M.I.T.E.
Meniere's in the Ears
An Interactive Guide

By

Timothy P. Duffy

Submitted to
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

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Timothy P. Duffy   Date

_____   _____

Dr. Sam Geonetta, Faculty Advisor   Date

_____   _____

Prof. James Sullivan, Department Head   Date

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I would like to acknowledge the following people and organizations that helped make this endeavor possible.

Dr. Sam Geonetta: Without his willingness to work some magic with scheduling I might not have been able to complete this project. Dr. Geonetta realized that I was determined to complete my degree despite several setbacks resulting from my Meniere's disease. I would also like to thank Dr. Geonetta for introducing me to Macromedia's® Authorware™ and keeping my interest in design alive.

Ms. Jaylynn Grey: Jaylynn sparked my interest in the electronic design and desktop publishing field and held it. Because of Jaylynn's and Dr. Geonetta's encouragement I plan to pursue this area.

Dr. George Bauer and his staff: My affliction with Meniere's may have gotten the better of me without the years of ongoing care and treatment I have received from Dr. Bauer and his staff. Also, the feedback I received on the original idea for this project and subsequently on the beta product by Dr. Bauer's office helped to ensure that the content addressed concerns of other Meniere's patients they treat.

The College of Applied Science Information Engineering Technology and Raymond Walter's College Office Information Technology faculty: For all their instruction and help which made it possible for me to obtain the information and skills needed to receive my Bachelors degree in Information Engineering Technology.

Dedication

This project is dedicated to my loving wife Mary Jo. Her unending support has helped me to overcome some of the most trying of times of my life.

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Abstract

This report presents a viable alternative to address concerns, options, questions, and treatments for people diagnosed with Meniere's syndrome. The purpose of this report is to examine the problems faced by those who suffer from Meniere's syndrome, the need for a convenient thorough repository of information, and the methods and technologies incorporated to create and present this information. I am proposing two mediums for the information, an interactive CD and a Web page implementation of the CD.

M.I.T.E.

Meniere's in the Ears:
An Interactive Guide

1. Statement of the Problem

Many individuals suffering with Meniere's syndrome are unable to obtain information about this life changing disease.

1.1 Definition of the Need

Meniere's syndrome causes severe episodic vertigo, hearing loss, and tinnitus. The vertigo and hearing loss are the most challenging aspects of the disease to overcome. Communication and mobility become difficult, if not impossible, for the individual who suffers from the disease. This poses big problems for the individual. First, not being able to "hear" the answers to questions and second, the inability to commute to a doctor's office or even a library to obtain information about the disease.

The effects of Meniere's are life changing. High levels of anxiety for the person suffering from this disease are often exacerbated when questions go unanswered (6). Oftentimes, persons diagnosed with Meniere's syndrome have questions and concerns that simply cannot be remembered or answered in one office visit (4). While most physicians welcome the questions, they cannot always take calls immediately due to scheduled appointments and surgery schedules.

Many people have a personal computer with Internet access in their homes. However, as Dennis Smitson (14) observes, the information available about Meniere's syndrome via the Internet is often difficult to understand unless the person seeking the information has a medical background. The need exists for a convenient "one-stop"

repository of information that addresses the most common questions and concerns for the individual looking to understand this disease.

2. Description of the Solution

The Meniere's In The Ears project contains information about Meniere's syndrome and its effects and treatment options that is presented on an interactive CD. The main purpose of this product is to provide information to individuals who have been diagnosed with Meniere's syndrome, as well as to their family and friends.

Because M.I.T.E. is distributed on CD, individuals are able to view the information at leisure in the privacy of their home. M.I.T.E. offers a person with Meniere's a comfortable way to learn and share information with loved ones and other people in their lives. The material on the CD is formatted in a way that is comprehensive and understandable for any user. M.I.T.E.'s contents include:

- General information on who Dr. Meniere was and what Meniere's is
- Symptoms of Meniere's
- Diagnostic information
- Treatment options
- Assistive devices
- Sources for obtaining more information

These are accessible from the main menu of the CD.

2.1 User Profile

The main users of M.I.T.E. will be Meniere's syndrome patients. Secondary users will be family and friends of Meniere's sufferers seeking more understanding of what the person is going through. The main distributors of this product will be physicians who

treat Meniere's syndrome patients and professional organizations that offer services for those who suffer with Meniere's syndrome.

Group 1: Physicians' patients who have been recently diagnosed with Meniere's syndrome or existing patients looking for a convenient way to share information with family and friends about their disease. It is difficult to speculate how much computer knowledge these users will have. Basic computer operation knowledge is assumed but not guaranteed. It is for this reason that the CD has an auto start feature and utilizes a simple user interface and includes a help feature on the opening screen.

