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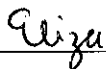
'COURSEWARE FOR VISUALLY IMPAIRED CHILDREN'

by

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Universiti Teknologi Petronas
in partial fulfilment of the requirement for the
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INFORMATION SYSTEM

Approved by,

 _____

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UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
December 2005

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



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ABSTRACT

'Courseware for Visually Impaired Children' is developed to help the blinds for their education learning process. This courseware is focusing for children from 7-10 years old. The objective is to develop a courseware that satisfies MAB (Malaysian Association for the Blind) to assist requirements blind children in their learning education. This courseware is developed because there is lack of teaching materials and experts to assist blind children in their education. Currently, teachings are based on communication between the teacher and the blind children. The problem with the current learning materials is there is no electronic media being used to ensure the efficiency and effectiveness of teaching methods. This courseware will enable the blind children to have their chance in using computer and learn how to read word, learn alphabetical, typing and memorizing numbers. They are exposed to new software that needs them to navigate this software using computer by using only keystroke and no mouse pointing. Based on interview, this courseware is useful for MAB in enhancing their ability and efficiency in delivering learning to blind children. The methodology selected for this courseware are based on five phases that are; project planning, system analysis, system design, coding and testing and project presentation. The expected output for this courseware will be the implementations of a real computerize system that can be used by the teachers to assist the blind children in their education.

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- CHAPTER 1 -

INTRODUCTION

1.1 Background

MAB (Malaysian Association for the Blind) is the premier voluntary organization in Malaysia serving visually impaired persons. It provides services that help the blind and prevent the tragedy of avoidable blindness. Established in 1951 by the then Department of Social Welfare to look after the general well-being of blind persons in the country, MAB has since carried out this role and much more. The Malaysian Association for the Blind always works toward creating greater public awareness concerning the abilities and capabilities of the visual impaired persons under its charge. This is to ensure their integration into the society and a better quality of life. In order to accommodate the changing needs, demands and challenges of the modern world, MAB strives constantly to improve and expand its services for the betterment of visually impaired people by introducing new courses and acquiring new equipment. This project is focus more on education learning for the blind children from the age of 7 to 10 years old.

Everyday there are always communication between teacher and the blind children. The learning process is based on communication itself to teach them on how to read and understand words in English. Problems arise as there is lack of interest of blind children as they can only hear the communication and nothing much they can do. To overcome this problem, a software called 'Courseware for Visually Impaired Children' being introduced. This development will help the blind children exposed to the technology of using computers. They need to learn how to use keyboard to be able them to navigate the software easily. This enhancement of learning process will help to build the interest of blind children in their early stage of learning process. This courseware will give them better understanding in English and make them confident to use computer and automatically build their self-confident. This software is reliable in helping MAB to achieve their aims to be better in serving the blind children.

1.2 Problem Statement

The problems occurred in the existing process are:

1. There is lack of teaching materials in MAB
2. There is no interest of blind children to focus on learning process as their interest is just 90% enjoying and playing. They have their own playground and toys around them so the interest in learning is too low. The author got it from the teachers in MAB based from their experience.
3. There is no software being used to serve the education for blind children's learning process from age 7 to 10 years old
4. Lots of learning materials is in written form as they are blind and difficult for them to read and understand, unless someone read up for them
5. Miscommunication between the blind children and normal person due to no proper platform for them to interact with each other

1.2.1 Significant of the Project

This courseware can help to improve the current process of the blind children education. Through this courseware it will help the blind children to build confidence level to use computers and exposed to the new learning process to use the special software created. This courseware will definitely help to save time and cost as the learning process thru hearing and listening system. The blind children learn by hearing every single word as they press by using keystroke of computer keyboard. Learning by hearing is much more efficient as they are blind and difficult for them to read a written material. This courseware will definitely useful for them as the learning process will continue even they are at home as the software are easily download to any computers with Windows platform. The learning process will be continuous as it will help to generate interest of blind children to use technology and make their life better and confident. This project will help MAB to be better in terms of learning process modules in future and strive their objective to serve the best for the blind people.

Several type of research area will be covered through this project based on some questions. The research questions are:

1. How does this courseware reliable to MAB and blind children?
2. What is the process involved to develop the courseware?
3. Can the current process be simplified?
4. What is the importance of implementing this courseware?
5. What is the suitable technique and method to implement the courseware?
6. What are the requirements needed to develop the courseware?
7. Can this courseware meet the objective?

1.3 Objectives

To design a courseware that can:

- ✓ Study and identify the problems arise in MAB relating to education learning process for blind children. This is to ensure that the proposed courseware will achieve the aims to upgrade, enhance and automate the current learning process
- ✓ To developed a courseware that can assist the blind children from the age of 7 to 10 years old to learn, read, understand and memorizing English words and numbers

1.4 Scope of Study

This report details the development and implementation of 'Courseware for Visually Impaired Children'. The author focuses on the need of blind children in their learning education thru hearing and listening. For this project, it will include detailed descriptions of system requirement specifications which describe the functions used in the software. As for the system analysis part, an interview is conducted among the blind people that work in MAB especially to those involves in education learning process for blind children. The purpose is to help and ease the author in designing phase. In design phase, the author must determine how the flow system and storyboard. The author will select five phases that are project planning, system analysis, system design, coding and testing, project presentation as the methodology for the system development. There are certain criteria need to be considered such as reliability, flexibility, scalability and satisfaction among MAB staff that they think can help their blind children for the learning process. At the end the system will be developed based on guideline given.

The development of the system involves the use of Visual Basic 6 and JAWS (Job Access with Speech) that act as the screen reading software that enable every single word to be read using Windows platform. Apart from that, the author applies the knowledge about the latest technology for the development through the use of JAWS and VB6. Regardless of all these the author has to do some research on how to navigate JAWS and how JAWS link with VB6. This is to ensure the software work well with each other in order to develop the system. The author also has to document all the findings using IT knowledge and skills that the author had learned for the past few years during her studies in UTP.

1.5 Feasibility of the Project within the Scope and Time Frame

The author is responsible to develop a courseware for blind children that will be used by MAB in teaching the early age children using computers. Through this software, the blind children will easily get exposed to the technology and make them easy to learn using the courseware provided. This project will take at least 3 months to be completed according to the timeline given by UTP

- CHAPTER 2 -

LITERATURE REVIEW AND THEORY

2.1 Specialized Education Services for Children Who Are Blind or Visually Impaired

The inadequate count of visually impaired children means that our nation lacks critical information about the need for specialized services for these children, and cannot correctly allocate the specialized resources and personnel required. Consequently, many children do not receive the appropriate specialized educational services they need (Pogrund, Fazzi, & Lampert, eds., 1992).

The sentence were taken from the article from the net says that there is a specialized education services for those children who are blind or visual impaired. Currently, the education is lack of expert that is able to teach the blind children. Consequently, many of the blind children did not manage to get proper education based on survey conducted. They need to get proper education in order to give them chance to be better even they are visually impaired children.

2.1.1 What skills that visually impaired children need?

From what we know, these children need special skills in order for them to achieve good education in their learning process. Visual impairments change the way these children obtain information about the world in which they grow and limit opportunities to learn through observation of visual elements in school or people around them. They need to get special skills from teachers and others who are specially trained to teach all sorts of skills, and it must be the certified teachers of visually impaired children and orientation and mobility specialist. This special skill needed that they must obtain such as using technology and computer proficiency that is using computer and equipment that adapt to their environment for blind and visually impaired people.

2.1.2 Visual Impaired Children Education

Usually those visual impaired children received their education in special school specifically designed for blind and with special classroom and itinerant teaching services in regular education classrooms. Based on the needs, they must get proper education and In addition, special schools frequently provide outreach support and technical assistance to public schools in their states.

2.1.3 What can help the visual impaired children?

- Provide access to the latest technology so every blind or visual impaired children benefit from computer based program such as software to teach them to read, learn and understand English through hearing and listening process.
- Provide qualified teachers in all educational settings that can provide specialized communication, literacy, academic etc.
- Assure that parents and families of children who are blind or visually impaired are provided with information they needed to determine the best educational options for their blind children.

From the list of point above, it is very important that this journal support to have good education to the blind children in terms of technology in using computers. It will help them to improve and be better with the help of good teachers that specialized to this area.

Please refer to *Appendix A: <American Foundation for the Blind>*

2.2 Young Children and Microcomputers

"The computer is seen as a material with many potential benefits and many potential problems. If it is used wisely, with the principles of early childhood development in mind, it can be a valuable addition to a developmental-based classroom. Although the computer has much to offer an early childhood classroom, its absence from the classroom will not be disastrous [emphasis added]" (Davidson, 1989, p.12).

From the articles of Young Children and Microcomputers: A Second Look by Larry Prochner tells about the use of computer for young children. The computer is a material with many potential benefits and problems. It is used wisely and can generate a good thinking in children's mind to use computer everyday to make them confident and learn towards IT world. Research on the effects of computers use on the social and cognitive development of young children is limited and for the most part, contradictory and inconclusive. Notice that, almost none has been conducted on computers in child care centers. However the same is true of many the materials commonly found in childhood settings.

"Computers are not necessary in the kindergarten classroom. In fact, unless they are incorporated with sensitivity and awareness, we gain by their absence [emphasis added]" (1989, p.28).

These examples point to a significant change in the early childhood educators think about computers. It is not that computers are seen as the work of the devil, as they were once called by the novelist Roberston Davies. Joseph Weizenbaum, professor of artificial intelligence at the Massachusetts Institute of Technology, perceptively called the computer in education a solution in search problem. Computers appeared in preschools and child care centers before were assigned any real use. In the environment of computers, children were believed to have natural affinity for the machines.

The aim is for educators to create "a child-oriented computer experience, where children are in control, acting on software to make events happen rather than reacting to predetermined questions and closed-ended problems" (Haugland & Shade, 1988, p.37).

In my view, the best choice for software is found in the market such as drawing and writing programs. But for this project, hearing and listening is important in order to help the blind children to access computers. Children must always work within the parameters set by the programmer and they are always limited by the procedural logic upon which computers are based. A word of caution "child oriented" should not be taken mean that children are completely in control of the software.

Finally it is well worth considering the computer in early childhood education in historical perspective. Computers, although more wieldy than blocks (it is difficult to set them on floor, but what would happen if you did?), also need to be "taken over" by today's early childhood educators. It is very important to locate the computer's proper place within our current understanding of childhood education. This process, surely a difficult process and might take more than one decade.

From the point of elaboration above, based on the project of 'Courseware for Visually Impaired Children', it is important to introduce the use of computers in early age of children learning process. This might help them to be more creative and the same as the others in future with the help of the software that need them to use hearing and listening methods for their early education program. Somehow this article, support the using of computers in children's early age of education.

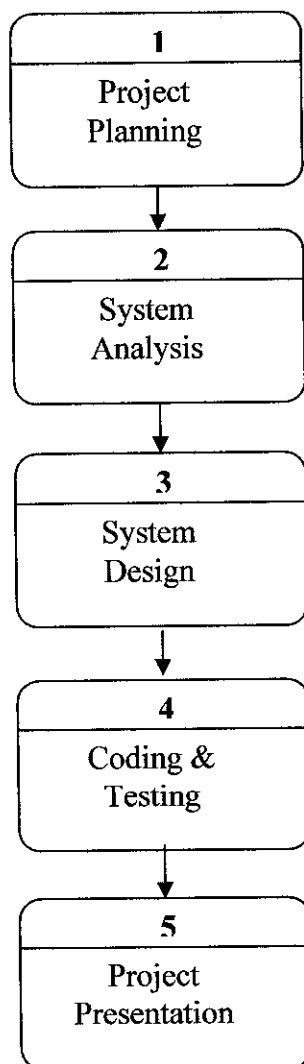
Please refer to *Appendix B: <Children & Family Canada>*

- CHAPTER 3 - METHODOLOGY

3.1 Project Phases

Methodology is the steps taken in undergoing the research and project work. In response towards the technology, five phases are finalized in order to complete the system. The phases are project planning, system analysis, system design, coding and testing and lastly the project presentation.

Following are the tasks planned for each phase in methodology.



3.1.1 Project Planning

In this first phase, several activities done such as proposal submission, scheduling and analyzing problems. This project planning will focus on the activities involved in the early stage of the development. The activities are recorded in the form of Gantt Chart. This Gantt Chart lists down the activities performed and the important milestone. This is actually the phase that needs the author to do the investigation on how to start analyze the problem statements and recommending appropriate and suitable solution. At this phase, the project being scoped and planned.

The task performed:

Gantt Chart

- The purpose of having a well plan Gantt Chart is to ensure that the work/task allocated for this project is based on the time line given. A brief Gantt Chart was created using Microsoft Project 2003 (Please refer to *Appendix C*)

Milestone

- The milestone will show to user the completion of each task related in the system

3.1.2 System Analysis Phase

The requirement analysis is done during this phase. The author started to gather information needed as required by the project. Interview and survey are been use to collect data to be analyzed. The author analyzed the system requirement as it will be the guidelines in developing this system. (Please refer to *Appendix D* for interview question)

The task performed:

Interview

- The author conducted an interview sessions during her visit to MAB (Malaysian Association for the Blind). Besides, an interview to staff and computer teachers in order to get their idea on how to construct a good problem and requirement analysis. From this technique, it is viable and quick way to gather data.

3.1.3 System Design Phase

In this phase, the author will design and analyzed the flow system that involved. The design phase will require the author to do a storyboard to show the flow of the system. Furthermore, the user interface of the system will be design as well in this phase. The detailed of the navigation of storyboard being included in order to understand more how is the design.

The task performed:

Flow Chart System

- The flow of the system process should be determined. It will describe how the system operates (Please refer to *Appendix E* for the flow chart system)

Storyboard

- The storyboard being included in order to get an idea on how the interface going to be. It includes the detail description of the functionality (Please refer to *Appendix F* for the storyboard)

3.1.4 Coding & Testing

In this phase, the coding and testing is important in order to run the system smoothly. The coding will enable the linkage between the forms in VB6. This phase will ensure and identify what language is going to use, functionality of button and navigation of the system. The author will conduct a user testing to ensure the system run efficiently as intended.

The task performed:

Visual Basic 6

- The author will use VB6 as the medium to run the system. The interface is based on VB6. The interface will integrate with JAWS as it acts like a screen reader that enables JAWS to navigate and understand every single word to be read out loud

User Acceptance Testing

- The author will conduct a user testing in MAB to fulfill them about the courseware

3.1.5 Project Presentation

This will be the last phase in developing 'Courseware for Visually Impaired Children'. This project presentation needs the author to present the end product to the internal and external examiners during the project demo. Related documents being attach together.

The task performed:

Demonstration

- This project presentation requires the author to demonstrate the end product according to the timeline to the internal and external examiners

3.2 Tools

The author has divided the tools into two categories which are:

3.2.1 Hardware

Table 3.2.1 shows the hardware requirement for the development of '*Courseware for Visually Impaired Children*'.

(Table 3.2.1 Minimum Hardware Requirement)

Device	Requirement
<i>Operating System</i>	Microsoft Window
<i>Processor</i>	Intel Pentium IV
<i>Memory</i>	256MB of memory
<i>Disk Space</i>	20GB of free space
<i>Other Peripherals</i>	Screen (1024 x 768), Keyboard, CD-ROM drive

3.2.2 Software

Table 3.2.2 shows the software use throughout the development of 'Courseware for Visually Impaired Children'.

(Table 3.2.2 Software Requirement)

Software	Function
<i>JAWS (Job Access With Speech)</i>	A screen reading software for Windows
<i>Microsoft Project 2003</i>	Project Planning (Gantt Chart & Milestone)
<i>Adobe Acrobat Reader 6.0</i>	This software will be used for the literature review part where some of the files need to be open using the Acrobat Reader
<i>Visual Basic 6.0</i>	Implementation of interface and coding that link with JAWS
<i>Microsoft PowerPoint</i>	This software will be used for preparing presentation slides later during project presentation and storyboard
<i>Microsoft Word</i>	This software used for writing reports, creating tables and charts throughout the semester

- CHAPTER 4 -

RESULTS & DISCUSSION

4.1 Results and Discussion

This chapter will conclude on all the findings and research that has been done for within the range of eight weeks from the starting of the project. Most of the findings were gathered through Internet and reference books, which have given great inputs to further on with this project. Other contributions for the data gathering would be from journals, brochures and articles. Most of the progress has been focused on how efficient and effective the courseware will help to assist the blind children in their early education in using computers.

