

Ready to Grow

By

Christina Anderson

Submitted to (12 point, regular centered from here down)
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

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Ready to Grow

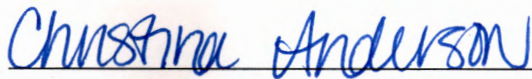
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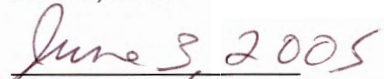
Christina Anderson



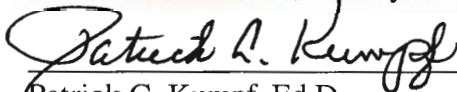
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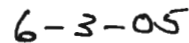
Professor Tom Wulf, Faculty Advisor



June 3, 2005



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Interim Department Head



June 3, 2005

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I would like to give special thanks to Angela Fages for her patience during this long process. I would also like to thank her for her insight and guidance into the young minds of developmentally delayed children. Finally I would like to give special thanks to my father, Steve Anderson, and my boyfriend, Mark Tedesco for their encouragement and emotional support.

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Abstract

Ready to Grow is an interactive CD-ROM for young children with learning delays. The interactive, multimedia project is designed for children 18-36 months who are receiving Early Intervention assistance. Currently, the Early Intervention specialist uses developmental learning toys as a learning tool. *Ready to Grow* is developed for the specialist as a new and innovative instructional learning tool. The CD-ROM focuses on three major learning delays: fine motor, receptive language, and cognitive delays. The educational games incorporate easy navigation, bold primary colors, and recognizable animals. It is intended for use in a teacher/student environment. The user friendly interface is developed in Macromedia Flash. The CD-ROM helps the child learn and understand basic concepts by playing engaging educational interactive games. *Ready to Grow* provides learning delayed children with relevant games that do not exceed their learning ability, but help them develop their learning skills.

Ready to Grow

1. Statement of the Problem

The idea of this project was thought of after speaking with my friend, Angela Fages. She is an Early Intervention (EI) specialist who works with children 18 to 36 months who have developmental delays. She has a need for a new and creative learning tool for her work with these children. Currently, the only learning tool she uses are toys. She has searched for children's interactive software suitable for children of ages 18 to 36 months, but existing available software was targeted for older children or not appropriate for children who are developmentally delayed.

The problem Ms. Fages faces is that there isn't suitable software for children with developmental delays. Ms. Fages needs adequate software that does not exceed her client's learning ability. With the help of Ms. Fages, I have designed exactly what she feels is the best learning tool.

I used Macromedia Flash MX 2004 to create the interactive software. The Flash software covers my first area of concentration which is multimedia as well as my second area of concentration which is programming. I used the programming language ActionScript 2.0. I decided to use Flash instead of other software because I was interested in learning Flash. Flash MX offers features such as advanced interactive content using slides to organize and sequence the project (13). It has new timeline effects which simplifies common timeline and scripting tasks. Flash MX also has improved runtime performance which includes faster graphics display and video playback. Flash MX will was most helpful because it had easy to learn templates and several online tutorials which helped in the development of the content.

2. Description of the Solution

The Ready to Grow interactive CD is developed especially for Ms. Fages's clients. The CD-ROM helps the child learn and understand basic concepts by playing engaging, educational, interactive games. This interactive software focuses on the daily activities Ms. Fages uses with these children. However, the main focus is on three important developmental delays: fine motor, cognitive, and receptive language delays. Fine motor delays are seen in children who lack hand-eye coordination and have trouble isolating their fingers to pick up or touch objects. The Ready to Grow software allows the child to work with the keyboard and the mouse, learning to isolate their fingers. Cognitive delays are seen in children needing help remembering colors, shapes, animals, and size concepts. The Ready to Grow software helps the child to learn through simple matching and color themed games. Size concepts and shapes are conquered together through games that help the child understand large and small shapes. Showing basic animals in their habitats can help the child relate to the animals. Receptive language delays are children who fail to follow commands or directions and also suffer from identification problems. The Ready to Grow software helps the child interact with the teacher. Since Ready to Grow is used in a teacher/student environment, the teacher guides the child through the software, thus following the teacher's directions.