Group 2: Individuals with Meniere's who seek assistance from professional organizations. Again, it is difficult to speculate how much computer knowledge the users will have. Basic computer operation knowledge is assumed but not guaranteed. It is for this reason that the CD has an auto start feature and utilizes a simple user interface and includes a help feature on the opening screen.

Group 3: Physicians or professional organizations wishing to offer this information that currently have an Internet presence about their services. A "cut and paste" file is planned for deploying the M.I.T.E. project over an existing Web site. It is assumed that this will be handled by a Webmaster or other Information Technology personnel. The Webmaster or Information Technology person should possess the knowledge needed to perform this task with minimum effort.

2.2 Design Protocols

The organizational scheme of the M.I.T.E. project is detailed in a flow chart (See Figure 1. Appendix A.). The layout follows the logical flow of information within each topic.

An auto-run script on the CD starts the presentation once the user inserts the CD into the drive and closes the drive tray. Upon starting, the presentation presents an opening screen on the monitor with instructions to click on a button. Navigation through the information is accomplished by clicking on a button on the monitor screen for the topic of interest. The main screen allows the user to enter the presentation, look at the help information, or exit the presentation. The user has the option of navigating back to

the main menu page or exiting the program from anywhere in the presentation by clicking the appropriate button.

All navigation icons are standard buttons. The information that each button links to will be on the button itself. There are no other interaction icons incorporated in this project. The text areas incorporate a vertical scroll bar that allows the user to view any text that may extend beyond the visible text box.

The background of the presentation is an image of an ear that is shaded in RGB cyan (#66FFFF). The interaction buttons are rectangular in shape and colored RGB blue (#3333FF) with RGB yellow (# FFFF66) text. The decision to use the blue/yellow combination was based on information obtained about colorblindness. The blue/yellow combination offers a strong contrast so the buttons of the interaction can be easily read by any user including those who may be colorblind. The text of the presentation is RGB black (#000000) which contrasts well against the cyan background.

Help information is available on the main screen when the program starts. How to navigate through the presentation and view all the text in each section is explained in this area of the presentation.

3. Deliverables

This project is a continuation of a project I completed for the Multimedia Production course at CAS. The purpose of the project is to offer a convenient source of information for individuals who suffer from Meniere's syndrome. This project is designed to help to answer common questions and ease the anxiety that can be experienced by an individual who is stricken with this disease. The following is what is delivered in the final product.

An easy to use medium. This is accomplished using the standard computer CD. This medium is durable, affordable and convenient. Modern computers have a CD-ROM drives installed thereby eliminating the need for additional equipment to view this information.

A user friendly interface. All interaction with the project uses a standard mouse to click on easy to read buttons. The buttons are individually labeled with the topic they activate. The user can exit the presentation at anytime by clicking on the Exit button located on every screen. Likewise, the user can always return to the main screen by clicking on the Home button.

Comprehensive but understandable information. The presentation covers many aspects of Meniere's syndrome, including information about Dr Meniere, what the symptoms and treatment options are, and links to Internet resources. This is presented in a format that can easily be understood by individuals without a medical background.

An instrument to aid physicians and professional organizations who work with individuals who suffer from Meniere's syndrome. Because CDs require minimal space for storage and are not affected by magnetism or electrical interference the way other computer media are, no special storage area is needed. They can be kept in an office and distributed to a patient or client during their visit. If the individual is unable to commute to the office, a CD can be mailed to the individual at minimal expense through the United States Postal Service.

A product that has the ability to be used on both PC and Macintosh computer systems. The ability to offer this is one of the main reasons Macromedia's®

Authorware™ was chosen for designing this project. One multimedia presentation can be created and complied for both platforms.

A product that can be incorporated by physicians and professional organizations that plan to have or currently have a Web presence. Again, this is a feature that is available with Macromedia's® Authorware™ using the original multimedia presentation

4. Design And Development

4.1 Budget

The budget table (See Figure 2. Appendix B.) outlines the costs associated with the development, production and possible distribution of the M.I.T.E. interactive CD. The equipment listed is the actual equipment used to create the project.

Mass production costs of CD's is between $1.49 -$2.00 each depending on the production company. This price includes a standard protective paper sleeve. Protective plastic jewel cases, the standard and the newer ½ sizes, are available at a cost of $0.25 each if needed.

The postal rates table (See Figure 3. Appendix B.) shows the cost to mail the CD to clients who are physically unable to travel to the office to obtain it.

I have contracted an initial order of 25 M.I.T.E. interactive CDs with Dr. George Bauer's office. Discussions with his office indicate that, depending upon the patient response after viewing the product an additional order of 50 or more CDs could follow. Pricing of the first order was discussed and indications point to an expected cost of $10.00 - $15.00 per CD. If patient response is favorable and an additional order is placed, a bulk price for orders of 50 CDs or more would be established.