From the findings being done thru out the project, those finding relates to the methodology discuss in chapter 3. The findings followed the five phases that are project planning, system analysis, system design, coding and testing and lastly the project presentation. All those five phases need to do a proper planning in order to have good development of the system. As mentioned in the previous chapter, this research is wanted to find out whether the learning that applies the ability for the blind children to learn and read English word based on the courseware created. However, before proceed with the result and discussion, the author has designed storyboard to achieve the result of this research in system analysis system design below.

4.1.1 Project Planning

In this phase, the findings are based on the analyzing problems. Milestone is to perform for each task completion. Gantt Chart will list down all activities related within the time duration. Each of the development phases has its own milestone that represents the completion task. The tracking Gantt Chart will show the percentage of completion. User can know how much the development of each phase completed within the range period of time. The Gantt Chart will show the steps that are Initiating, Planning, Executing, Controlling and Closing. (Please refer to *Appendix C* for Gantt Chart and Milestone)

4.1.2 System Analysis

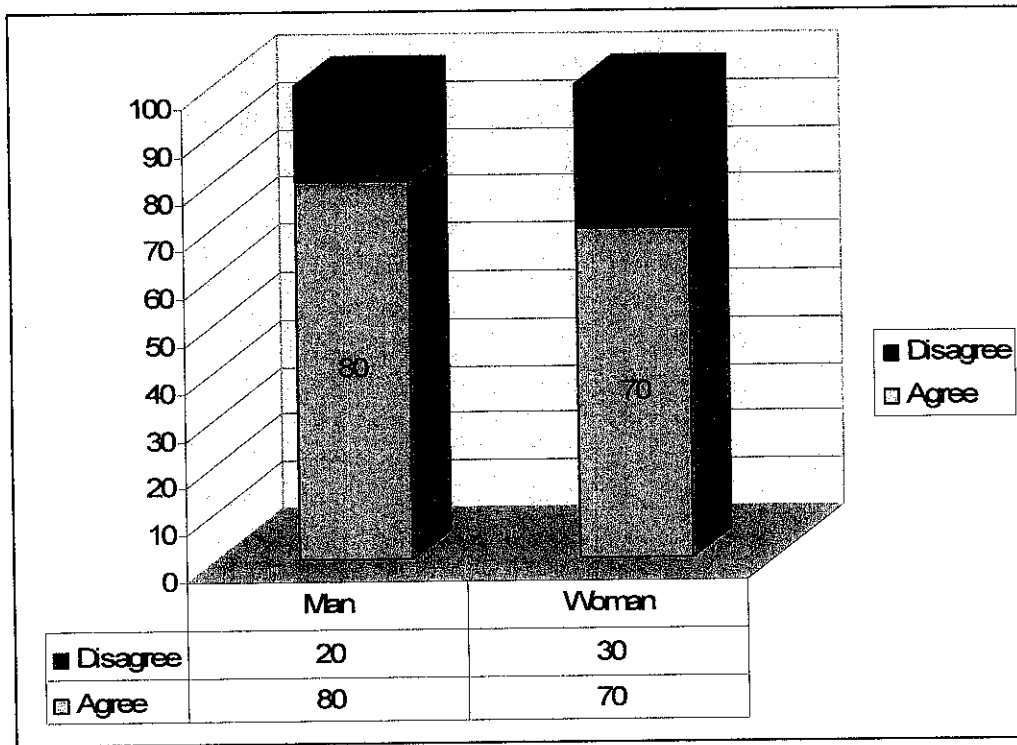
In this phase, analysis that being conducted are interview session with MAB (Malaysian Association for The Blind) staff in MAB itself. This analysis is focus to the education of the blind people in MAB. The scope was narrow down as the author choose to help the learning process for the blind children in MAB. During the interview, the staff (Mrs. Hema Latha and Mr.Wong) had brought the author to look around the surrounding in MAB to have some view on how they managed the blind people in daily lives. The interviews were conducted to 15 people who worked in MAB people that related to the area of Blind Association.

(Please refer to *Appendix D* for Interview Question)

From the interview question, a few of the staff managed to help the author in her analysis phases. The author needs to write down all those answer rather than giving the questionnaire to them that need them to fill up. The problem with questionnaire is that the people in MAB itself especially the managers are blind. It's hard for them to answer any printed material questionnaire unless someone read up for them or else the materials must be in Braille. To overcome the problem, interview session being conducted to a few staff in MAB.

The histogram below is the response that the author get from the interview conducted to few of the MAB staff. To summarize the response, this 'Courseware for Visually Impaired Children' will definitely help a lot to MAB and help them in enhancing their learning style. Below are some of the feedbacks as the result of asking the importance of developing this courseware for MAB. The feedbacks are from man and woman that are currently working in MAB and the people that related to the area of Blind Association.

Histogram of Agree & Disagree of Courseware for Visually Impaired Children



From the diagram of interview and survey conducted in MAB:

Man: 80% are agree
: 20% are disagree

Woman: 70% are agree
: 30% are disagree

From the diagram, the author can conclude that most of them are agree with this courseware as it will help MAB in terms to improve their ability in teaching style. It will be more effective and efficient to teach the blind children as it allows the blind children to explore this courseware using computers.

4.1.3 System Design

In the design phase, the author has transformed the analysis phase into design specification for coding and testing. The design phase is concerned with technology-based views of the prototype data, processes and interface. During this phase, the author has planned the appropriate design for the prototype to be used, in order to prove the practicality of this 'Courseware for Visually Impaired Children' concept. In designing the prototype, the author has:

1. Design the flow system
2. Design storyboard
3. Design interface

The author has applied the appropriate design to meet the main objective of this research. It was applied by providing user interaction method such as enabling the user (blind children) to click on each button and there are sound will be heard. Besides, the author also has provided the ability to click buttons using only specific keystroke and spacebar to navigate throughout the environment. Such environment may lead the blind children to learn more in enhancing the ability in using computer.

4.1.3.1 Flow Chart System

The flow of the system represented in the *Appendix E*. The flowchart showed the functionality of the system. The most important phase that can be seen through the diagram is that choosing the category to learn that representing in the main page. The user (blind children) can make their selection between the four category provided and if not user can just exit the system. The four categories are Read English button, Learn Alphabet button, Typing button and Numbers button.

As the user click for the courseware, user is directly in Introduction Page. If the user wishes to continue, user must click at the welcome button. Next, user is already in the Main Page, in this Main Page user need to choose the four categories above and it will link to the selected pages. If the user wishes to exit, there is an exit button in Main Page and in the selection category pages.

4.1.3.2 Storyboarding

Storyboarding refers to the layout of the prototype story line. The storyboarding helped the author to keep the visual map of the prototype in mind and to see the extent of the prototype. The main advantage of storyboarding is, when the author is deep into the project, the pressure is seem much less because all sketches of every scene are already there. Please refer to *Appendix F* for storyboard. Below are the discussions of the storyboard layout:

Introduction Page

In the Introduction Page, there is a welcome button provided and user can just press the spacebar and the button will link directly to the Main Page.

Main Page

In the Main Page, there are four buttons that user can choose on.

- The first button is Read English button and the button will link to Read English page. (Press spacebar or ALT+R)
- The second button is Learn Alphabet button and the button will link to Learn Alphabet page. (Press spacebar or ALT+L)
- The third button is Typing button and the button will link to Typing page. (Press spacebar or ALT+T)
- The fourth button is Numbers button and the button will link to Numbers page. (Press spacebar or ALT+N)

If user wishes to log out/exit, there is an exit button in Main Page and user can just press spacebar on the button or ALT+E.

Read English Category Page

In this selection page, there are 10 buttons that user can choose. User can navigate by pressing TAB key.

- 1st Button: Animal
- 2nd Button: Body
- 3rd Button: Clothes

- 4th Button: Fruits
- 5th Button: House
- 6th Button: Kitchen
- 7th Button: Occupation
- 8th Button: School
- 9th Button: Tools
- 10th Button: Transport

Each of the buttons will link directly to each selection page. If user wishes to log out/ exit from the current system, there is an Exit button and if user wishes to go to Main Page, there is a Home button provided in this selection page.

Learn Alphabet Category Page

In this selection page, there are 26 buttons that user can choose from A to Z button. User can navigate by pressing TAB key for each button or ALT+A till ALT+Z. All button will link directly to its own A to Z page. The A to Z selection page will provide user with the description of the alphabet. If user wishes to continue to next alphabet or return to previous alphabet, there is a Next button and Back button provided.

If user wishes to exit or return to Main Page, there is a Home and Exit button in each of the pages.

Typing Category Page

In this selection page, there are 4 buttons that user can select from Tutorial 1 to Tutorial 4. Each of the Tutorial buttons will link directly to its own Tutorial page. In each Tutorial pages, there are typing box provided for the user to practice typing. If user wishes to continue to next tutorial or return to previous tutorial, there is a Next button and Back button provided.

If user wishes to exit or return to Main Page, there is a Home and Exit button in each of the pages.

Numbers Category Page

In this selection page, there are numbers from 1 till 100. User can navigate by using TAB key to read the numbers. There are also 3 buttons that are Add, Subtract and Multiply buttons. This 3 buttons will link directly to its own pages. If user wishes to continue to next numbers or return to previous numbers page, there is a Next button and Back button provided in each pages.

If user wishes to exit from the current system or return to Main Page, there is a Home and Exit button in each of the pages.

4.1.3.3 User Interface

This section of report will present several print screens of user interface for 'Courseware for Visually Impaired Children'. This print screens are based on storyboard that has been sketched earlier. Below are some discussions of the user interface:

All Button:

Font: Georgia

Font Size: 12

Color: Appropriate with background

Text Box (Read English Category):

Font: Times New Roman

Font Size: 12

Color: Appropriate with background

Text Box (Learn Alphabet Category):

Font: Georgia

Font Size: 24

Color: Appropriate with background

Labels:

Font: Georgia

Font Size: 24

Color: Appropriate with background

Numbers:

Font: Times New Roman

Font Size: 10

Color: Appropriate with background

Each Form Text:

Font: Times New Roman

Font Size: 12

Color: Automatic

Refer *Appendix G* for the print screens.

4.1.4 Coding & Testing

In this phase, the author needs to test the coding that can run using VB6 platform. As the medium are VB6, the author need to ensure that the integration of VB6 and JAWS can be link together. It is to ensure the system can run smoothly. Furthermore, after the implementation of coding, the author need to do a User Acceptance Testing to make sure that the system fulfill their requirement in order to improve the efficiency and effectiveness in MAB in order to give the best for the blind children age 7 to 10 years old.

4.1.4.1 Functionality and navigation of the system

The functionality is based on the navigation of the system. The language that being use is VB6 that acts as the platform to run the system. The use of VB6 is because it is the easiest software that can integrate well with JAWS to be read all buttons out loud. Furthermore, as this courseware is created for the blind children, they can just use the keyboard as the way to use computer. The blind children use the short cut keys or the special keystroke in the system that makes them easy to understand and navigate well. Each of the forms has its own keystroke and JAWS will read out loud so that the children know the keystroke for them to enter into the selection criteria. Some of the examples of the keystroke provided in the system:

(All the short cut or keystroke is based on the first alphabet. If there is the same keystroke within the same page, JAWS will ask the blind children to choose either one of the selection they made by pressing the keystroke or spacebar. The rest of the navigation, press TAB to move from one button to another)

Main Page

- ALT+R = Read English Button (Link to Read English Page)
- ALT+L = Learn Alphabet Button (Link to Learn Alphabet Page)
- ALT+T = Typing Button (Link to Typing Page)
- ALT+N = Numbers Button (Link to Numbers Page)
- ALT+E = Exit Button (Exit System)

Read English Page

- ALT+A = Animal Button (Link to Animal Page)
- ALT+B = Body Button (Link to Body Page)
- ALT+C = Clothes Button (Link to Clothes Page)
- ALT+F = Fruits Button (Link to Fruits Page)
- ALT+H = House & Home Button (Link to House Page & Main Page)
- ALT+K = Kitchen Button (Link to Kitchen Page)
- ALT+O = Occupation Button (Link to Occupation Page)
- ALT+S = Schools Button (Link to School Page)
- ALT+T = Tools & Transport Button (Link to Tools & Transport Page)
- ALT+E = Exit Button (Exit System)

Learn Alphabet Page

- ALT+A = Alphabet A Button (Link to Alphabet A Page)
- ALT+B = Alphabet B Button (Link to Alphabet B Page)
- ALT+C = Alphabet C Button (Link to Alphabet C Page)
- ALT+D = Alphabet D Button (Link to Alphabet D Page)
- ALT+E = Alphabet E & Exit Button (Link to Alphabet E Page & Exit System)
- ALT+F = Alphabet F Button (Link to Alphabet F Page)
- ALT+G = Alphabet G Button (Link to Alphabet G Page)
- ALT+H = Alphabet H & Home Button (Link to Alphabet H Page & Main Page)
- ALT+I = Alphabet I Button (Link to Alphabet I Page)
- ALT+J = Alphabet J Button (Link to Alphabet J Page)
- ALT+K = Alphabet K Button (Link to Alphabet K Page)
- ALT+L = Alphabet L Button (Link to Alphabet L Page)
- ALT+M = Alphabet M Button (Link to Alphabet M Page)
- ALT+N = Alphabet N Button (Link to Alphabet N Page)
- ALT+O = Alphabet O Button (Link to Alphabet O Page)
- ALT+P = Alphabet P Button (Link to Alphabet P Page)
- ALT+Q = Alphabet Q Button (Link to Alphabet Q Page)

- ALT+R = Alphabet R Button (Link to Alphabet R Page)
- ALT+S = Alphabet S Button (Link to Alphabet S Page)
- ALT+T = Alphabet T Button (Link to Alphabet T Page)
- ALT+U = Alphabet U Button (Link to Alphabet U Page)
- ALT+V = Alphabet V Button (Link to Alphabet V Page)
- ALT+W = Alphabet W Button (Link to Alphabet W Page)
- ALT+X = Alphabet X Button (Link to Alphabet X Page)
- ALT+Y = Alphabet Y Button (Link to Alphabet Y Page)
- ALT+Z = Alphabet Z Button (Link to Alphabet Z Page)

Learn Alphabet A-Z Selection Page

- ALT+B = Back Button (Link to previous alphabet page)
- ALT+N = Next Button (Link to next alphabet page)
- ALT+H = Home Button (Link to Main Page)
- ALT+E = Exit Button (Exit System)

Typing Alphabet Page

- ALT+1 = Tutorial 1 Button (Link to Tutorial 1 Page)
- ALT+2 = Tutorial 2 Button (Link to Tutorial 2 Page)
- ALT+3 = Tutorial 3 Button (Link to Tutorial 3 Page)
- ALT+4 = Tutorial 4 Button (Link to Tutorial 4 Page)
- ALT+H = Home Button (Link to Main Page)
- ALT+E = Exit Button (Exit System)

Typing Tutorial 1-4 Selection Page

- ALT+B = Back Button (Link to previous tutorial page)
- ALT+N = Next Button (Link to next tutorial page)
- ALT+H = Home Button (Link to Main Page)
- ALT+E = Exit Button (Exit System)

Numbers Page

- ALT+A = Add Button (Link to Add Numbers Page)
- ALT+S = Subtract Button (Link to Subtract Numbers Page)
- ALT+M = Multiply Button (Link to Multiply Numbers Page)
- ALT+H = Home Button (Link to Main Page)
- ALT+E = Exit Button (Exit System)

Numbers (Add, Subtract & Multiply Numbers) Selection Page

- ALT+B = Back Button (Link to previous numbers page)
- ALT+N = Next Button (Link to next numbers page)
- ALT+H = Home Button (Link to Main Page)
- ALT+E = Exit Button (Exit System)

Below are some JAWS keystroke provided for Laptop and Desktop for using the courseware in order to fast or slower down the voice rate:

Desktop Keystrokes

For Temporarily Changing Voice Rate During SayAll:

Increase Voice Rate	PAGE DOWN
Decrease Voice Rate	PAGE UP

When not in SayAll:

Increase Voice Rate	ALT+CTRL+PAGE DOWN
Decrease Voice Rate	ALT+CTRL+PAGE UP
Restore Normal Voice Settings	INSERT+ESC

Informational:

Interrupt Speech	CTRL
------------------	-------------

Laptop Keystrokes

For Temporarily Changing Voice Rate During Say All:

Increase Voice Rate	PAGE DOWN
Decrease Voice Rate	PAGE UP

When not in Say All:

Increase Voice Rate	ALT+CTRL+PAGE DOWN
Decrease Voice Rate	ALT+CTRL+PAGE UP
Restore Normal Voice Settings	CAPS LOCK+ESC

Informational:

Interrupt Speech	CTRL
------------------	-------------

To understand more on JAWS keystroke please refer to *Appendix H*

4.1.4.2 Prototype Testing / Evaluation

In order to test the prototype, the author has conducted a prototype testing using 15 participants (blind children) who are currently studying in MAB. The blind children have been given the opportunity to test the courseware thorough the prototype and at the end they need to evaluate the prototype with the assistance of their teachers. The author has provided a questionnaire for the blind children to give them opportunity to evaluate the prototype with the assistance of the teachers. The purpose of the conducted prototype testing or evaluation is to ensure the main objectives can be achieved and enhance the learning system in MAB for the blind children age 7 to 10 years old.