This software eliminates the hassle of bringing a large bag of toys to every home Ms Fages visits, which will in turn allow her to spend more time with the child. Ms. Fages will not do away completely with the toys, as this is still a good hands-on learning tool. The software is an extension, not a substitution for the toys. The software also helps her concentrate on exactly what she wants the child to learn from or get out the

software. Ready to Grow helps to enhance the child's development and reinforce one on one skills, as well as develop interpersonal skills with the teacher and other children their age. Multimedia – based tools are another way in which information can be made accessible to students. Multimedia's use of text, speech, graphics, pictures, audio, and video in reference – based software is especially effective in meeting the heterogeneous needs of the students with mild disabilities (12, p. 3).

Some of the key features for this Multimedia CD-ROM include:

- It is used in a teacher/student environment only.
- A parent letter provides information about the interactive CD and how to use it with the child.
-
- It covers 3 important developmental delays in children 18-36 months:
 1. Fine motor delays
 2. Cognitive delays
 3. Receptive language
- Flash animations,
- Primary colors, shapes, large text.

The Ready to Grow software also provides:

- *Ease of use for parents/teacher*

A parent letter can be opened from the introduction page or from the main page. This area discusses the layout of the “Ready to Grow” software.

- *Ease of use for the children*

Over time children should be able to identify shapes, colors, and sounds. They will progress the more they use the software on a regular basis with the parent/teacher.

- *Ease of navigation*

The software is easy to navigate. The navigation information such as information on frequently used icons is explained in the Parent Help section.

- *Functionality*

The primary goal of the Ready to Grow software is to intervene children that show early signs of developmental delays.

- *Educational*

Although this software is geared toward children with developmental delays, any child who enjoys playing on the computer can use this software for fun, educational purposes.

- *Interactivity*

The interaction that occurs between the child and the software is very important. The more interactive the software, the more the child is able to manipulate what happens when the program is used (8, p.1).

2.1 User Profile

The users of “Ready to Grow” software consist of two groups. The primary user group are children of ages 18-36 months who have learning delays. The secondary user group is the EI specialist or parent who is assisting the child.

The children included in the primary user group are between the ages of 18-36 months who receive Early Intervention from Ms. Fages. These children have developmental delays which can make learning difficult. The interactive software is used to help the child overcome delays in three main areas. However, this software is not limited to children of this age group or children with developmental delays. Most of these children have no experience on the computer. There are only a handful that have had some computer experience. The software is designed for a novice user, no matter what age.

The users in the secondary group are intended to be the EI specialist and parents. The EI specialist assists the child through software, and helps the child become

comfortable with using a computer. The parents are encouraged to practice with their child outside of the Early Intervention sessions. A parent letter is provided to assist parents in using the application.

2.2 Design Protocols

The design of the Ready to Grow software is an interactive, multimedia CD-ROM. Ready to Grow was developed in Macromedia Flash MX 2004. All clipart images were resized and cropped in Macromedia's Fireworks 2004. ActionScript 2.0 was used to provide easy navigation and user interactivity.

The Ready to Grow graphical interface is designed for 800 by 600 screen resolution. The user interface uses bright primary colors to engage young children. Topic areas are visually coded through the use of specific color schemes. This is used so the user always has a sense of direction within the application. Familiar images such as a teddy bear, baby doll, baseball, basketball, etc. will be used for easy identification.

When the CD loads there is an introduction page which will direct the user to the Ready to Grow main navigation page or to the Parent Help section.



Figure 1. “Ready to Grow” Introduction Page

The main navigation splash page is where the Help, Animals, Shape/Colors, and All About Me buttons will be located. From here the EI specialist or parent can select the topic of choice. Parents should read the parent help section, which is located under the Parent help button, before they assist their child. This section explains the software and gives a brief description of each game.



Figure 2. Main Navigation Page

When a topic button is selected, the user will be prompted to choose either the Basic or Challenge level. The difference between these is explained in the parent help section on the main navigation splash page. Basic level is suitable for children of ages 1½ - 2 years and Challenge is suitable for children of ages 2–3 years.