4.2 Timeline

I have modified the timeline to reflect the unique circumstances surrounding my ability to complete the Senior Design sequence. (See Figure 4. Appendix B.)

4.3 Hardware Requirements

All development was completed using computers running Microsoft® Windows 2000 or newer. The minimum requirements for the Windows 2000 operating system has been met and is considered more than adequate to run both the Macromedia® and Adobe® software products used to complete the project.

I used a scanner to procure most graphics that are incorporated but that are not available in digital form. In addition, I used a digital camera for any other digital images. Several images came from companies whose products are showcased in the project; they have been made available to me at no additional cost.

4.4 Software Requirements

The main software chosen to create this presentation was Macromedia's® Authorware™. Authorware™ is robust and can be run on Macintosh™ and PC computers or over an intranet should a company want to offer information via the Internet. It is because of this flexibility that I chose Macromedia's® Authorware™.

All audio file creation and editing was done with GoldWave audio software. GoldWave allowed flexibility for proper mixing of files to create the desired effects needed. All custom graphics were created using Adobe Photoshop. I created the master CD with *Ahead Nero CD* software. Nero offers an easy to use interface and error safeguards to ensure an error free CD master.

5. Proof Of Design

M.I.T.E. was completed meeting all key areas of the section 3. Deliverables discussed in this report.

5.1 An Easy to Use Medium

The project has been compiled error free onto a standard CD using the Ahead Nero software. The prototype copy of M.I.T.E. was run on several desktop computers and two laptop computers and performed as expected. The computers used ranged from an older 486-100MHz running Microsoft® Windows95™ to a Pentium® III P3 866MHz running Microsoft® Windows XP Professional™. There was a noticeable difference between the 486-100MHz and the Pentium® III as far as page transitions, but not in the overall effectiveness of the presentation.

5.2 A User Friendly Interface

By incorporating a simple background and highly contrasting colors the interface did not appear intimidating for any person who previewed the prototype copy of M.I.T.E. project. As you can see from the opening screen (See Figure 5. Appendix D.), the interface is intuitive and self explanatory. The opening screen allows the user to enter the presentation, exit the presentation, and help information about navigation and other item functions in the presentation. All the screens in the M.I.T.E. project follow this simple design.

The help section (See Figure 6. Appendix D.) was kept simple and to the point. Basic information about navigation and special buttons are explained mainly for the benefit of non-computer savvy individuals.

The main screen (See Figure 7. Appendix D.) illustrates the intuitive navigation. Each section is listed along with options to go back to the help section and also to exit the presentation. The main screen also introduces the user to basic information about Meniere's syndrome.

The World Wide Web button (See Figure 8. Appendix D.) in the contact section offers Web links to various Internet sites that contain more information about help and assistance available to Meniere's patients. Icon graphics were chosen over the standard URL style links. Icon links allow the user to know the name of the organization or service to which they will be directed versus a cryptic non-descriptive URL style link.

5.3 Comprehensive but Understandable Information

Every effort was made to keep the material in the M.I.T.E. project as simple as possible without compromising the content. Where technical terms are used they are explained in an easy to understand manner. M.I.T.E. is intended for all audiences and understandability is a key aspect.

5.4 An Instrument to Aid Physicians and Professional Organizations

Feedback from Dr. Bauer and his staff on the M.I.T.E. prototype CD was very favorable. I was told by one of Dr. Bauer's staff that they would most likely keep them in a drawer at the reception desk. This would offer them the convenience of being close at hand to distribute to patients who are interested in more information about Meniere's syndrome. Since CDs are not susceptible to electrical or magnetic damage they are a more reliable medium for this project.

5.5 A Product Usable on Both PC and Macintosh Computers.

Although it is possible to create a cross-platform CD with Macromedia® Authorware™, this version has not incorporated it as originally planned. Lack of access to a Macintosh® computer prevented the cross-platform functionality. All documentation and instructions I have gathered indicates that creating a cross-platform version from the master CD is possible (8).

5.6 A Product That Can be Incorporated by Physicians and Professional Organizations That Plan to or Currently Have a Web Presence.

M.I.T.E. was tested on my home network and also published to an Internet Web site. The presentation ran as expected. The only portion that was not included on the Web site is a video file (See Figure 9. Appendix D.) located in the more information section of the presentation. The file size and time needed to download the video file was the determining factor for it not being included.

6. Conclusions And Recommendations

6.1 Conclusions

From the inception of the idea for the M.I.T.E. project I received high interest and positive responses from professionals who treat Meniere's patients and individuals who suffer with Meniere's. Professionals and individuals alike embraced the idea of a convenient single source of information about Meniere's syndrome. Although not every aspect of Meniere's can be covered in M.I.T.E., the most common questions have been answered in an easy to understand format.