4.1.4.2.1 Questionnaire (User Acceptance Testing)

In order to give rank (between 1-5) based on the prototype, the author has given questionnaires to the teachers at MAB. The teachers represent the educator (guidance) who observes the new or changing behavior of the blind children in learning via the courseware. Please refer to *Appendix I* to see the sample of questionnaires that has been developed.

4.1.4.2.2 Data Analysis

In the evaluation testing of the User Acceptance Testing, the author has obtained results from the blind children testing teachers' evaluation. The obtained result is based on the value that was given by the teachers after the children have used the prototype. In order to achieve the accurate result, the data analysis has been made. Please refer *Appendix J* for the Result of User Acceptance Testing. The result and discussion will be shown below:

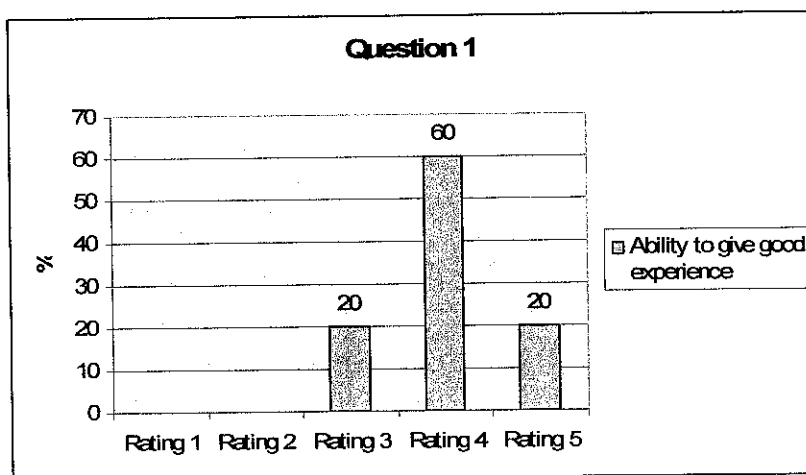
i. Description statistic rating

	N	Minimum Rating	Maximum Rating
1. Ability to give good experience	15	3	5
2. Courseware easy to understood	15	3	4
3. Ability to give clear instruction	15	3	4
4. Able to attract children interest in learning	15	3	5
5. Ability to enhance the learning system in MAB for children age from 7 to 10	15	4	5

6. Able to help the children to memorize in calculation	15	3	4
7. Able to help the children improve their reading and typing skills	15	3	4

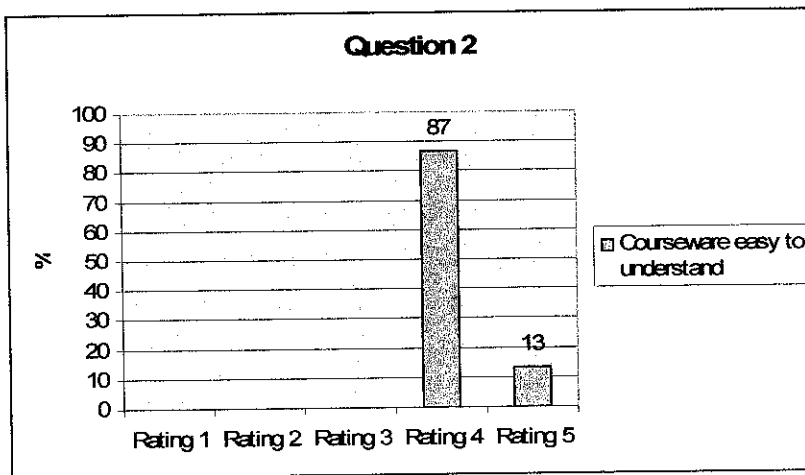
From the table above, the minimum and maximum ratings for the Use Acceptance Testing are 3 to 5. Please refer to *Appendix J* for further information

ii. Histogram Chart for each Attribute



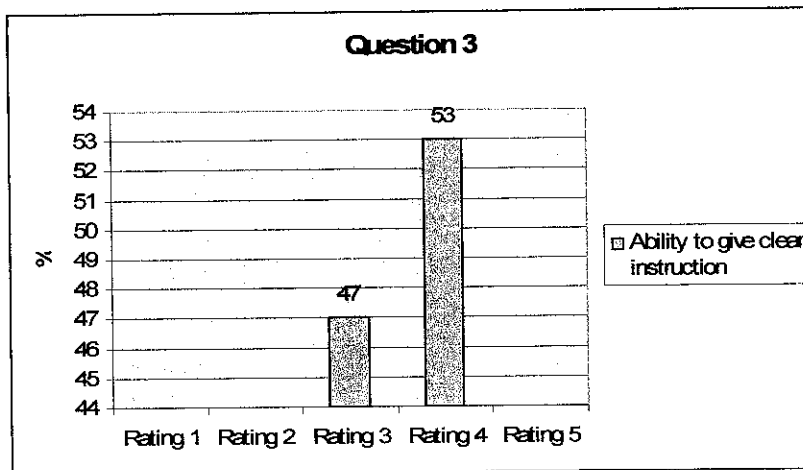
Attribute	Percentage % (Highest)
1. Ability to give good experience	60

The higher percentage is 60% are from Rating 4 from the UAT. It means that 60% agreed that this courseware can give good experience to the blind children. There are no rating for 1 and 2 and it means none of them are disagree



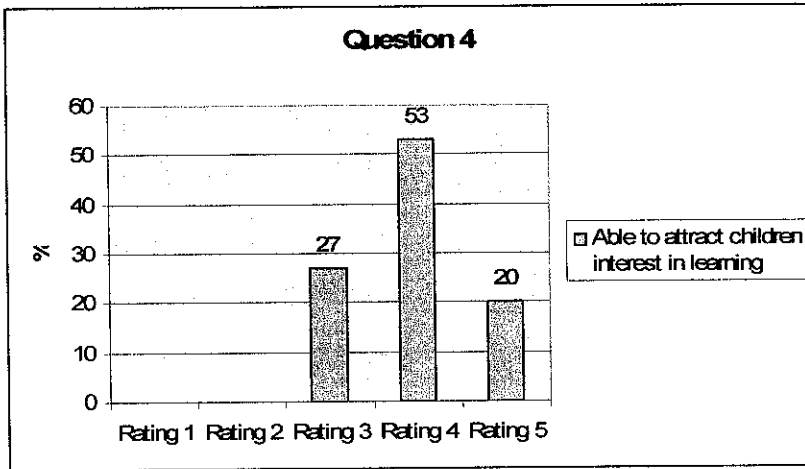
Attribute	Percentage % (Highest)
2. Courseware easy to understand	87

The higher percentage is 87% are from Rating 4 from the UAT. It means that 87% agreed that this courseware is easy to understand. There are no rating for 1, 2 and 3 and it means none of them are disagree



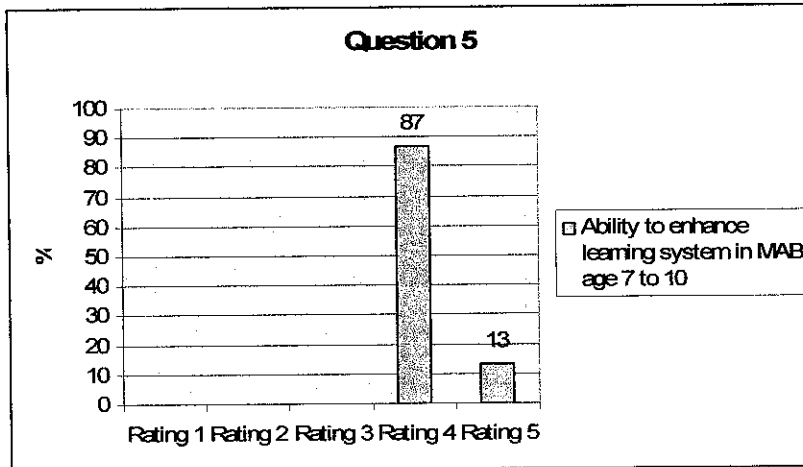
Attribute	Percentage % (Highest)
3. Ability to give clear instruction	53

The higher percentage is 87% are from Rating 4 from the UAT. It means that 87% agreed that this courseware is able to give clear instruction. There are no rating for 1, 2 and it means none of them that disagree and total agree with it



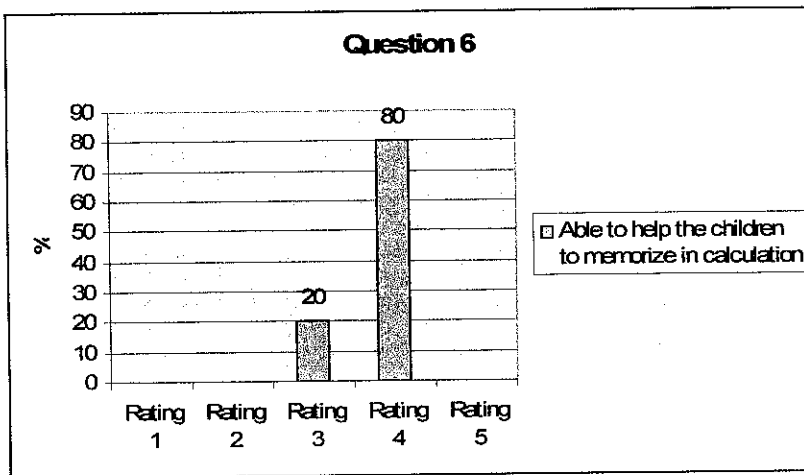
Attribute	Percentage % (Highest)
4. Able to attract children interest in learning	53

The higher percentage is 53% are from Rating 4 from the UAT. It means that 53% agreed that this courseware is able to attract blind children interest in learning. There are no rating for 1 and 2 and it means that none of them are disagree



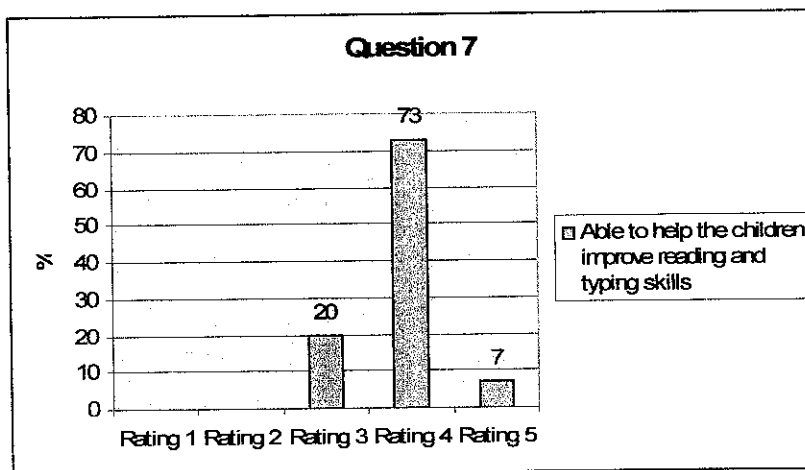
Attribute	Percentage % (Highest)
5. Ability to enhance learning system in MAB age 7 to 10	87

The higher percentage is 87% are from Rating 4 from the UAT. It means that 87% agreed that this courseware is able to enhance learning system in MAB. There are no rating for 1, 2 and 3 and it means that none of them are disagree



Attribute	Percentage % (Highest)
6. Able to help the blind children to memorize in calculation	80

The higher percentage is 80% are from Rating 4 from the UAT. It means that 80% agreed that this courseware is able to help the blind children to memorize in calculation. There are no rating for 1, 2 and 5 and it means that none of them are disagree and total agree with it



Attribute	Percentage % (Highest)
7. Able to help to improve their reading and typing skills	73

The higher percentage is 73% are from Rating 4 from the UAT. It means that 73% agreed that this courseware can help to improve the children's reading and typing skills. There are no rating for 1 and 2 and it means that none of them are disagree

The author has proved the ability that the courseware are shaping behavior based on the highest percentage of the blind children that most of it are in rank 4. As a conclusion, we can see the percentage overall as below:

- Question 1 = 60%
- Question 2 = 87%
- Question 3 = 53%
- Question 4 = 53%
- Question 5 = 87%
- Question 6 = 80%
- Question 7 = 73%

From the percentage above, the high percentage among the attribute are Question 2 and 5 that get the highest of 87%. As a conclusion, this courseware are easy to understand and thus able to enhance the learning system in MAB from age 7 to 10 years old.

- CHAPTER 5 -

CONCLUSION

5.1 Conclusion

This research is focus on enhancing the learning process in MAB for blind children age 7 to 10 years old. The courseware helps to educate and motivate the children to learn, read, understand and memorizing English words and numbers. Thus, it will help to attract the blind children interest to learn more. At the market currently, there are numbers of available software, but the software is in a one-way communication concept (in form of video). Most of the software is full of graphic and it is no point of having that because the purpose is for those blind children. Other than that, the limitation of JAWS is that JAWS can't understand graphic. Basically, the blind children may only hear and try to interact and navigate using special keystroke provided through the software. Thus, the best way to develop this 'Courseware for Visually Impaired Children' applies learning theory where user may hear through the help of JAWS and at the same time interact and navigate through out the courseware by only using hearing system. This type of application offers effective way that results an easy and fast learning for the blind children.

5.2 Recommendation

Basically, the author wants to develop a courseware that can help the learning of the blind children from age 7 to 10 years old. This courseware will train the children through their hearing system and their capability to cope well. Due to time constraint the author has specify some limitation, which is developing a courseware that integrated between JAWS and VB6. There are two multimedia elements that are sound and text available in order to fulfill the requirement needed. As suggested future work for expansion and continuation, the author want to suggest that in future, will be integrate with voice recognition, where the courseware may determine whether the blind children can pronouns the correct English word and not using JAWS as the medium. The learning can be both ways where the blind children can hear through JAWS and can respond back to the system through voice recognition. Hence, the future enhancement of the courseware, it is beneficial to develop a courseware that contains school syllabus that enable for them to learn more.

Furthermore in future development, the author suggests that this courseware can be download freely in the website. After the launch of the courseware, hope that the author can get more feedback from the user that are currently using the courseware to give an idea on how to upgrade the courseware according to their specifications.