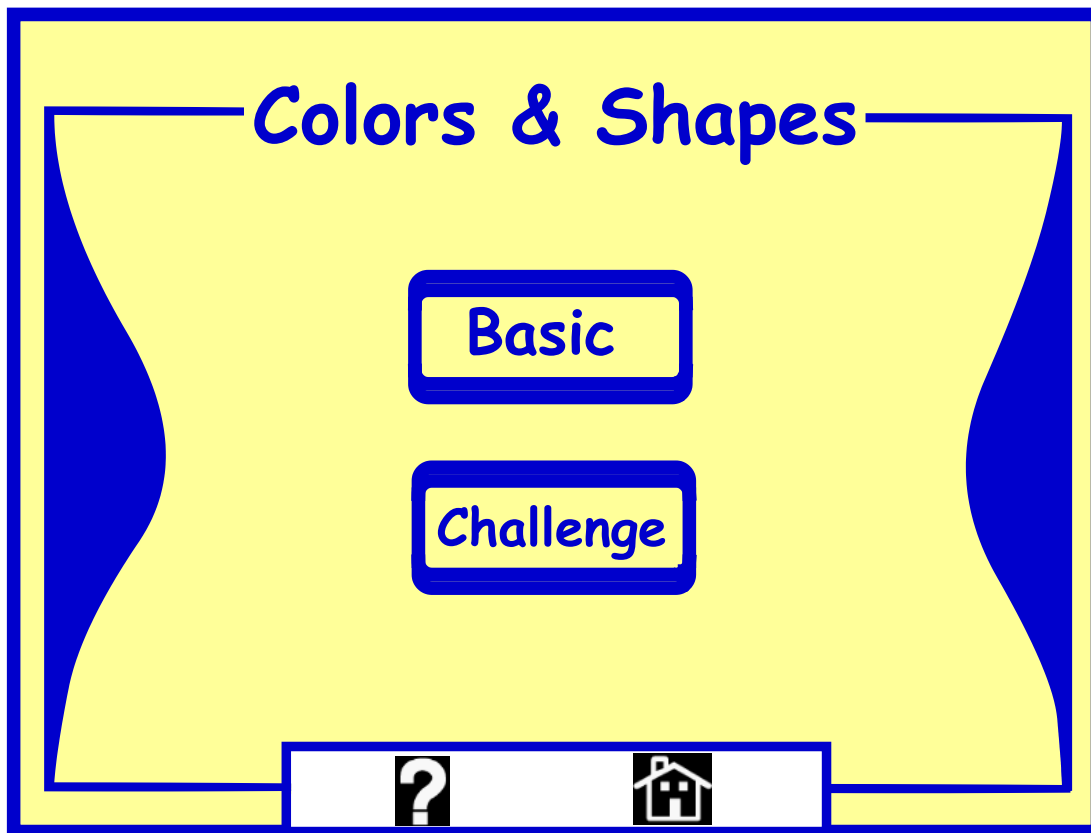


Figure 3. Colors and Shapes Basic/Challenge page

When the selected game is completed, then the user can go back to the Basic/Challenge page or to the main page to select a different topic. There will be a navigation bar at the bottom of the screen, so at anytime the user can go back to the home navigation page, the Basic/Challenge screen (of the selected topic), or to the Parent Help page.

The key forms of interaction are basic symbols. A navigation bar is present at the bottom of the screen at all times through out the games. This includes a symbol of a house with the meaning of home as in the home navigation page. Returning to this screen allows the user to select a different game topic. The Parent Help icon is a question mark. This takes the user to the Parent Help section. The Basic/Challenge button is a bold B/C for Basic/Challenge.