Utilizing a simple interaction interface, M.I.T.E. can be used by most anyone who owns a computer and is able to read. The interface is straight forward and easily

navigated utilizing strong contrasting colors which are easy to read by anyone including individuals who may be color blind.

The M.I.T.E. project will be a continuing personal endeavor. Because of recent advancements in technology and a growing interest and study of the root cause and possible cure of this life changing disease the information in M.I.T.E. will need continual updating. It has not been decided whether this will be an annual or a semiannual update.

6.2 Recommendations

Creating an actual cross-platform version of the M.I.T.E. CD is the highest item on the list of recommended improvements. Once I have procured a Macintosh computer, I well release the first revision of M.I.T.E. compatible with PC and Macintosh® computer systems.

Another area that needs to be addressed is updated information. Several advances have been made both in the treatment of Meniere's and devices for those who have suffered profound hearing loss as a result of Meniere's since the start of the M.I.T.E. project. This is precisely why M.I.T.E. needs to be an ongoing project.

The Web site deployment portion of M.I.T.E. should be modified to allow simpler integration. This will involve gathering more knowledge of programming techniques in the Authorware™ software. If this can not be streamlined, another presentation platform may be utilized.

Finally, implementing some form of feedback from users of both the CD and the Web site will help address end users' opinions for improvement of the project. Feedback from physicians and organizations that wish to distribute M.I.T.E. will also aid in future changes since this is where most new information and technology originates. By

addressing concerns, comments, and suggestions, the M.I.T.E. project can keep pace with

the ever changing information and needs of the individuals for whom it was designed.
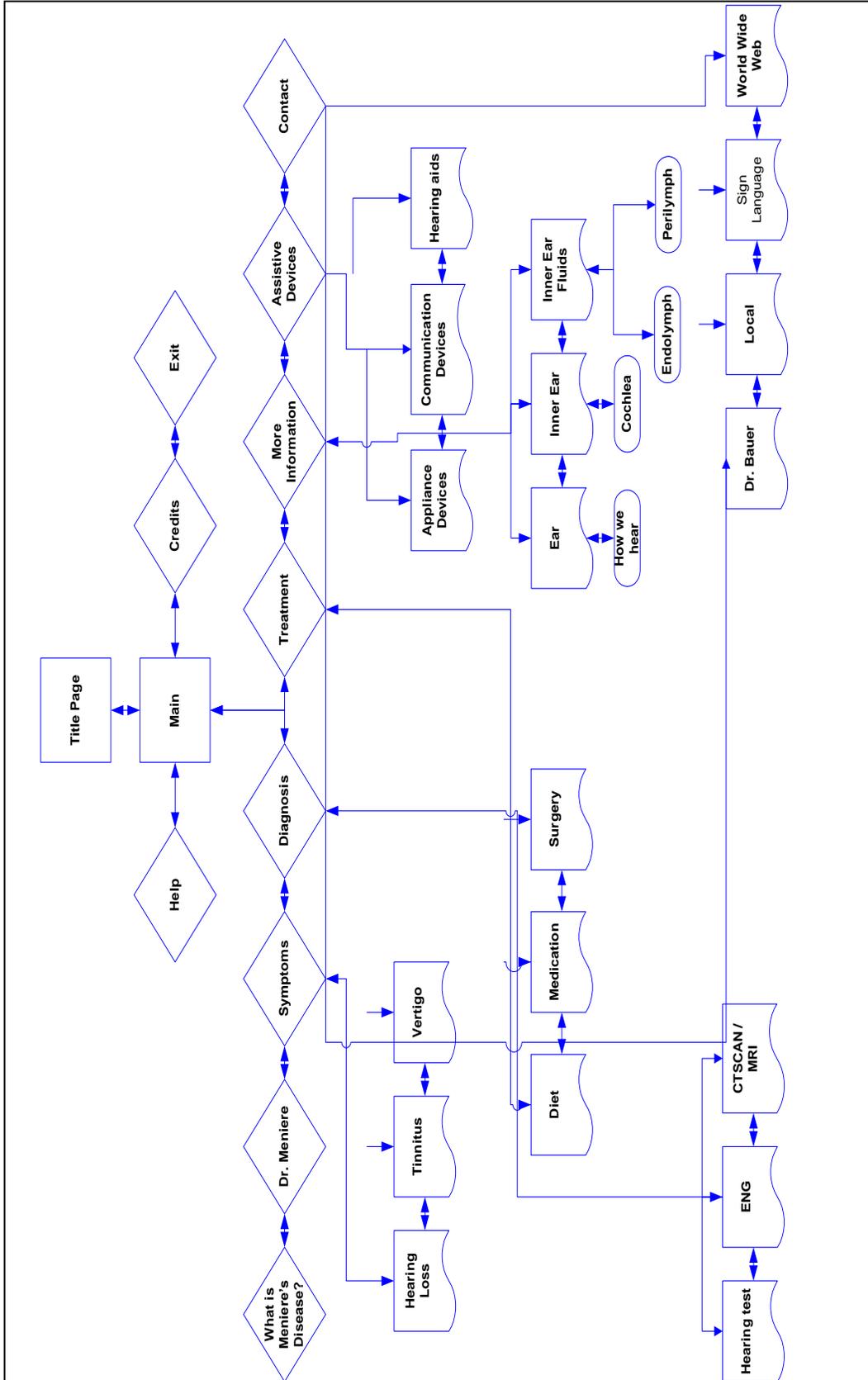
Appendix A.