Those recommendations that have been suggested by the author to ensure that the courseware can be improved for future work in terms of future growth and continuation.

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APPENDICES



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**APPENDIX A: AMERICAN FOUNDATION FOR THE BLIND
(JOURNAL)**

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ap



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Specialized Education Services for Children Who Are Blind or Visually Impaired

Who are our nation's blind and visually impaired children?

Federal and state estimates used for planning educational services do not adequately account for the number of children in the United States who are blind or visually impaired. For example, 24,877 children with visual impairments are reported by the U.S. Department of Education (U.S. Department of Education, 1996). However, a recent study indicates that this figure fails to account for as many as 80% of these students (Corn, Ferrell, Spungin, & Zimmerman, 1996).

In some cases, only students who are legally blind are reported, ignoring those who have difficulty seeing but do not qualify as "legally" blind. In other instances, children who are visually impaired and have other disabilities—such as mental retardation—are not counted as visually impaired because they are reported in other federally defined categories, such as "multiple disabilities" or "mental retardation." Tragically, because many professionals lack the specialized skills necessary to recognize and address vision loss, there are also children with visual and multiple impairments whose vision loss remains undiagnosed throughout their school experience (Erin, Daugherty, Dignan, & Pearson, 1990). The inadequate count of visually impaired children means that our nation lacks critical information about the need for specialized services for these children, and cannot correctly allocate the specialized resources and personnel required. Consequently, many children do not receive the appropriate specialized educational services they need (Pogrud, Fazzi, & Lampert, eds., 1992).

What skills do visually impaired children need to learn?



Visual impairments change the way children obtain information about the world in which they grow and function, and limit opportunities to learn through observation of visual elements in the school

curriculum and the people around them. This means that, in addition to their regular classroom studies, children who are blind or visually impaired need to learn specialized skills from teachers and others who are specially trained to teach these skills, such as certified teachers of visually impaired children and orientation and mobility specialists. The specialized skills visually impaired children must learn include: **Technology and computer proficiency**--using computer and telecommunication equipment and software adapted for blind or visually impaired people. **Literacy**--reading and writing with braille, large print, optical devices, or training in effective use of available vision. **Safe and independent mobility**--using specific orientation and mobility techniques, long canes, or other mobility tools. **Social interaction skills**--understanding body language and other visual concepts. **Personal management and independent living skills**--learning specialized techniques for personal grooming, food preparation, money management, and other tasks.

Where do visually impaired children receive their education?

Children with visual impairments receive educational services from an array of options that includes residential and special schools specifically designed for blind and multiply disabled children, and special classes, resource rooms, and itinerant teaching services in regular education classrooms in the child's community--where most visually impaired children are educated. Based upon the individual needs of children and input from their parents and educators, specialized schools, or classes are appropriate educational options for certain students. In addition, special schools frequently provide outreach support and technical assistance to public schools in their states.

What are the challenges facing visually impaired children?

Although many school programs provide the specialized instruction needed by students who are visually impaired, there is much room for improvement. Too many visually impaired students leave school without having mastered the skills or knowledge essential for further education, gainful employment, and independent living at home and in their communities.

There is a severe shortage of orientation and mobility specialists and qualified teachers of visually impaired students, which restricts access to the specialized skills these children need. This means that students with visual impairments frequently receive instruction from personnel who are not qualified to teach critical skills such as braille, cane and other travel skills, and effective use of available vision. This problem is even more alarming in rural communities, where shortages of qualified personnel are most acute.

Equally detrimental is the continued perception by many that residential and special schools for blind and visually impaired children



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APPENDIX B: CHILDREN & FAMILY CANADA (JOURNAL)

Child & Family

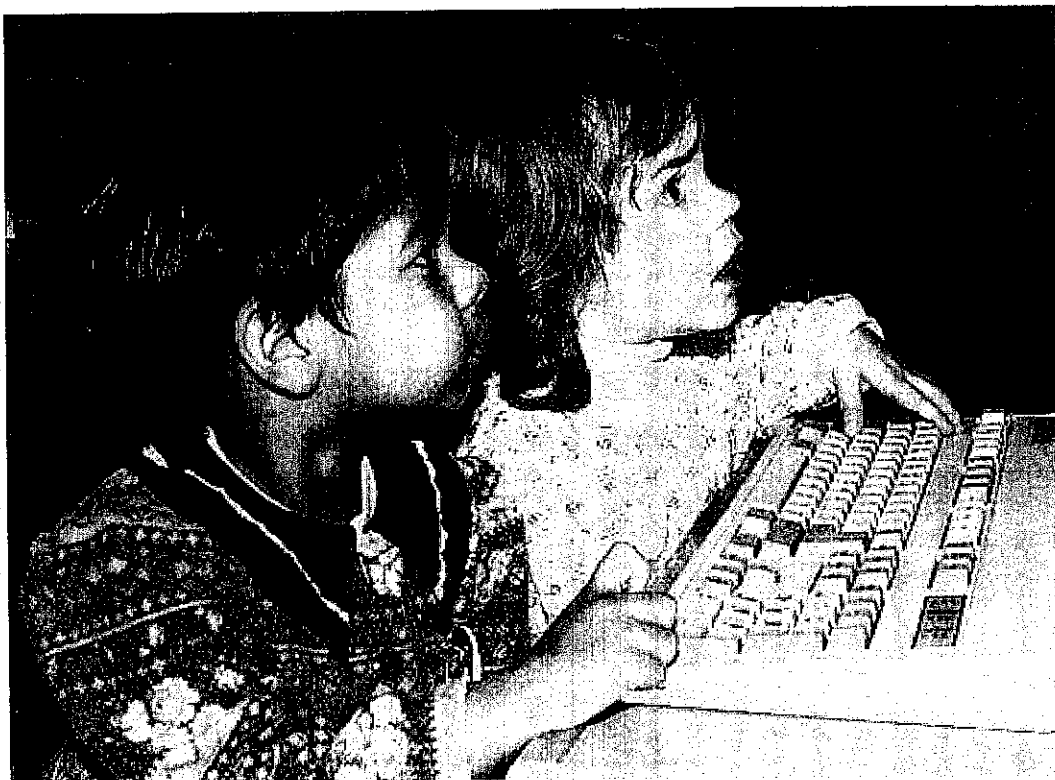
C A N A D A



Young Children and Microcomputers: A Second Look

by Larry Prochner

A decade ago, an article appeared in an early childhood journal on a brand new subject: microcomputers and young children. It bore the tentative-sounding subtitle, "A First Look" (Ziajka, 1983). In 1994, computers are no longer a novelty in preschools and child care centers. For better or worse, they are found in early childhood settings across the country. The strong feelings evoked by the *idea* of computers in our classrooms in the early years -- of either fear and loathing or blind love -- have largely been tempered by familiarity. We have come to take the presence of computers for granted. As increasing numbers of early childhood educators have achieved a level of expertise and comfort with computers, it is timely to return to a central and perhaps discomfiting question posed some years ago by Harriet Cuffaro (1985): "Just why should young children use computers?"



Do computers deserve a permanent place in our classrooms? Research on the effects of computer use on the social and cognitive development of young children is limited and, for the most part, contradictory and inconclusive. Almost none has been conducted on computers in child care centers (outside university lab schools). However, the same is true of many of the materials commonly found in early

childhood settings. The effect of using blocks on child development, for example, has not been systematically studied (Davidson, 1989). We just accept that blocks are somehow beneficial, given our understanding of how children think and learn. As so wryly expressed by Jane Davidson, the author of a well-known textbook on computers, blocks should not be banned from child care centers because of a lack of research, and it is similarly unlikely that we should place a moratorium on computers pending further investigation. What is necessary, is for educators to be critical and reflective regarding their use.

The early excitement generated by LOGO (a high-level computer language as well as a philosophy of education developed by Seymour Papert), and the promise of all manner of positive benefits believed to accrue from child-computer interaction, resulted in extraordinary claims. One author suggested that, "by the year 2000, the child who becomes an adult unable to use a computer will be the equivalent of today's adult who can neither read nor write" (Hammond, p.53). Schools felt the pressure the most -- from parents and computer companies, for example -- to place a computer in every classroom. Some even desired a computer at every desk. The fear was that children who were not computer literate (a vague and questionable concept) were going to grow up to be adults out-of-work and out-of-touch in a computer dominated world.

These kind of statements are rarely made today outside the hyperbole of computer company advertising campaigns. Compare the "computer at every desk" slogan with the caution expressed in Davidson's textbook:

"The computer is seen as a material with many potential benefits and many potential problems. If it is used wisely, with the principles of early childhood development in mind, it can be a valuable addition to a developmental-based classroom. **Although the computer has much to offer an early childhood classroom, its absence from the classroom will not be disastrous** [emphasis added]" (Davidson, 1989, p.12).

It is difficult to imagine a textbook on another topic, children's literature for example, in which the author includes a disclaimer that while books are nice, they are not all that important. Davidson is not alone in her lukewarm approach to computers. Bailey, writing from the point-of-view of a kindergarten teacher in the journal *Canadian Children*, was more blunt:

"Computers are not necessary in the kindergarten classroom. **In fact, unless they are incorporated with sensitivity and awareness, we gain by their absence** [emphasis added]" (1989, p.28).

These examples point to a significant change in the way early childhood educators think about computers. It is not that computers are seen as the work of the devil, as they were once called by the novelist Roberston Davies. Instead, there is growing consensus that they are unnecessary and, quite possibly, a distraction from our curriculum objectives **if they are not used in an educationally responsible manner**.

What do I mean by educationally responsible? Simply, that we are able to provide a clear rationale, consistent with our philosophy of education, for the use of computers or any other material in our classrooms. Joseph Weizenbaum, professor of artificial intelligence at the Massachusetts Institute of Technology, perceptively called the computer in education a solution in search of a problem. This was certainly true of the field of early childhood education. Computers appeared in preschools and child care centers before they were assigned any real use. In the folklore surrounding computers, children were believed to have a natural affinity for the machines. Over time, it is true that innovative educators have found problems suitable for the "computer solution" in school settings. Books and encyclopedias on CI

OM provide up-to-date and easily accessible information for large numbers of students. The Internet can create an electronic link between children in classrooms around the world.

What, though, is the educational solution that the computer can provide in a child care center? Are electronic reproductions of grocery store checkout children's books the best we can do? Cuffaro (better known for her commentary on blocks) pointed us in the right direction by making the observation that today's generation of computer programmers did not necessarily grow up with computers. "What they did have," she noted, "were ideas -- the problems and projects they created and brought to computers" (1985, p.27). While Cuffaro was extremely bleak regarding the relevance of computers in early childhood classrooms, her insight proves useful. It leads us to ask the question: "What self-generated problems do young children have that they can bring to the computer?" By asking this question, we are open to view the computer as part of the flow of classroom activity instead of an activity in itself. In contrast, most software is self-serving -- designed to teach a specific concept or parcel of information. It is rarely connected to the life of the classroom. A few years ago, one critic observed that of the thousands of so-called educational programs available, almost all were based on principles of drill and practice. Software creators seemed to assume that the central problem in early childhood education was the efficient teaching of numbers, shapes and the alphabet. The question of why a child would want to pause, in the midst of a creative, play-based activity room, to make a sluggish electronic bear robotically grunt the ABC's, was never asked.

However, if we take our central problem in early childhood education to be the optimal growth and development of each child in our care, the computer may have a modest (not starring) role. Computers can be an alternative means for exploring the traditional core areas of the early childhood curriculum (for example, language, music and the creative arts). They can be a tool to enable a child to meet her goals (to tell a story, make a song or draw a picture), which are always greater than the mere use of the machine (learning about the computer).

In short, computer activities should be developmentally appropriate. The aim is for educators to create "a child-oriented computer experience, where children are in control, acting on software to make events happen rather than reacting to predetermined questions and closed-ended problems" (Haugland & Shade, 1988, p.37).

In my view, the best choice for software is found in the handful of drawing and writing programs for young children currently available on the market. A word of caution; "child-oriented" should not be taken to mean that children are completely in control of the software. Children must always work within the parameters set by the programmer and they are always limited by the procedural logic upon which computers are based. This is true even of open-ended programs such as word-processors. Using a computer to write changes the process and the product of writing. The computer is not "just another tool," as is so often claimed. It is not merely an innocuous alternative to markers, crayons, pencils or chalk.

Finally, it is well worth considering the computer in early childhood education in historical perspective (Zukerman, 1987). Many of the materials we now take for granted as essential in ECE classrooms were controversial when they were first introduced. Large wooden floor blocks are a good example. In the early twentieth-century, kindergarten teachers responded to the progressive movement in education by appropriating Froebel's Gifts (the essential materials of the original kindergarten). They gave the spheres, cones and blocks new meaning as secular objects for children's physical and psychological, rather than spiritual, growth. The old materials became a solution to the new definition of the educational problem. Computers, although more wieldy than blocks (it is difficult to set them on the floor, but what would happen if you did?), also need to be "taken over" by today's early childhood educators. We need to locate the computer's proper place within our current understanding of early

childhood education. This process, surely a difficult one, might take more than a decade.

r. Larry Prochner is an assistant professor in the Department of Education at Concordia University in Montreal, Quebec.

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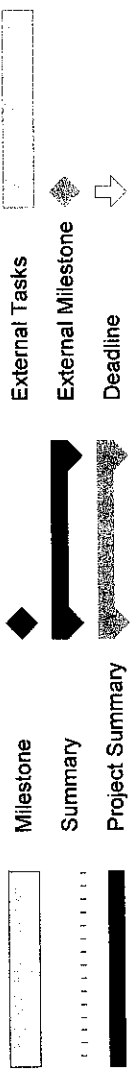
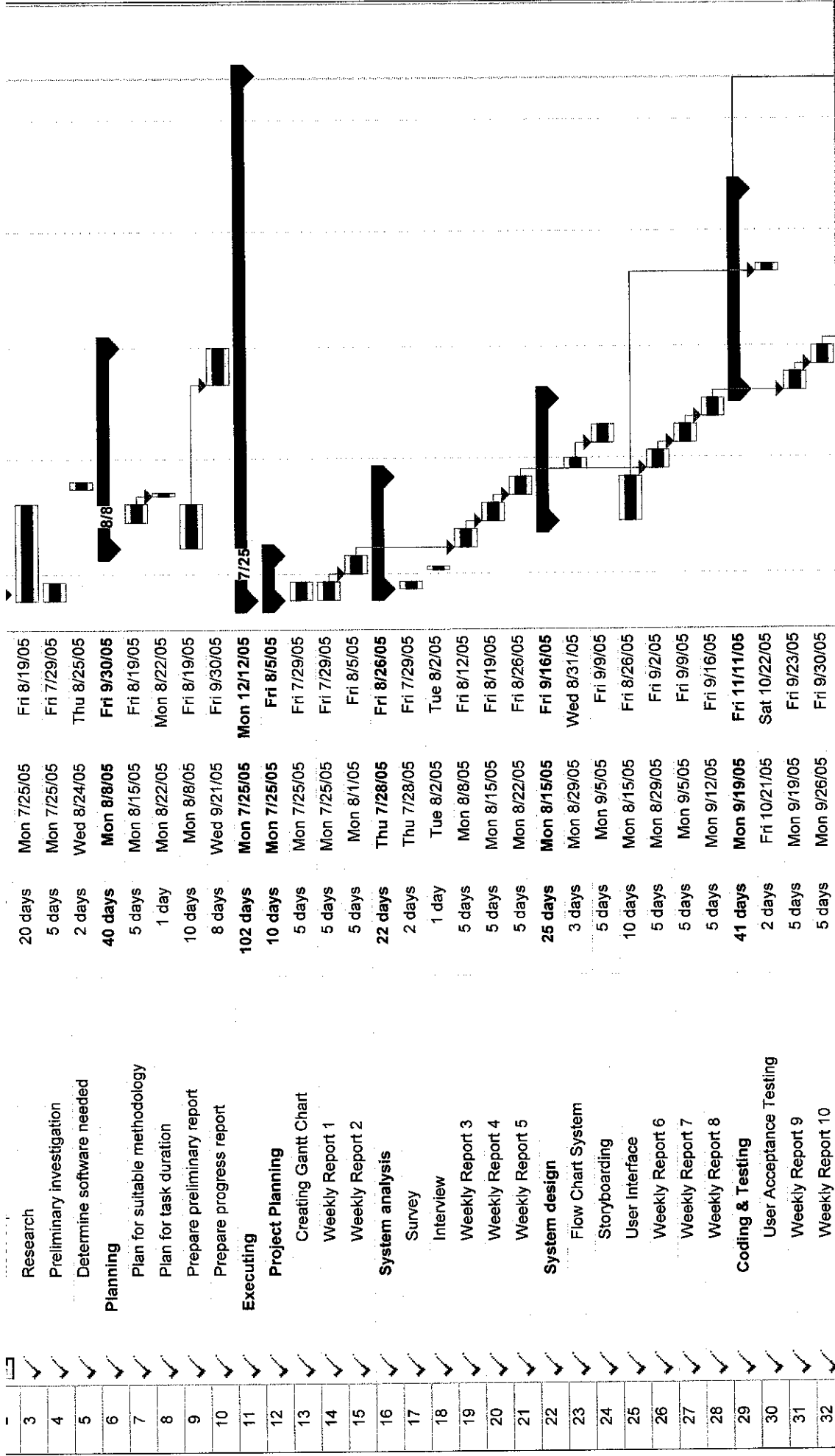
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APPENDIX C: GANTT CHART