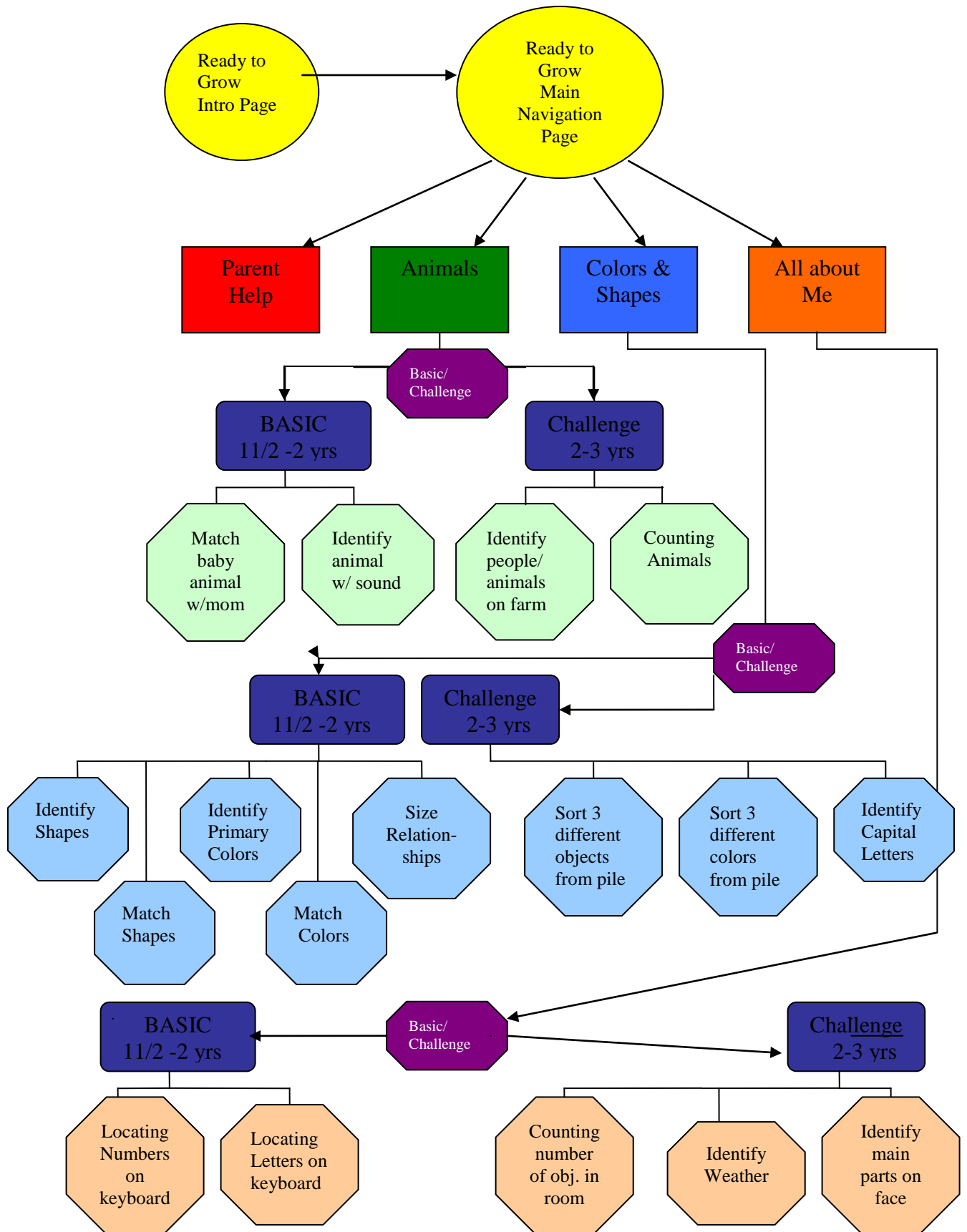


Figure 4. Navigation bar buttons

The color scheme utilizes bold primary colors. The navigation bar is white and the icons are black and white. The icons are black and white to eliminate confusion from the game. A color scheme among topics will help keep the games organized. The games about animals use green as an accent color. The games about Colors/Shapes use blue as an accent color. The games about All About Me use an orange accent color. The Parent Help section use a red accent color. A light yellow is used as a consistent background color.

The Help option is labeled as Parent Help. On the Main Navigation splash screen there is a red button that will take the user to the Parent Help screen. The Parent Help option is represented by a black and white question mark which appears at the bottom of every game in the navigation bar. However, when the user is currently in a game and the help icon is pressed, a pop up window displays which has the directions of the game as well as the main areas of concentration.

The following, **Figure 5**, is an outline of Ready to Grow's educational topics and games.



3 Deliverables

The objective of this project is to provide the EI specialist with a new developmental learning tool for children with learning delays.