M.I.T.E Flow Chart

Figure 1. M.I.T.E. Project Flow Chart

Appendix B.

Budget Tables

Meniere's in the Ears Budget		
Hardware		
Computer with CDRW	**$450.00**	**Purchased from TigerDirect.com**
HP® ScanJet 5P™	**$229.00**	**Office Depot**
Olympus® D400 Zoom™	**$282.75**	**Purchased on Ebay.com**
Hardware Total	**$961.75**	
Meniere's in the Ears Project Budget		
Software		
Adobe® Photoshop™	**$609.00**	http://www.adobe.com
Goldwave™	**$40.00**	http://www.goldwave.com/
Macromedia® Authorware™	**$2,699.00**	http://www.macromedia.com
Ahead® Nero™	**$78.00**	http://www.nero.com/en/purchase.htm
Software Total	**$3,426.00**	

Figure 2. Budget Table

Postal Rates for Shipping CD-ROMS	
CD-ROM in Jewel Case approximately 4 ounces:	
Media Mail	$1.33
First Class Mail	$1.03
CD-ROM in paper sleeve approximately 1 ounce:	
Media Mail	$1.33
First Class Mail	$0.56

Figure 3. Postal Rates

Appendix C.

Timeline Table

Task	Start	Finish
Senior Design I The Proposal		
Project Concept	4/1/2003	12/12/2003
Write Draft Proposal	4/28/2003	4/29/2003
Submit Draft Proposal	4/30/2003	4/30/2003
Begin to Develop Project Design	4/1/2003	12/12/2003
Submit Revised Proposal	5/30/2003	5/30/2003
Senior Design I Presentation	5/26/2003	6/4/2003
Senior Design II Design Freeze		
Continue Development and Information Gathering	4/1/2003	12/3/2003
Prepare Design Freeze Report	7/28/2003	7/29/2003
Submit Design Freeze Draft	7/29/2003	7/29/2003
Create Working Model of Project	4/1/2003	12/12/2003
Revise Design Freeze Draft	8/1/2003	8/4/2003
Submit Design Freeze Report	8/4/2003	8/4/2003
Senior Design II Presentation	7/28/2003	8/4/2003
Begin Incorporation of Feedback into Project	8/1/2003	8/24/2003
SDIII The Final Report		
Testing of Project	6/9/2003	12/1/2003
Finalizing Project	12/1/2003	12/7/2003
Retesting Final Project	12/8/2003	12/11/2003
Submit Draft of Final Report and Abstract	11/20/2003	11/20/2003
Revise Final Report and Abstract	11/26/2003	12/11/2003
Package Final Project	12/11/2003	12/11/2003
Senior Design III Final Report Presentation	12/3/2003	12/3/2003
Submit Completed Final Report and Project	12/12/2003	12/12/2003