Project: FYP Dissertation
Date: Mon 12/12/05

34	✓	Weekly Report 13	5 days	Mon 10/17/05	Fri 10/21/05	
35	✓	Weekly Report 14	5 days	Mon 10/24/05	Fri 10/28/05	
36	✓	Weekly Report 15	5 days	Mon 10/31/05	Fri 11/4/05	
37	✓	Weekly Report 16	5 days	Mon 11/7/05	Fri 11/11/05	
38	✓	Project Presentation	1 day	Mon 12/12/05	Mon 12/12/05	
39	✓	Controlling	81 days	Mon 7/25/05	Fri 11/11/05	
40	✓	Status weekly report	81 days	Mon 7/25/05	Fri 11/11/05	
41	✓	Closing	42 days	Mon 10/17/05	Mon 12/12/05	
42	✓	Prepare final draft project report	11 days	Mon 10/17/05	Fri 10/28/05	
43	✓	Prepare final project presentation	4 days	Wed 12/7/05	Mon 12/12/05	
44	✓					

Project: FYP Dissertation
Date: Mon 12/12/05

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	



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APPENDIX D: INTERVIEW QUESTION (MAB STAFF)

Interview Question & Answer

Some of the interview questions are as below:

1. What range of age that MAB handle the blind children?
2. What type of printed materials currently being used in MAB?
3. How do the blind children behave towards the interest of learning?
4. Do the blind children know how to use computers?
5. How was the response between the blind children and the teacher?
6. What is the best way in enhancing the style of learning in MAB especially for the blind children?
7. Do any coursewares will help the blind children in their learning process?

Answer:

Below are some of the comments and response given by those MAB staff from the interview conducted:

Question 1

- *“The ranges of age that MAB holds are from 7 to 10 years old. Majority the blind children are female rather than male. The percentage are 60% are female and 40% are male”*

Question 2

- *“Currently, the communications of learning education in MAB are based on direct communication between the teacher and the blind children. The teachers are using printed materials such as pre-school education book that need the teacher to read up for them. They learn ABC by listening and hearing every single word that the teacher teaches them”*

Question 3

- *“As we all know, the interest of children are 90% of playing. Some of them have the interest and some of them are not. It is somehow quite hard for the teacher to handle and cater a few numbers of blind children in one class. But the learning process is according to our syllabus of teaching. We teach them how to read, learn the alphabet and many more”*

Question 4

- *“In MAB, we have our own computer class. Most of them know how to use computers. For those blind children, we teach them the basic idea of computer. Meaning that show and teach them how to type by memorizing the keyboard and learn by using the special software called JAWS. JAWS (Job Access With Speech) can help the blind people master the computer easily because they have the ability to hear every single word and icon in computers. JAWS acts like a screen reading software to Windows platform. The user needs to just install the JAWS to their computer. But unfortunately, there are none of courseware syllabus that being install that enable the blind children to learn by using computers”*

Question 5

- *“The response given by the blind children is moderate. Sometimes they give the full cooperation and sometimes not. But some of them are very active to ask question that they did not understand. But as human, we have to be patient because they are special from the others and we give our full moral support”*

Question 6

- *“Currently, the teaching done in MAB are according to our syllabus. In order to give chance to the blind children to use widely computers, the computer class is conducted. But we hope that to have new software that can help the blind children in accessing knowledge using computer system. The old style need to be changed and use all computerized system in our teaching styles. Hope that our dream will come true in future”*

Question 7

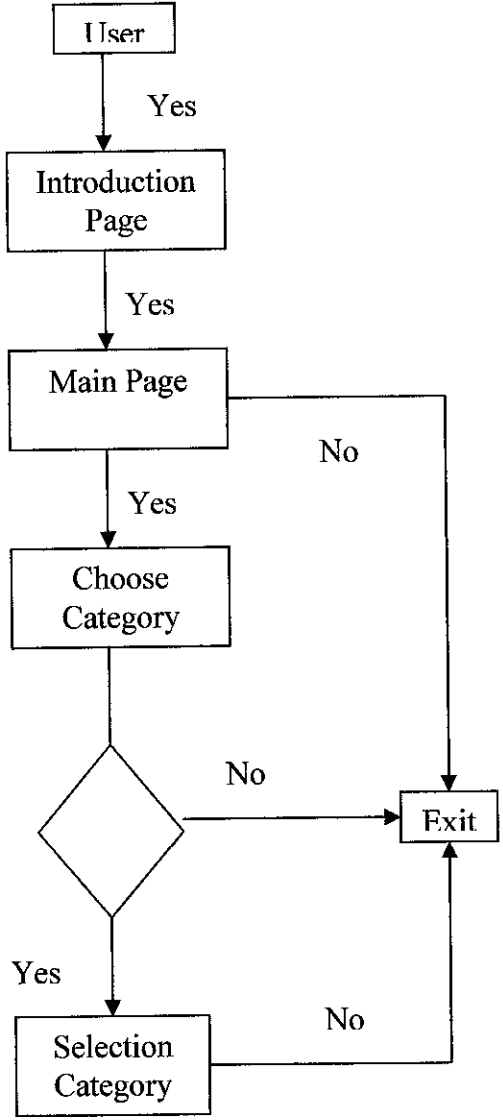
- *“As far we are concern, there a lot of courseware for children that available in the market that can be used. But unfortunately, in MAB itself, every computer has the software called JAWS. Yes, JAWS acts like a screen reading software for Windows, but not all the CD of that available courseware can be used and read by JAWS. JAWS have its own limitation and it can't read any graphic. Most of the courseware is in FLASH form. JAWS can't read Flash software. So there is no point of having graphic because they are blind, and no point of having that. Definitely any courseware that suits with JAWS will help us a lot in terms of education of the blind children. It will also help them to build interest to learn more using computers”*



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APPENDIX E: FLOW CHART SYSTEM

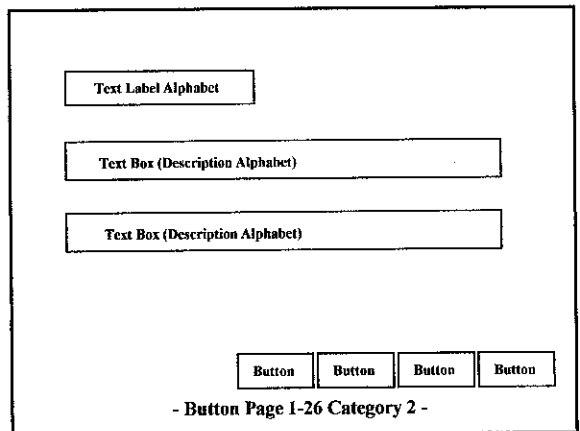
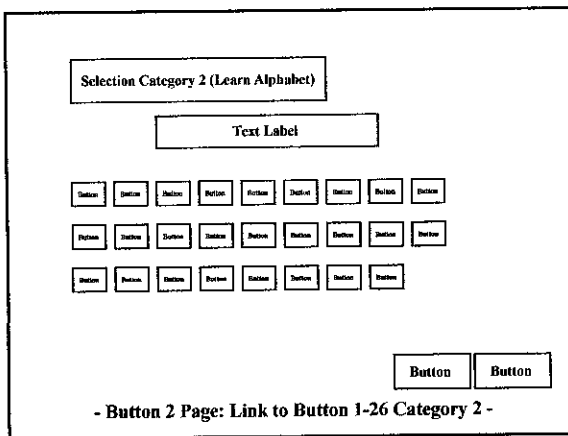
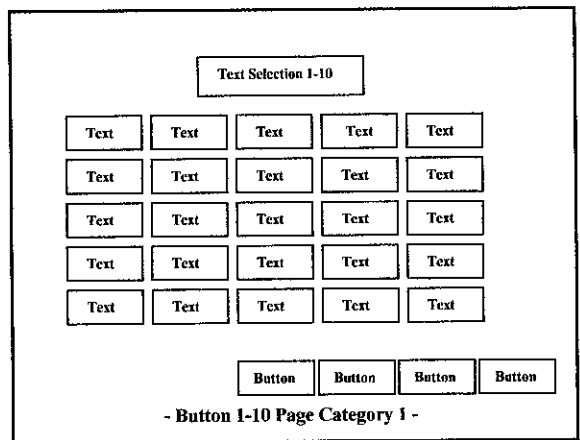
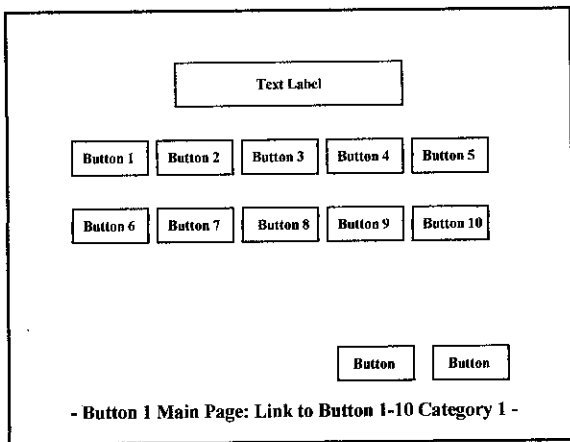
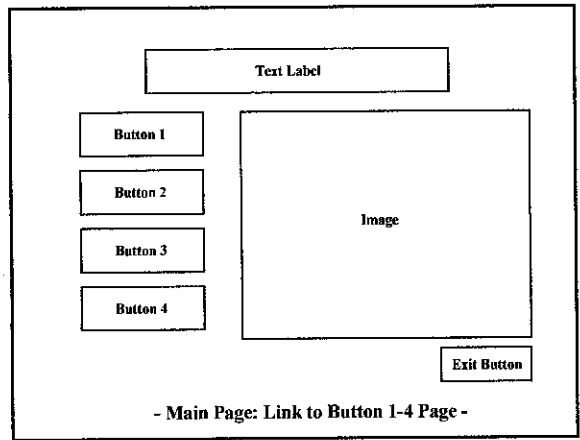
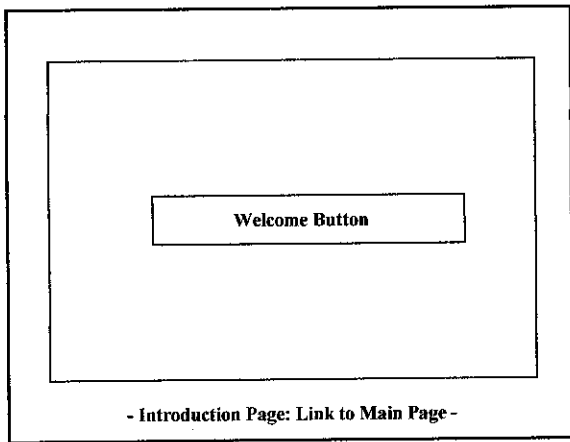
Flow Chart System





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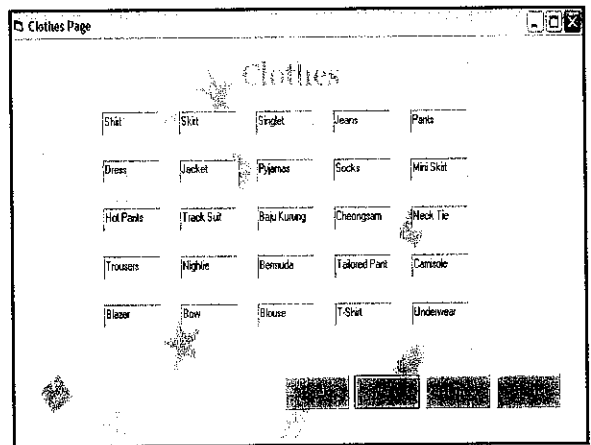
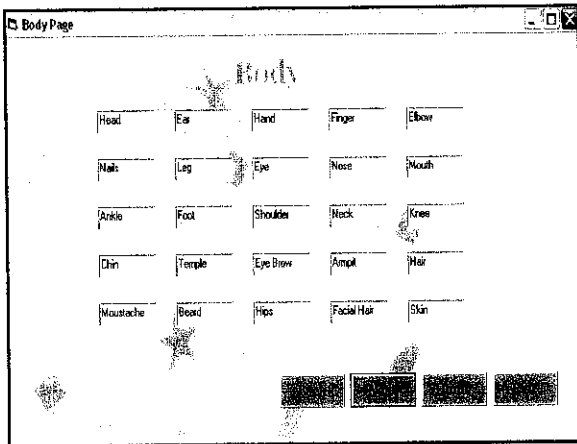
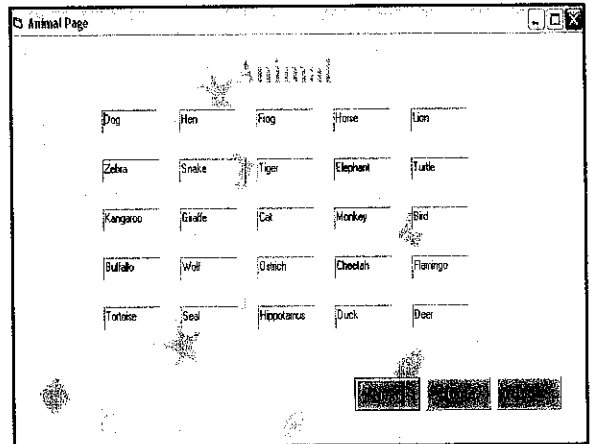
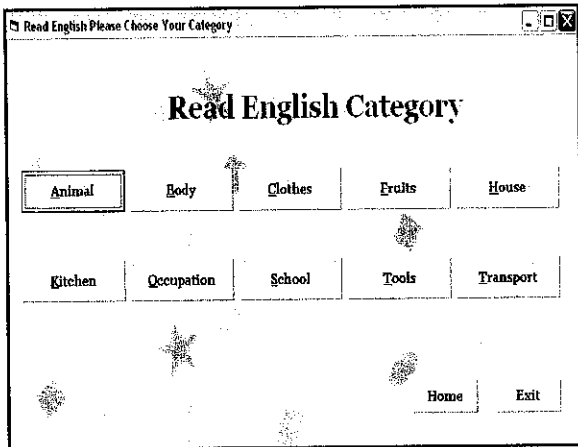
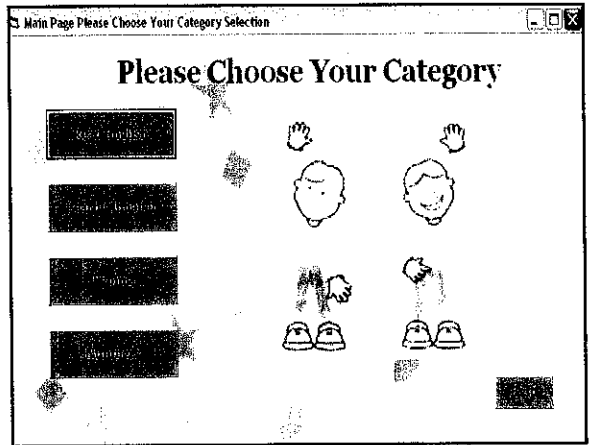
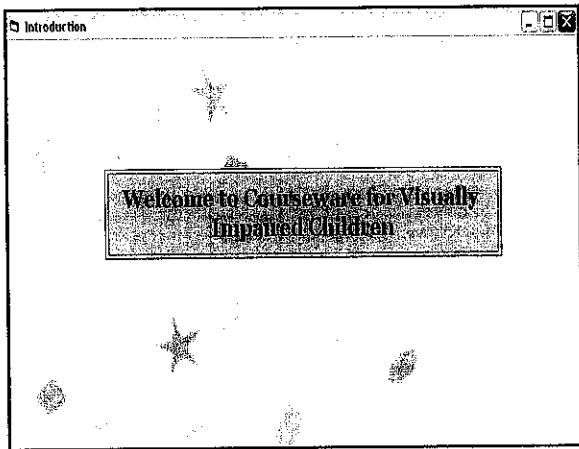
APPENDIX F: STORYBOARD





