Graphics Program, you will only have to translate one or more English words or phrases into American sign language in front of the video camera. These pieces of recorded film will integrate an interactive computer program which will also translate English into Spanish.

Please indicate your name and where can I reach you if you wish to contribute today in this project. Your name will appear on the thesis's credits. Further on I would get in touch with you to indicate the date of the thesis's presentation. Thank-you for your attention.

1 Xavier ARANA

2 Nyi-Nyi Aho

3 Juan E. Rodriguez

4 Michael Hinkelheim

5 Dan Gosselin

6 Stacey LAWSON

7 Kimberly Laule

8 David McClellan

9 Jeffery Mather

10 Dilani Warrington

11 _____

12 _____

13 _____

14 _____

15 _____

16 _____

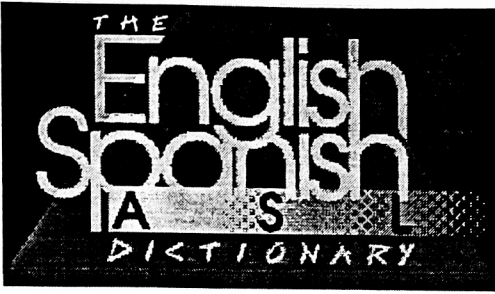
17 _____

18 _____

19 _____

20 _____

QUESTIONNAIRES



Name Mary Thomas Williams

What language you consider to be your first language? (circle one) English Spanish ASL

How were the instructions of the English/Spanish/ASL Translation program?

(circle one) very clear somewhat clear not clear at all

How did the navigational buttons work?

(circle one) very efficiently efficiently enough not efficient at all

Did you win or lose the game(s)? Give reasons why. (time limitation, incorrect answers, etc.)

win - excellent!

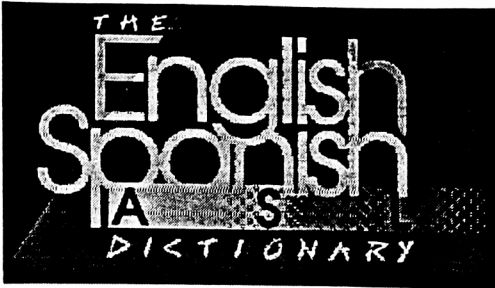
What additional features you feel are necessary to improve this translation program.

On the play screen any language
The button for play game.

Please provide any additional comments.

The colors would make it
easier. I like the sun at the top
of the screen.

THANK YOU FOR YOUR PARTICIPATION



Name Paul Cofrancesco

What language you consider to be your first language? (circle one) English Spanish ASL

How were the instructions of the English/Spanish/ASL Translation program?

(circle one) very clear somewhat clear not clear at all

How did the navigational buttons work? ~~*~~

(circle one) very efficiently efficiently enough ↓ not efficient at all

Did you win or lose the game(s)? Give reasons why. (time limitation, incorrect answers, etc.)

time limitation.

What additional features you feel are necessary to improve this translation program.

maybe see the spanish pronunciations (phonetically)
or english

Please provide any additional comments.

size bright colors,
Nice design

THANK YOU FOR YOUR PARTICIPATION

PROGRAM'S REVIEW PRINTOUT



Name Janise Negrón

Words you should review in the English/Spanish /ASL Dictionary:

hello

food

tree

dog

Thanks for participating in the English/Spanish/ASL Translation Program.
This program was created by Janise Negrón as a thesis submitted
in candidacy for the Degree of Master for Fine Arts.

NEWSPAPER ARTICLE

Program teaches 3 languages

By M. Kathleen Wagner

Staff writer

Five-year-old Scott Lester and 6-year-old Joshua Burnette sidle up to the Macintosh computer in the Graphic Design Laboratory at Rochester Institute of Technology.

The two kindergartners and their eight classmates from RIT's Horton Childcare Center have come for their language lesson. Today they're going to learn Spanish and American Sign Language — simultaneously and from a computer.

Janise Negron, a 27-year-old RIT graduate student and a native of Puerto Rico, designed "The English/Spanish ASL Dictionary" interactive computer program as her thesis project.

The program is innovative in that it combines English, Spanish and ASL, and blends a computer program with video, said Gary

Mowl, chairman of the Center for Sign Language and Interpreting Education at the National Technical Institute for the Deaf, an RIT college.

Moving video particularly suits ASL instruction, he said. Books don't adequately show the hand shape, movement and position vital to accurate ASL, Mowl said.

Negron, who is hearing, said, "I just love languages, and I learned to appreciate American Sign Language while living here in Rochester.

"In Puerto Rico, we had to learn English all through school. I think American children should learn Spanish here," she added. "It helps to bridge the cultures. It helps to make the whole world seem closer."