Figure 4. M.I.T.E. Updated Timeline
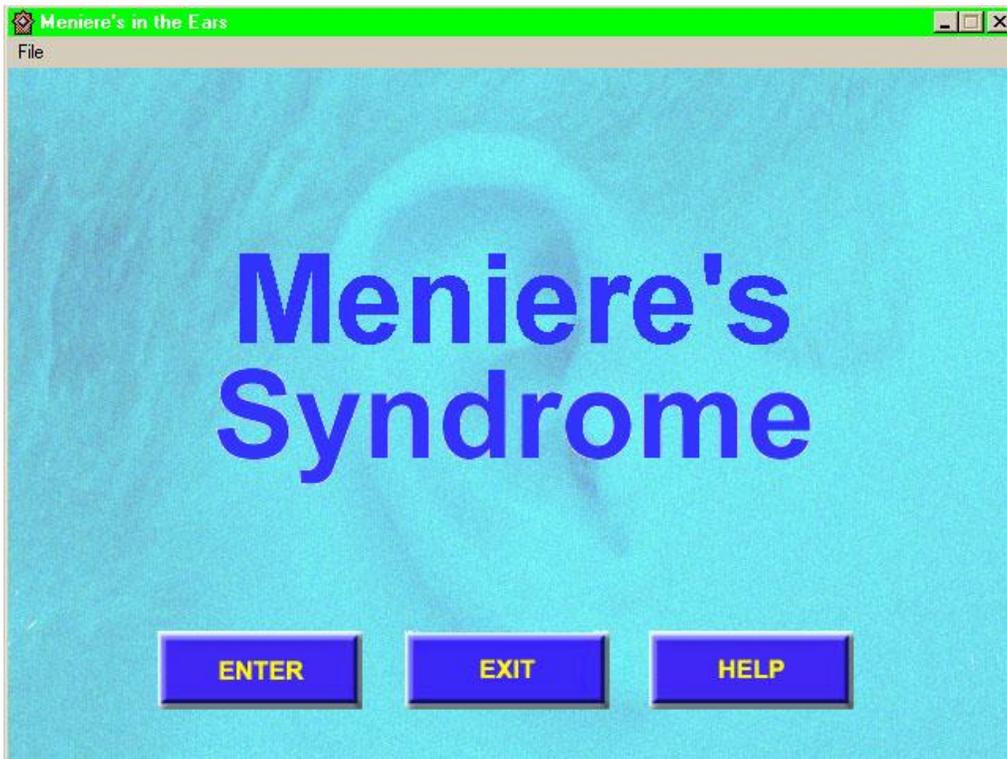
Appendix D.
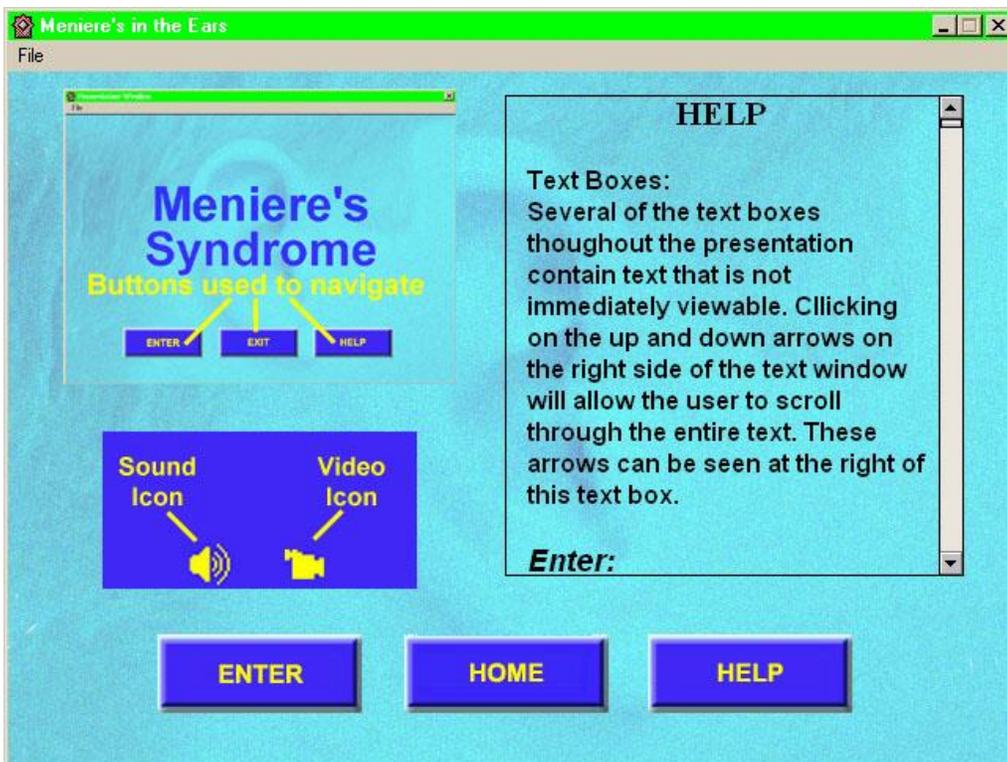
Screen Captures of M.I.T.E.