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APPENDIX G: USER INTERFACE (PRINT SCREENS)



Fruits Page

Fruits

Apple	Banana	Watermelon	Strawberry	Mangosteen
Mango	Pineapple	Dragon Fruit	Orange	Shawaberry
Plum	Grape	Litchi	Papaya	Guava
Kiwi	Passion Fruit	Pineapple	Cherry	Soursop
Berries	Lemon	Lime	Chestnut	Honeydew

House Page

House

Curtain	Floor	Bed	Sofa	Aquarium
Fan	Air Cond	Dining Table	Television	Radio
Door	Roof	Clock	Table	Window
Bath Tub	Kitchen	Gall	Sliding Door	Blanket
Stair	Porch	Balcony	Gate	Pillar

Kitchen Page

Kitchen

Knife	Spoon	Fork	Plate	Cup
Mug	Tissue	Wash Basin	Stove	Gas
Bowl	Mug	Scissors	Chopstick	Rice Cooker
Pot	Frying Pan	Kettle	Microwave	Coffee Maker
Peels	Refrigerator	Freezer	Toaster	Water Filter

Occupation Page

Occupation

Doctor	Carpenter	Farmer	Police	Lawyer
Dentist	Cook	Fishman	Butcher	Cobbler
Judge	Tailor	Postman	Teacher	Barber
Surgeon	Businessman	Driver	Plat	Technician
Lecturer	Manager	Secretary	Accountant	Mechanic

School Page

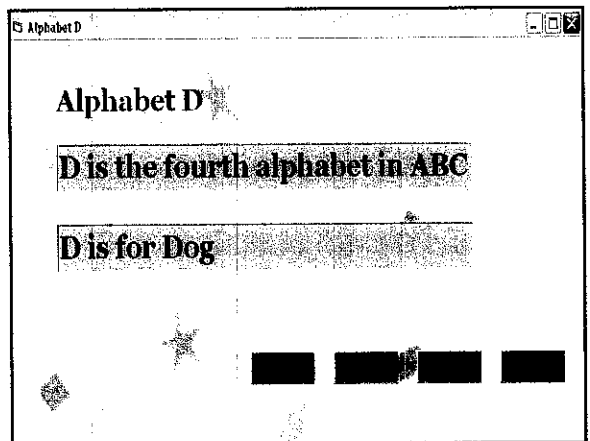
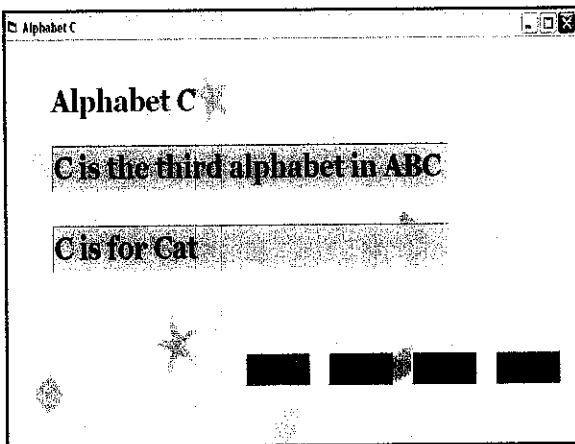
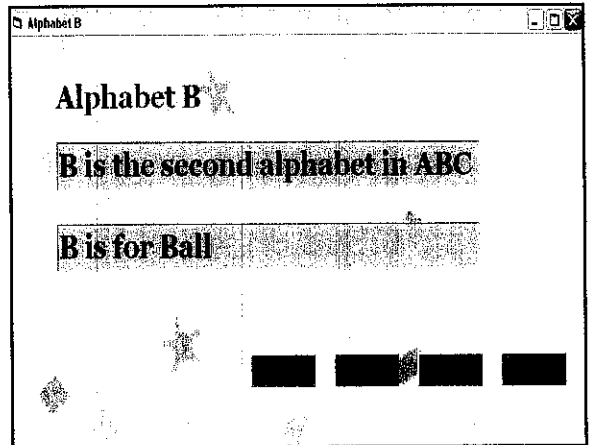
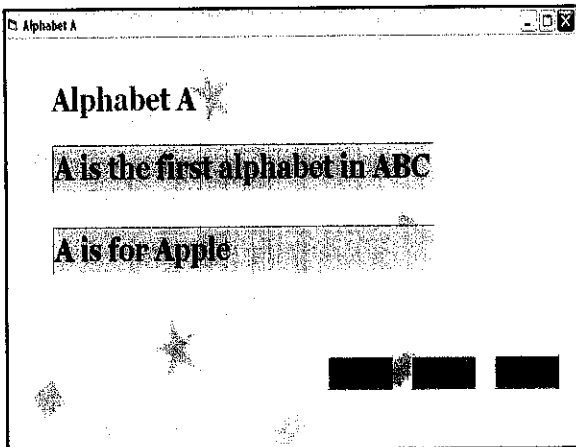
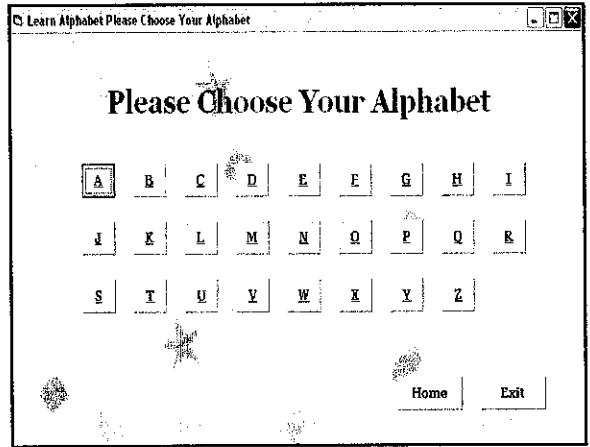
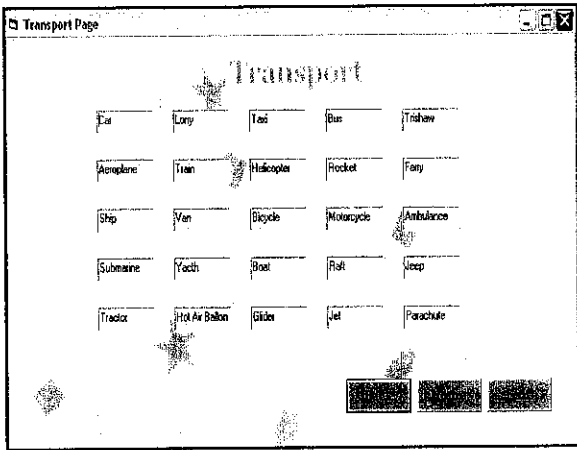
School

Teacher	Chalk	White Board	Crayon	Gardens
Pond	Classroom	Desk	Chair	Library
Computer	HeadMaster	Notice Board	Field	Corridor
School Flag	Books	Shelves	Students	School Bag
School Badge	Files	Marker	Bench	Hall

Tools Page

Tools


Hammer	Stub	Bar Wire	Plywood	Drill
Paint	Nuts	Ladders	Nail	Screwdriver
Brush	Screw	Lamp	Wife	Test Pen
Bolts	Wife	Socks	Saw	Door Knock
File	Thames	Plan	Fuse	Wife



Alphabet E

E is the fifth alphabet in ABC


E is for Elephant



Alphabet F

F is the six alphabet in ABC


F is for Frog



Alphabet G

G is the seventh alphabet in ABC


G is for Giraffe



Alphabet H

H is the eight alphabet in ABC


H is for House



Alphabet I

I is the ninth alphabet in ABC


I is for Ice cream



Alphabet J

J is the ten alphabet in ABC

J is for Jug




Alphabet K

Alphabet K

K is the eleven alphabet in ABC

K is for Kite




Alphabet L

Alphabet L

L is the twelve alphabet in ABC

L is for Lion




Alphabet M

Alphabet M

M is the thirteen alphabet in ABC

M is for Monkey




Alphabet N

Alphabet N

N is the fourteen alphabet in ABC

N is for Nose




Alphabet O

Alphabet O

O is the fifteen alphabet in ABC

O is for Orange




Alphabet P

Alphabet P

P is the sixteen alphabet in ABC

P is for Pen




Alphabet Q

Alphabet Q

Q is the seventeen alphabet in ABC

Q is for Queen




Alphabet R

Alphabet R

R is the eighteen alphabet in ABC

R is for Ring




Alphabet S

Alphabet S

S is the nineteen alphabet in ABC

S is for Snake




Alphabet T

Alphabet T

T is the twenty alphabet in ABC

T is for Turtle




Alphabet U

Alphabet U

U is the twenty one alphabet in ABC

U is for Umbrella




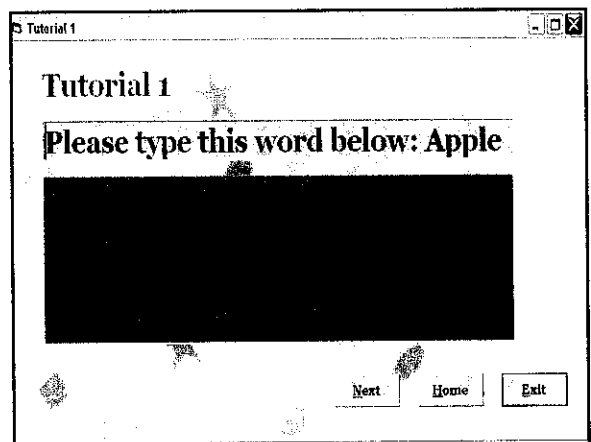
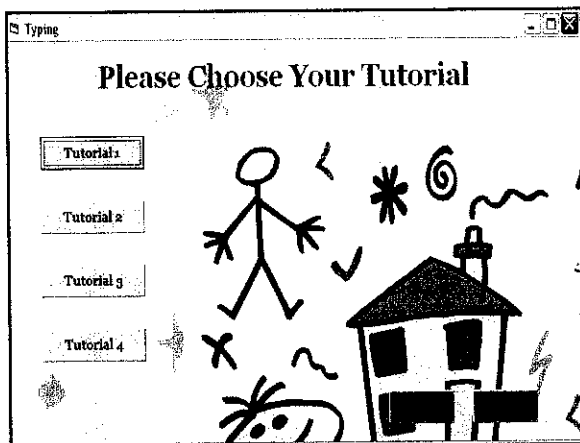
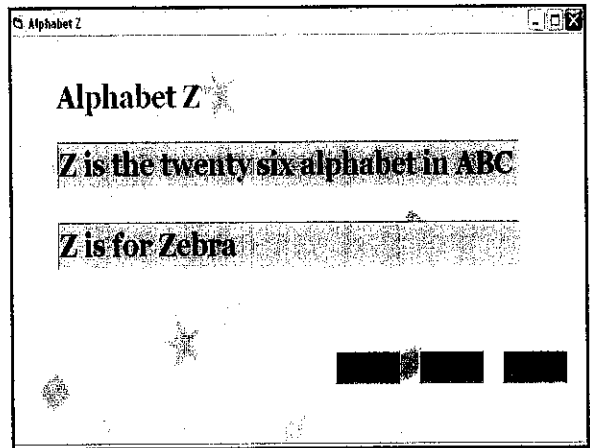
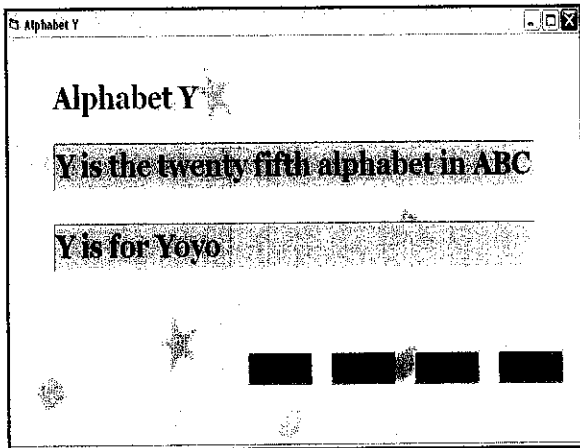
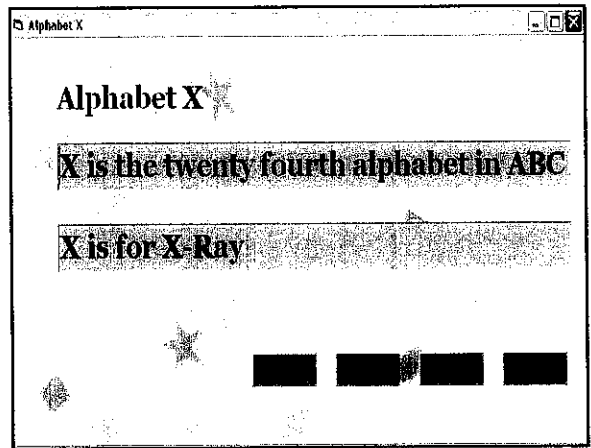
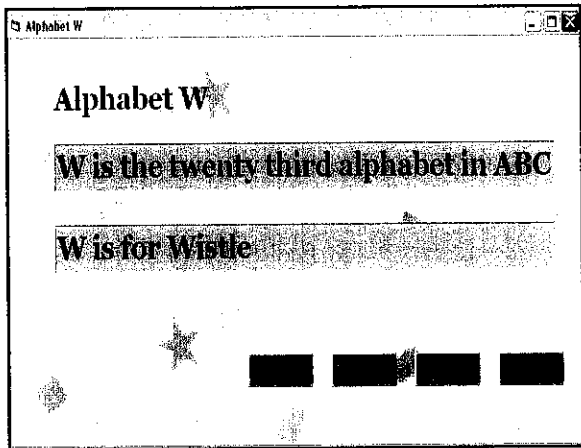
Alphabet V