Teacher Amy Stappenbeck says she teaches some Spanish and ASL in the Horton kindergarten class. Many of the children's parents who work or study at RIT already use

Spanish, ASL or both, she said.

The children "really love language and they're open to everything," Stappenbeck said. "They don't know it's hard for older people, so they just learn."

"Hello, Scott," the computer greets its young user after he types his name on the keyboard.

Scott and Joshua then choose among seven categories of vocabulary words, including courtesies, home, food — and a favorite — "Let's Get Wild," which includes animal names.

Each of the seven categories includes seven words.

"Dog" and the Spanish word for dog — "perro" — appear on the left side of the screen, for example. We hear Negron's recorded voice say the word in Spanish. In a 3- by 2-inch box on the right side of the screen, we see a video of an NTID student signing "dog."

Once the user masters the 49 words, it's on to one of three games. If the player makes a mistake, the computer sympathizes: "Wrong, Scott. Maybe next time." If the player gets four words right, an animated character climbs four steps and gets a graduation cap. □

KNOW THAT?

A biweekly exploration of issues, people and events of interest to the deaf and hard-of-hearing community

COLOR PRINTOUTS

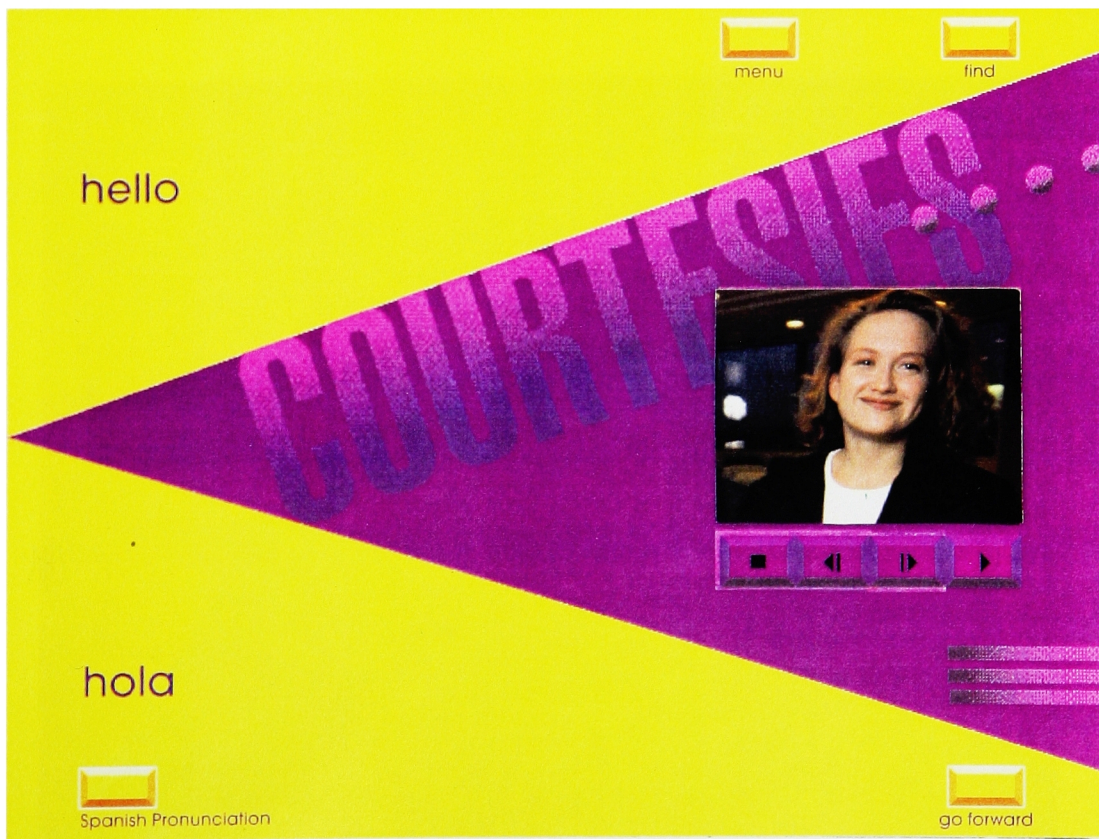
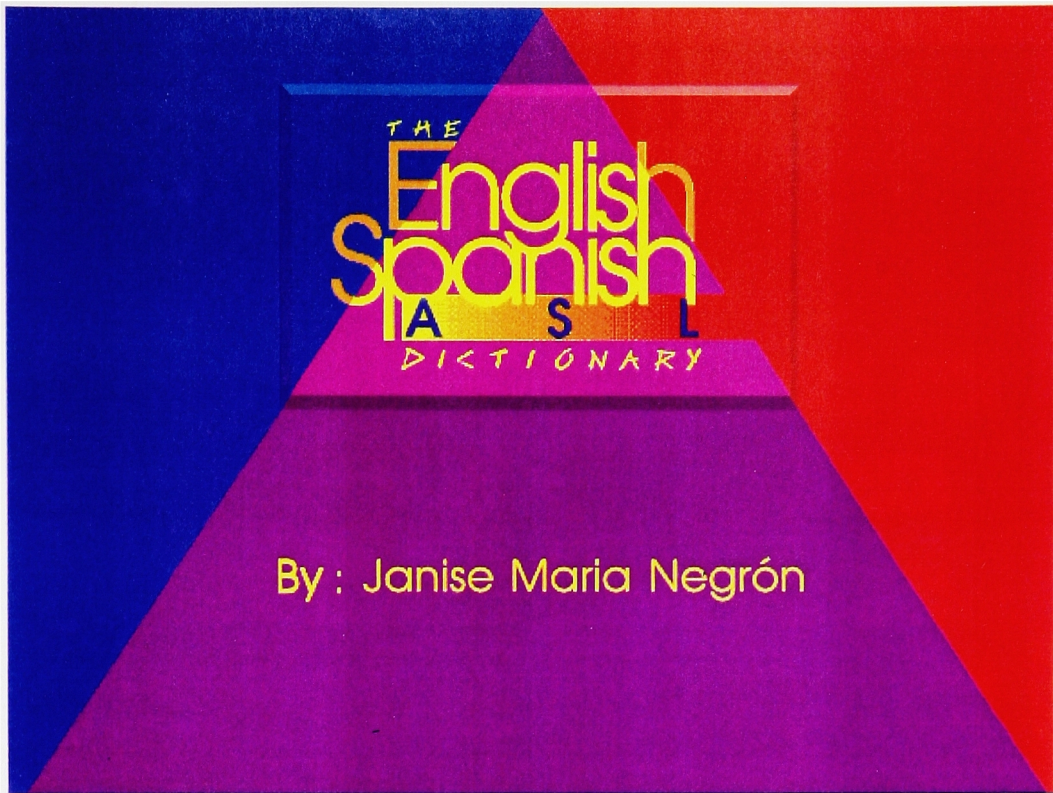
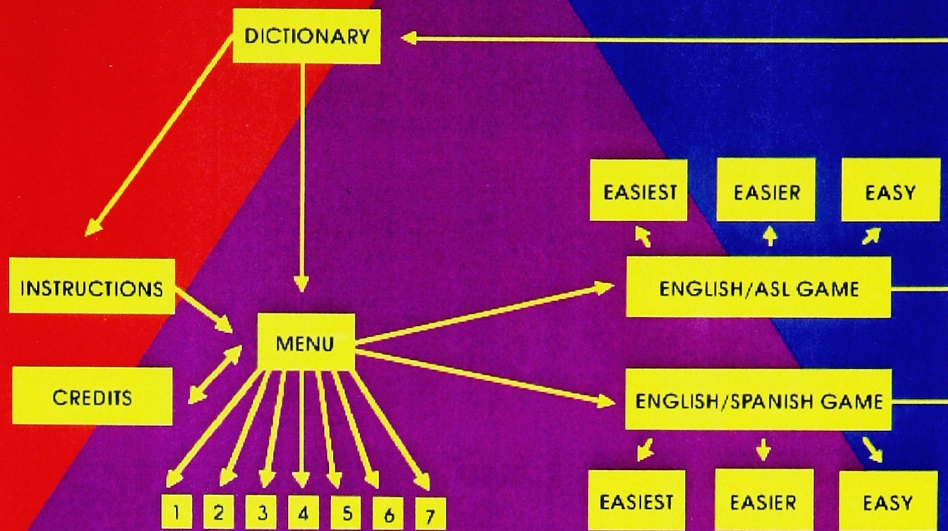


DIAGRAM OF TRANSLATION PROGRAM



WORDS TRANSLATED IN THE PROGRAM

COURTESIES

hello
welcome
How are you?
thank-you
Happy Birthday
congratulations
sorry

EVERYDAY STUFF

here
there
now
yes
night
bad
happy

ARE YOU HUNGRY?

food
hungry
breakfast
dinner
fruit
milk
fork

ALL NATURAL...

tree
flower
leaf
mountain
lake
forest
river

HOME SWEET HOME

house
room
bed
window
table
bathroom
door

WHICH WAY?

east
west
north
entrance
left
up
down

LET'S GET WILD!

dog
cat
horse
bird
squirrel
mouse
worm