Figure 5. Opening

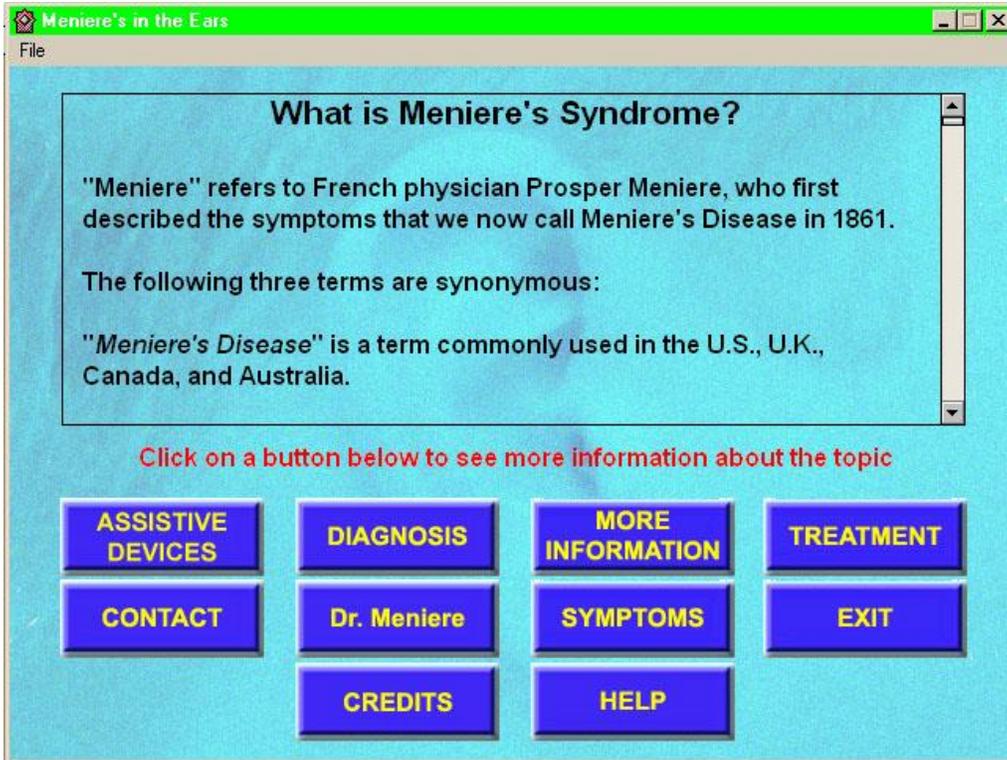
Figure 6. Help Screen

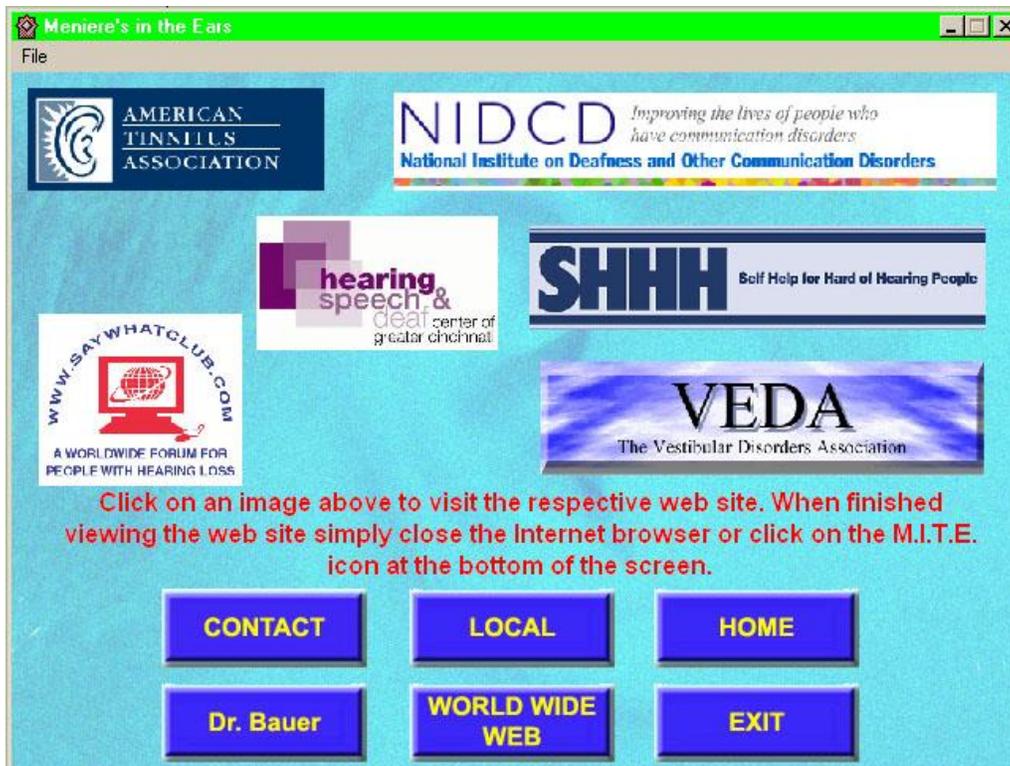**Figure 7. Main Screen**

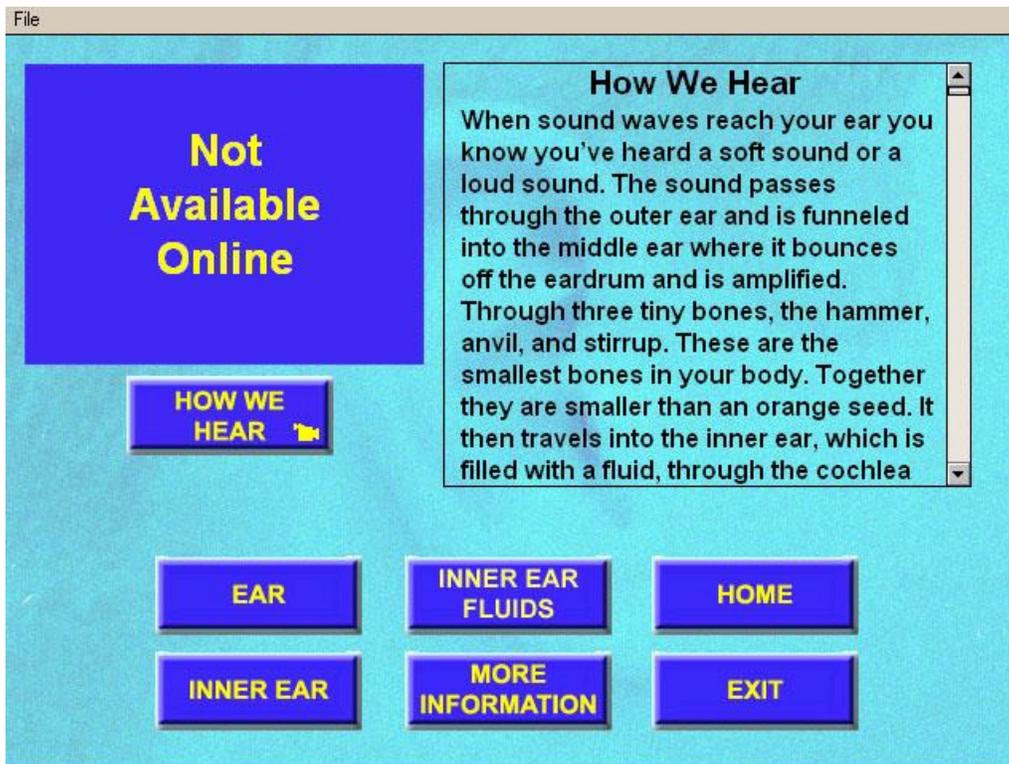**Figure 8. Web Links**

Figure 9. Web Screen

References

1. Adobe Premiere 6.0 *Classroom in a Book*. Adobe Press; September 26, 2001.

2. American Tinnitus Association Portland, OR. *Web Site Link image and information*. http://www.ata.org/

3. Aging Nation council on the: *The Consequences of Untreated Hearing Loss in Older Persons.Summary*. Washington, D.C. NCOA.

4. Bauer, George P. Doctor of Otology/Neurotology. Mercy/Franciscan Hospital. *Personal interview*. October 4, 2001.

5. HSDCGC. *Hearing Loss and Close Relationships*. Cincinnati, Ohio. Hearing Speech & Deaf Center of Greater Cincinnati.

6. HSDCGC. *Personal Interview with Director and Staff*. Hearing Speech & Deaf Center of Greater Cincinnati. January 21, 2002.

7. Kalata, Kathleen. *Internet Programming with VBScript and JavaScript*. Boston, MA: Thomson Learning, 2001.

8. *Macromedia .Authorware General Discussions*. http://webforums.macromedia.com/authorware/. Macromedia, Inc 1995-2002.