Alphabet V

V is the twenty two alphabet in ABC

V is for Violin





Tutorial 2

Tutorial 2

Please type this word below: Im cute

Tutorial 3

Tutorial 3

Please type this word below: Im so happy

Tutorial 4

Tutorial 4

Please type this word below: I drink milk every morning

Numbers Page

Numbers

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Add Numbers

1+0=1	2+0=2	3+0=3	4+0=4	5+0=5	6+0=6	7+0=7	8+0=8	9+0=9
1+1=2	2+1=3	3+1=4	4+1=5	5+1=6	6+1=7	7+1=8	8+1=9	9+1=10
1+2=3	2+2=4	3+2=5	4+2=6	5+2=7	6+2=8	7+2=9	8+2=10	9+2=11
1+3=4	2+3=5	3+3=6	4+3=7	5+3=8	6+3=9	7+3=10	8+3=11	9+3=12
1+4=5	2+4=6	3+4=7	4+4=8	5+4=9	6+4=10	7+4=11	8+4=12	9+4=13
1+5=6	2+5=7	3+5=8	4+5=9	5+5=10	6+5=11	7+5=12	8+5=13	9+5=14
1+6=7	2+6=8	3+6=9	4+6=10	5+6=11	6+6=12	7+6=13	8+6=14	9+6=15
1+7=8	2+7=9	3+7=10	4+7=11	5+7=12	6+7=13	7+7=14	8+7=15	9+7=16
1+8=9	2+8=10	3+8=11	4+8=12	5+8=13	6+8=14	7+8=15	8+8=16	9+8=17
1+9=10	2+9=11	3+9=12	4+9=13	5+9=14	6+9=15	7+9=16	8+9=17	9+9=18
1+10=11	2+10=12	3+10=13	4+10=14	5+10=15	6+10=16	7+10=17	8+10=18	9+10=19

Subtract Numbers

9-0=9	8-0=8	7-0=7	6-0=6	5-0=5	4-0=4	3-0=3	2-0=2	1-0=1
9-1=8	8-1=7	7-1=6	6-1=5	5-1=4	4-1=3	3-1=2	2-1=1	1-1=0
9-2=7	8-2=6	7-2=5	6-2=4	5-2=3	4-2=2	3-2=1	2-2=0	1-2=-1
9-3=6	8-3=5	7-3=4	6-3=3	5-3=2	4-3=1	3-3=0	2-3=-1	1-3=-2
9-4=5	8-4=4	7-4=3	6-4=2	5-4=1	4-4=0	3-4=-1	2-4=-2	1-4=-3
9-5=4	8-5=3	7-5=2	6-5=1	5-5=0	4-5=-1	3-5=-2	2-5=-3	1-5=-4
9-6=3	8-6=2	7-6=1	6-6=0	5-6=-1	4-6=-2	3-6=-3	2-6=-4	1-6=-5
9-7=2	8-7=1	7-7=0	6-7=-1	5-7=-2	4-7=-3	3-7=-4	2-7=-5	1-7=-6
9-8=1	8-8=0	7-8=-1	6-8=-2	5-8=-3	4-8=-4	3-8=-5	2-8=-6	1-8=-7
9-9=0	8-9=-1	7-9=-2	6-9=-3	5-9=-4	4-9=-5	3-9=-6	2-9=-7	1-9=-8
9-10=-1	8-10=-2	7-10=-3	6-10=-4	5-10=-5	4-10=-6	3-10=-7	2-10=-8	1-10=-9

Multiply Numbers									
1*0=0	2*0=0	3*0=0	4*0=0	5*0=0	6*0=0	7*0=0	8*0=0	9*0=0	
1*1=1	2*1=2	3*1=3	4*1=4	5*1=5	6*1=6	7*1=7	8*1=8	9*1=9	
1*2=2	2*2=4	3*2=6	4*2=8	5*2=10	6*2=12	7*2=14	8*2=16	9*2=18	
1*3=3	2*3=6	3*3=9	4*3=12	5*3=15	6*3=18	7*3=21	8*3=24	9*3=27	
1*4=4	2*4=8	3*4=12	4*4=16	5*4=20	6*4=24	7*4=28	8*4=32	9*4=36	
1*5=5	2*5=10	3*5=15	4*5=20	5*5=25	6*5=30	7*5=35	8*5=40	9*5=45	
1*6=6	2*6=12	3*6=18	4*6=24	5*6=30	6*6=36	7*6=42	8*6=48	9*6=54	
1*7=7	2*7=14	3*7=21	4*7=28	5*7=35	6*7=42	7*7=49	8*7=56	9*7=63	
1*8=8	2*8=16	3*8=24	4*8=32	5*8=40	6*8=48	7*8=56	8*8=64	9*8=72	
1*9=9	2*9=18	3*9=27	4*9=36	5*9=45	6*9=54	7*9=63	8*9=72	9*9=81	
1*10=10	2*10=20	3*10=30	4*10=40	5*10=50	6*10=60	7*10=70	8*10=80	9*10=90	



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APPENDIX H: JAWS KEYSTROKE

Internet Explorer Keystrokes

General:

Go Back a Page	ALT+LEFT ARROW
Read Address Bar	INSERT+A
Next Link	TAB
Prior Link	SHIFT+TAB
Open Link	ENTER
List Frames	INSERT+F9
List Links	INSERT+F7
List Headings	INSERT+F6
Personalized Web Settings	SHIFT+INSERT+V
Virtual HTML Features	INSERT+F3
Activate Mouse Over	CTRL+ENTER
JAWS Find Next and Previous (IE only)	F3 and SHIFT+F3

Navigation Quick Keys:

Move to Next Anchor	A*
Move to Next Button	B*
Next Combo Box	C*
Next Different Element	D
Next Edit Box	E*
Next Form Control	F
Move to Next Graphic	G*
Next Heading	H
Next Item in a List	I*
Jump to Line	J
Next PlaceMarker	K
Next List	L*
Next Frame	M
Skip Past Links	N
Move to Next Object Tag	O
Next Paragraph	P*
Move to Next Quote	Q*
Next Radio Button	R*
Next Same Element	S
Next Table	T*
Next Unvisited Link	U
Next Visited Link	V
Next Check Box	X*
Move to Next Division	Z*
Previous Element	SHIFT+COMMA
Next Element	SHIFT+PERIOD

Tip: If you hold down **SHIFT** before pressing one of the Navigation Quick Keys listed above, you can move to the previous instance of that element. In addition, if you hold down **CTRL+SHIFT** while pressing keystrokes with an asterisk (*) next to them, JAWS displays a list of those elements on the page.

Forms:

Enter Forms Mode	ENTER
Exit Forms Mode	NUM PAD PLUS
List of Form Fields	INSERT+F5

Tables:

Next Row	WINDOWS KEY+DOWN ARROW
Prior Row	WINDOWS KEY+UP ARROW
Read Row	WINDOWS KEY+COMMA
Read Column	WINDOWS KEY+PERIOD
Next Cell in Row	ALT+CTRL+RIGHT ARROW
Prior Cell in Row	ALT+CTRL+LEFT ARROW
Cell Below in Column	ALT+CTRL+DOWN ARROW
Cell Above in Column	ALT+CTRL+UP ARROW
Read Current Cell	ALT+CTRL+NUM PAD 5
Jump to Table Cell	CTRL+J
Return to Previous Table Cell	CTRL+SHIFT+J
Move to First Cell	ALT+CTRL+HOME
Move to Last Cell	ALT+CTRL+END
Read Row to Cell	LEFT+SHIFT+R
Read Row from Cell	RIGHT+SHIFT+R
Read Column to Cell	LEFT+SHIFT+C
Read Column from Cell	RIGHT+SHIFT+C

PlaceMarkers:

List PlaceMarkers	CTRL+SHIFT+K
Add Temporary PlaceMarker	CTRL+K
Move to the Next or Prior PlaceMarker	K or SHIFT+K
Read Text at PlaceMarker 1-0	CTRL+SHIFT+number
Move to PlaceMarker 1-0	CTRL+SHIFT+number twice quickly

Note: The JAWS help system includes detailed information about using Internet Explorer. From within Internet Explorer, press and hold **INSERT** and press **F1** twice quickly. Once JAWS help is open, press **F6** to move to the help topic window.

Desktop Keystrokes**For Reading Text:**

Say Character	NUM PAD 5
Say Prior Character	LEFT ARROW
Say Next Character	RIGHT ARROW
Say Word	INSERT+NUM PAD 5
Spell Word	INSERT+NUM PAD 5 twice quickly
Say Prior Word	INSERT+LEFT ARROW
Say Next Word	INSERT+RIGHT ARROW
Say Line	INSERT+UP ARROW
Spell Line	INSERT+UP ARROW twice quickly
Say Prior Line	UP ARROW
Say Next Line	DOWN ARROW
Say Sentence	ALT+NUM PAD 5
Say Prior Sentence	ALT+UP ARROW
Say Next Sentence	ALT+DOWN ARROW
Say Paragraph	CTRL+NUM PAD 5
Say Prior Paragraph	CTRL+UP ARROW
Say Next Paragraph	CTRL+DOWN ARROW
Say to Cursor	INSERT+HOME
Say from Cursor	INSERT+PAGE UP
Say All	INSERT+DOWN ARROW
Rewind During a Say All	LEFT ARROW
Fast Forward During a Say All	RIGHT ARROW

Say Color	INSERT+5 on the numbers row
Say Font	INSERT+F
Start Skim Reading	CTRL+INSERT+DOWN ARROW
Change Skim Reading Preferences	CTRL+SHIFT+INSERT+DOWN ARROW
Display Skim Reading Summary	CTRL+WINDOWS Key+DOWN ARROW

For Temporarily Changing Voice Rate During SayAll:

Increase Voice Rate	PAGE DOWN
Decrease Voice Rate	PAGE UP

When not in SayAll:

Increase Voice Rate	ALT+CTRL+PAGE DOWN
Decrease Voice Rate	ALT+CTRL+PAGE UP
Restore Normal Voice Settings	INSERT+ESC

Informational:

Interrupt Speech	CTRL
Say Window Title	INSERT+T
Say Window Prompt and Text	INSERT+TAB
JAWS Find	INSERT+CTRL+ F
JAWS Find Next	INSERT+F3
JAWS Find Previous	INSERT+SHIFT+F3
Say Top Line of Window	INSERT+END
Say Bottom Line of Window	INSERT+PAGE DOWN
Say Selected Text	INSERT+SHIFT+DOWN ARROW
Say Application Version	INSERT+CTRL+V

For Cursors:

PC Cursor	NUM PAD PLUS
JAWS Cursor	NUM PAD MINUS
Route PC Cursor to JAWS Cursor	INSERT+NUM PAD PLUS
Route JAWS Cursor to PC Cursor	INSERT+NUM PAD MINUS
Left Mouse Button	NUM PAD SLASH
Right Mouse Button	NUM PAD STAR
Drag and Drop	CTRL+INSERT+NUM PAD SLASH
Restrict JAWS Cursor	INSERT+R

For Dialog Boxes:

Say Default Button of Dialog Box	INSERT+E
Read Current Window	INSERT+B
Read Word in Context	INSERT+C
Say Current Control Hot Key	SHIFT+NUM PAD 5
Open Combo Box	ALT+DOWN ARROW
Close Combo Box	ALT+UP ARROW

For Help:

Screen Sensitive Help	INSERT+F1
Keyboard Help	INSERT+1
JAWS Help for Applications	INSERT+F1 twice quickly
Hot Key Help	INSERT+H
Window Key Help	INSERT+W

Miscellaneous:

JAWS Window	INSERT+J
Refresh Screen	INSERT+ESCAPE

Adjust JAWS Verbosity	INSERT+V
Run JAWS Manager	INSERT+F2
Shut Down JAWS	INSERT+F4
Window List Dialog	INSERT+F10
Select a System Tray Icon Dialog	INSERT+F11
Say System Time	INSERT+F12
Say System Date	INSERT+F12 twice quickly
Graphics Labeler	INSERT+G
AutoGraphics Labeler	CTRL+INSERT+G
Pass Key Through	INSERT+3 on the numbers row
Virtualize Window	CTRL+INSERT+W
Select Scheme	ALT+INSERT+S
Select Language	CTRL+WINDOWS KEY+L
Select Synthesizer	CTRL+INSERT+S
Minimize All Applications	WINDOWS KEY+M

For Frames:

Frame Get Top Left	CTRL+SHIFT+LEFT BRACKET
Frame Get Bottom Right	CTRL+SHIFT+RIGHT BRACKET
Frame Set to Window	CTRL+SHIFT+LEFT BRACKET twice quickly

Laptop Keystrokes

For Reading Text:

Say Character	CAPS LOCK+COMMA
Say Prior Character	CAPS LOCK+M
Say Next Character	CAPS LOCK+PERIOD
Say Word	CAPS LOCK+K
Spell Word	CAPS LOCK+K twice quickly
Say Prior Word	CAPS LOCK+J
Say Next Word	CAPS LOCK+L
Say Line	CAPS LOCK+I
Spell Line	CAPS LOCK+UP ARROW twice quickly
Say Prior Line	CAPS LOCK+U
Say Next Line	CAPS LOCK+O
Say Sentence	CAPS LOCK+H
Say Prior Sentence	CAPS LOCK+Y
Say Next Sentence	CAPS LOCK+N
Say Paragraph	CAPS LOCK+CTRL +I
Say Prior Paragraph	CAPS LOCK+CTRL+ U
Say Next Paragraph	CAPS LOCK+CTRL+ O
Say to Cursor	CAPS LOCK+SHIFT+J
Say from Cursor	CAPS LOCK+SHIFT+L
Say All	CAPS LOCK+A
Rewind During a Say All	LEFT ARROW
Fast Forward During a Say All	RIGHT ARROW
Say Color	CAPS LOCK+5
Say Font	CAPS LOCK+F
Start Skim Reading	CTRL+CAPS LOCK+DOWN ARROW
Change Skim Reading Preferences	CTRL+SHIFT+CAPS LOCK+DOWN ARROW

For Temporarily Changing Voice Rate During Say All:

Increase Voice Rate	PAGE DOWN
Decrease Voice Rate	PAGE UP

When not in Say All:

Increase Voice Rate	ALT+CTRL+PAGE DOWN
Decrease Voice Rate	ALT+CTRL+PAGE UP
Restore Normal Voice Settings	CAPS LOCK+ESC

Informational:

Interrupt Speech	CTRL
Say Window Title	CAPS LOCK+T
Say Window Prompt and Text	CAPS LOCK+TAB
JAWS Find	CAPS LOCK+ CTRL +F
JAWS Find Next	CAPS LOCK+F3
JAWS Find Previous	CAPS LOCK+SHIFT+F3
Say Top Line of Window	CAPS LOCK+SHIFT+Y
Say Bottom Line of Window	CAPS LOCK+SHIFT+N
Say Selected Text	CAPS LOCK+SHIFT+A
Get Application Version	CAPS LOCK+CTRL +V

For Cursors:

PC Cursor	CAPS LOCK+SEMICOLON
JAWS Cursor	CAPS LOCK+P
Route PC Cursor to JAWS Cursor	CAPS LOCK+APOSTROPHE
Route JAWS Cursor to PC Cursor	CAPS LOCK+LEFT BRACKET
Left Mouse Button	CAPS LOCK+8
Right Mouse Button	CAPS LOCK+9
Left Mouse Button Lock	CTRL+8
Drag and Drop	CAPS LOCK+CTRL +8
Restrict JAWS Cursor	CAPS LOCK+R

For Dialog Boxes:

Say Default Button of Dialog Box	CAPS LOCK+E
Read Current Window	CAPS LOCK+B
Read Word in Context	CAPS LOCK+C
Say Current Control Hot Key	CAPS LOCK+SHIFT+COMMA
Open Combo Box	ALT+DOWN ARROW
Close Combo Box	ALT+UP ARROW

For Help:

Screen Sensitive Help	CAPS LOCK+F1
Keyboard Help	CAPS LOCK+1
JAWS Help for Applications	CAPS LOCK+F1 twice quickly
Hot Key Help	INSERT+H
Window Key Help	CAPS LOCK+W

Miscellaneous:

JAWS Window	INSERT+J
Refresh Screen	CAPS LOCK+ESCAPE
Adjust JAWS Verbosity	CAPS LOCK+V
Run JAWS Manager	CAPS LOCK+F2
Shut Down JAWS	CAPS LOCK+F4
Window List Dialog	CAPS LOCK+F10
Select a System Tray Icon Dialog	CAPS LOCK+F11
Say System Time	CAPS LOCK+F12
Say System Date	CAPS LOCK+F12 twice quickly
Graphics Labeler	CAPS LOCK+G
AutoGraphics Labeler	CAPS LOCK+ CTRL +G