9. Martin, Kathleen M.S.CCC-A. Mercy/Franciscan Hospital. *Personal interview*. October 4, 2001.

10. Salt, Alec M. Ph.D. Department of Otolaryngology, Washington University School of Medicine St. Louis, MO. *Images from Inner Ear Anatomy*. http://oto.wustl.edu/cochlea/intro1.htm

11. Say What Club. *Web Site Link Image*. http://www.saywhatclub.com/index.html

12. SHHH Self Help for Hard of Hearing People Washington, D.C. Office. *Web Site Link Image*. http://www.shhh.org

13. Siebert, Lori & Ballard, Lisa. *Making a Good Layout*. Cincinnati, Ohio: North Light Books, 1992.

14. Smitson, Dennis. *Personal Interview*. Clarksville, Ohio. February 23, 2002.

15. Stromberg, Eleanor Ph.D. *Tips for Communicating With a Person Who has Hearing Loss*. Canton, Ohio. Interactive Therapeutics Inc.

16. Ultratec, Inc. Madison, WI. *Images of Assistive Devices*.
http://www.ultratec.com

17. United States Census Bureau. *Population Clock.*
Web Site: http://www.census.gov/cgi-bin/popclock.

18. Vaughn, Tay. *Multimedia: Making it Work*. Berkley, California:
Osborne/McGraw-Hill, 1998.

19. Welling, Robin M.S.CCC-A
      Mercy/Franciscan Hospital. *Personal interview*. October 4, 2001.