Pass Key Through	CAPS LOCK+3
Minimize All Applications	WINDOWS KEY+M
Select Scheme	CAPS LOCK+ALT+S
Select Language	WINDOWS KEY+CTRL+L or CAPS LOCK+CTRL+L
Select Synthesizer	CAPS LOCK+CTRL+S
Virtualize Window	CAPS LOCK+CTRL+W

For Frames:

Frame Get Top Left	CTRL+SHIFT+LEFT BRACKET
Frame Get Bottom Right	CTRL+SHIFT+RIGHT BRACKET
Frame Set to Window	CTRL+SHIFT+LEFT BRACKET twice quickly

Windows Keystrokes

General:

Get Help	F1
Open the Start menu	CTRL+ESC or WINDOWS KEY
Open Windows Explorer	WINDOWS KEY+E
Open Run Dialog	WINDOWS KEY+R
Find File or Folder from Desktop	F3
Minimize All Applications	WINDOWS KEY+M
Switch between open applications	ALT+TAB
Quit the active application	ALT+F4

For Windows and Menus:

Open the application control menu	ALT+SPACE BAR
Move to the Menu bar in application	ALT
Choose a Menu item	ENTER
Move between menus	ALT, ARROW KEYS
Cancel or close a menu	ESC
Cancel or close a cascading menu	ALT
Open a child window control menu	ALT+DASH
Close a child window	CTRL+F4
Open the applications menu	APPLICATION KEY or SHIFT+F10

For Dialog Boxes:

Move through dialog controls	TAB
Move backward through dialog controls	SHIFT+TAB
Move to another page	CTRL+TAB
Reverse direction through pages	CTRL+SHIFT+TAB
Select or deselect in list view	SPACEBAR or CTRL+SPACEBAR
Toggle a check box on/off	SPACEBAR

For Reading Text:

Move One Character Left	LEFT ARROW
Move One Character Right	RIGHT ARROW
Move One Word Left	CTRL+LEFT ARROW
Move One Word Right	CTRL+RIGHT ARROW
Move to Beginning of Line	HOME
Move to End of Line	END
Move One Paragraph Up	CTRL+UP ARROW
Move One Paragraph Down	CTRL+DOWN ARROW
Scroll up one screen	PAGE UP
Scroll down one screen	PAGE DOWN

Move to beginning	CTRL+HOME
Move to end	CTRL+END

For Editing Text:

Copy	CTRL+C
Cut	CTRL+X
Paste	CTRL+V
Undo	CTRL+Z
Delete current character	DELETE
Delete prior character	BACKSPACE
Select One Character Left	SHIFT+LEFT ARROW
Select One Character Right	SHIFT+RIGHT ARROW
Select One Word Left	CTRL+SHIFT+LEFT ARROW
Select One Word Right	CTRL+SHIFT+RIGHT ARROW
Select to Beginning of Line	SHIFT+HOME
Select to End of Line	SHIFT+END
Select to beginning	CTRL+SHIFT+HOME
Select to end	CTRL+SHIFT+END
Select All	CTRL+A

For Windows Explorer:

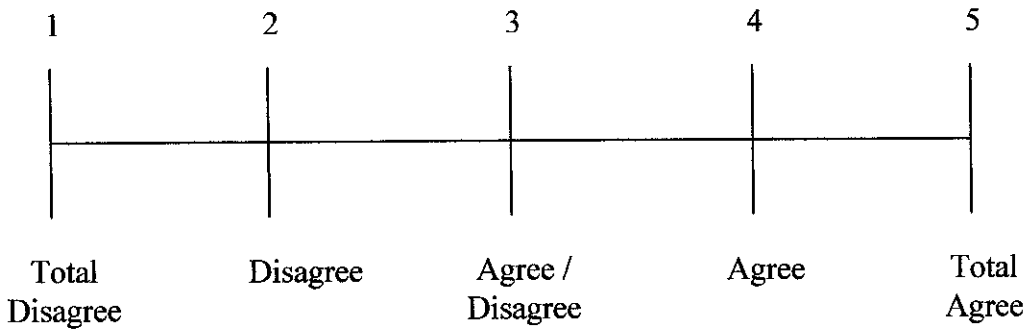
Delete files	DELETE
Rename a file or folder	F2
Open Properties for Selected File or Folder	ALT+ENTER
Refresh a window	F5
Switch between windows	F6 or TAB
Go up one level	BACKSPACE



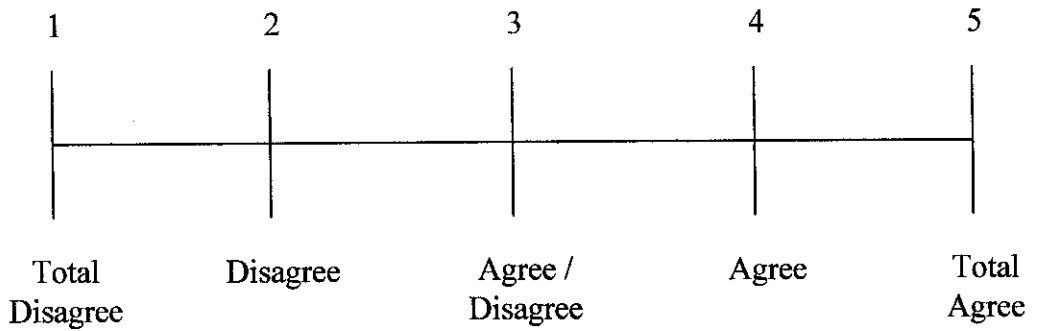
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**APPENDIX I: QUESTIONNAIRE USER ACCEPTANCE
TESTING**

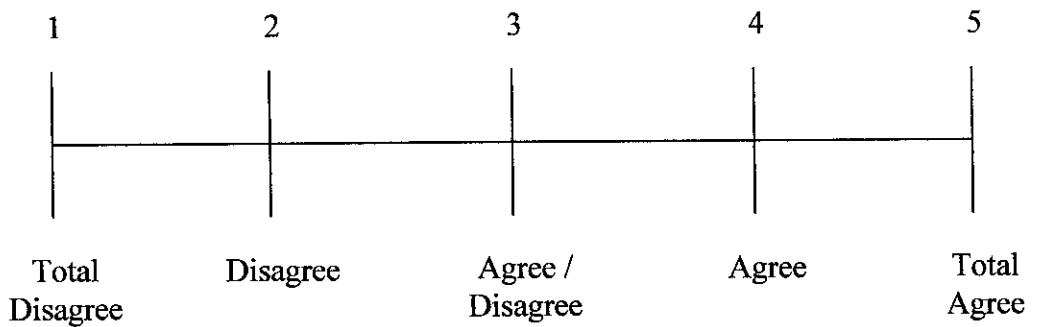
4. Can the courseware attract the interest of the blind children to learn more?



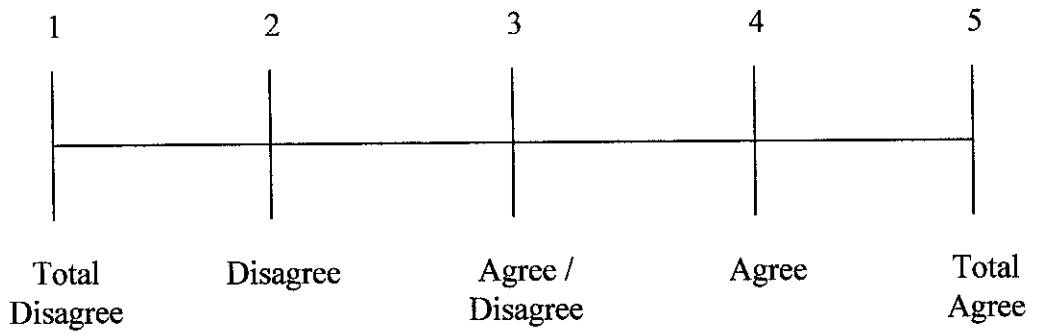
5. Can this courseware help to enhance the learning system in MAB for children age 7 to 10 year old?



6. Does this courseware provide enough information to help the blind children to memorize in calculation?



7. Can this courseware help the blind children to improve their reading and typing skills?





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APPENDIX J: USER ACCEPTANCE TESTING RESULTS

Data Gathered from User Acceptance Testing

	1. Ability to give good experience	2. Courseware easy to understand	3. Ability to give clear instruction	4. Able to attract children interest in learning	5. Ability to enhance the learning system in MAB for children age from 7 to 10	6. Able to help the children to memorize in calculation	7. Able to help the children improve their reading and typing skills
1	4	4	4	4	4	4	4
2	4	4	4	4	4	4	4
3	4	4	4	4	4	4	4
4	3	4	3	4	4	3	5
5	3	4	3	4	4	4	4
6	5	4	4	5	4	4	4
7	4	4	4	5	4	4	3
8	4	4	4	5	4	3	4
9	4	4	4	3	4	3	4
10	4	4	3	3	5	4	3
11	3	5	3	4	4	4	3
12	5	5	3	4	4	4	4
13	4	4	3	4	4	4	4
14	4	4	3	3	5	4	4
15	5	4	4	3	4	4	4
Total N	15	15	15	15	15	15	15

Numbers of blind children evaluated = 15

Result for each attribute for User Acceptance Testing

1. Does this courseware give a good experience to the blind children

	Frequency	Percentage (%)
Rating		
3	3	20
4	9	60
5	3	20
Total	15	100

2. Do this courseware easy to understand

	Frequency	Percentage (%)
Rating		
4	13	87
5	2	13
Total	15	100

3. Does this courseware give clear instructions to the blind children

	Frequency	Percentage (%)
Rating		
3	7	47
4	8	53
Total	15	100

4. Can the courseware attract the interest of the blind children to learn more

	Frequency	Percentage (%)
Rating		
3	4	27
4	8	53
5	3	20
Total	15	100

5. Can this courseware help to enhance the learning system in MAB

	Frequency	Percentage (%)
Rating		
4	13	87
5	2	13
Total	15	100

6. Does this courseware provide enough information to help the blind children to memorize in calculation

	Frequency	Percentage (%)
Rating		
3	3	20
4	12	80
Total	15	100

7. Can this courseware help the blind children to improve their reading and typing skills

	Frequency	Percentage (%)
Rating		
3	3	20
4	11	73
5	1	7
Total	15	100



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APPENDIX K: POWERPOINT PRESENTATION SLIDES

COURSEWARE FOR VISUALLY IMPAIRED CHILDREN

**Presented by,
Name: Nurul Alia Norehsan
Student ID: 3013
Project Supervisor: Miss Eliza Mazmee Mazlan
Date: 12th December 2005**

PRESENTATION OUTLINE

- Introduction
- Problem Statement
- Objectives
- Scope of Study
- Methodology
- Development Tools
- Results and Discussion
- Recommendation
- Conclusion
- Project Demo
- Q & A

INTRODUCTION

- Courseware for Visually Impaired Children is develop to help the blind children from 7 – 10 years old in their learning education in MAB
- Before this the learning are based on direct communication between the teacher and the students and in MAB there are lack of teaching materials
- This courseware will help the blind children in using computer and have the chance to read, learn, typing and memorizing
- The blind children will only use keyboard with special keystroke without mouse pointing

PROBLEM STATEMENT

- Lack of teaching materials in MAB
- There is lack of interest to focus on learning process
- There is no software being used to serve the education for blind children
- Lots of learning materials in written form and difficult for them to read as they are blind

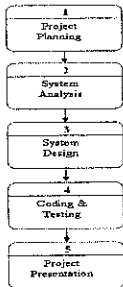
OBJECTIVES

- Study and identify the problems arise in MAB relating to education learning process for blind children. This is to ensure that the proposed courseware will achieve the aims to upgrade, enhance and automate the current learning process
- To developed a courseware that can assist the blind children from age 7 – 10 years old to learn, read, understand and memorizing English words and numbers

SCOPE OF STUDY

- This courseware focuses on the need of blind children in their learning education thru hearing and listening
- The development involves the use of Visual Basic 6 and JAWS (Job Access With Speech) that act as a screen reading software that enable every single word to be read out loud using Windows platform
- Interview conducted among the blind people that work in MAB especially to those involves in education learning process for blind children and ask the specific requirement needed to serve the blind children education

METHODOLOGY



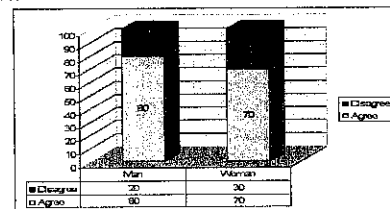
DEVELOPMENT TOOLS

- JAWS (Job Access With Speech)
 - ❖ Act as a screen reading software for Windows
- Visual Basic 6.0
 - ❖ Implementation of interface and coding that link with JAWS

RESULTS AND DISCUSSION

- Result : User Acceptance Testing
 - ❖ A test being conducted in MAB for the blind children age 7- 10 years old evaluated by the teacher
 - ❖ Overall, improvement need to be done to make sure the system meets the exact user requirements

HISTOGRAM (INTERVIEW)

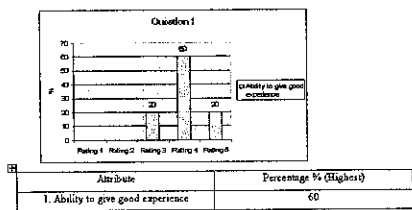


From the diagram of interview and survey conducted in MAB:

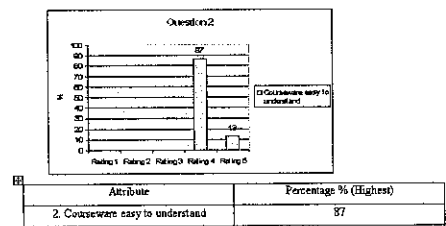
Men: 80% are agree
20% are disagree

Women: 70% are agree
30% are disagree

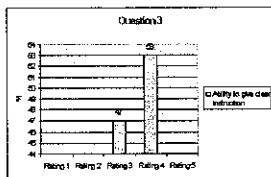
HISTOGRAM (QUESTIONNAIRE)



HISTOGRAM (QUESTIONNAIRE)

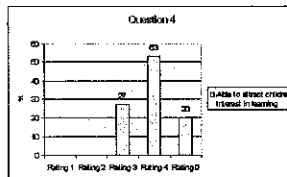


HISTOGRAM (QUESTIONNAIRE)



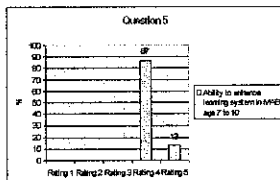
Attribute	Percentage % (Highest)
3. Ability to give clear instruction	53

HISTOGRAM (QUESTIONNAIRE)



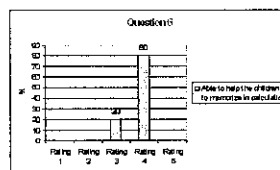
Attribute	Percentage % (Highest)
4. Able to attract children interest in learning	53

HISTOGRAM (QUESTIONNAIRE)



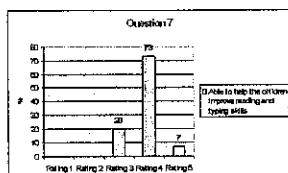
Attribute	Percentage % (Highest)
5. Ability to enhance learning systems in MAB age 7 to 10	87

HISTOGRAM (QUESTIONNAIRE)



Attribute	Percentage % (Highest)
6. Able to help the blind children to memorize in calculation	80

HISTOGRAM (QUESTIONNAIRE)



Attribute	Percentage % (Highest)
7. Able to help to improve their reading and typing skills	73

RECOMMENDATION

- Learning process can be in two ways communication where the blind children can hear and respond back to the system through voice recognition
- Enhance the courseware by adding school syllabus that enable them to learn more
- This courseware can be download freely in the website

CONCLUSION

- Help to educate and motivate the blind children to learn, read, understand and memorizing English words and numbers
- This courseware applies learning theory where user may hear through JAWS and this application offers effective way that results an easy and fast learning for the blind children

PROJECT DEMO

Q & A
THANK YOU !!