- Multimedia based interactive CD created for an Early Intervention Specialist.
 - Created in Flash MX 2004.
- Intended for use in a teacher/student environment.
- Provide a user friendly interface.
- User will have ability to select topic of educational game.
 - Colors & Shapes
 - Animals
 - All About Me
- Once topic of game is selected user will choose from an age group topic.
 - “Basic” are beginner games. Typically for ages 18-24 months.
 - “Challenge” are games that are a level up from beginner games, a little more challenging. Typically for ages 24-36 months.
- The Colors & Shapes topic will have five Basic games: Identify Shapes, Match Shapes, Size Relations, Identify Colors, Match Colors.
- The Colors and Shapes topic will have at least three Challenge games: Sort objects from pile, Sort colors from pile, Identify capital letters.
- The Animals topic will have at least two Basic games: Match baby animal with mom, Identify animal sounds.
- The Animals topic will have at least two Challenge games: Identify people and animals on the farm, Count animals.
- The All About Me topic will have at least two Basic games: Identify numbers on keyboard, Identify numbers on screen.
- The All About Me topic will have at least three Challenge games: Count number of objects in room, Identify weather, Identify main body parts.

- All games must explain the area of focus (receptive language, fine motor delays, and cognitive delays) in the Parent Help section.
- Action Script will be used to allow advanced features.
 - Allow for easy navigation.
 - Allow the user to work with the keyboard.
- “Ready to Grow” will incorporate animal sounds.
- “Ready to Grow” will use text to explain the games. The EI specialist or parent is expected to read the instructions to the child and guide them initially through the games and activities.
- “Ready to Grow” users will be able to:
 - Develop their computer skills.
 - Play games that help develop better receptive language, fine motor, and cognitive skills.

4. Design and Development

The following sections described the budget, timeline, software, and hardware of the project.

4.1 Budget

Item	Cost
Gateway, Intel Pentium 4, 256 Mb of Memeory, 40 Gb Harddrive	\$700.00
Macromedia Flash MX 2004	\$500.00
Total	\$1200.00

Figure 6. Ready to Grow budget

4.2 Timeline

TASK	2004				2005					
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Get approval for project	9/23-----10/14									
Research Flash and EI		10/7-----11/4								
Keep in contact with Ms. Fages		10/7-----						-----6/2		
Learn Flash and action scripting			11/22-----		-----2/12					
Present Senior Design I			----11/18							
Determine Layout of design				12/20-----1/10						
Finish Basic Design					1/8-----2/8					
Project Desc/Int. Use & Prg. Rep. 1					1/27					
Draft of Design Freeze						10-Feb				
Finish action scripting programming					1/20-----2/12					
Progress Report 2						2/17				
Testing and Documentation					1/8-----2/28					
Finish testing and documentation						2/1-----2/28				
Design Freeze						2/28-----3/10				
Present Senior Design II						-----3/10				
Progress Report 1								4/21		
Complete the software									5/25	
Abstract due									5/5	
Tech Expo									5/20	
Progress Report 2									5/20	
Final debugging/fixing problems									5/20-5/31	
Final Report									5/15---6-2	
Final Senior Design III Presentation									----6/2	

Figure 7. Timeline

4.3 Software:

Macromedia Flash MX 2004: Use of good graphics and action scripting.

4.4 Hardware:

Processor: Intel Pentium 4 processor

Operating System: Windows XP Professional Edition

Memory: 256 Mb

Hard drive: 40 Gb

Optical Drives: CD-ROM, DVD-ROM, CD-RW.

This software is developed at no cost for Ms. Fages. She is using Ready to Grow as a developmental learning tool for her clients with learning disabilities. However, Figure 6 above is an example of a proposed budget if I was provided funding.

5. Proof of Design

The following sections describe how the project met the deliverables.

5.1 Flash Design

The first four items of the Deliverables describe the basic design of Ready to Grow. The Ready to Grow software is a multimedia based interactive CD made for an Early Intervention Specialist. This project was created in Macromedia Flash MX 2004. as described in section 2. Description of the Solution, the software is used in a teacher/student environment and the interface is user friendly to young children. The introduction page is the first thing the user sees when the CD ROM is loaded. This page is important because it needs to be visually appealing to young children. The use of motion tweening in Flash allows for visual stimulating effects. Motion tweens are used in the introduction page to gain the child's interest. A start button leads the user into the Main Navigation page. The main page is decorated with bright colors, animals, and shapes. From this page the user has the ability to select a topic of an educational game.

5.2 Basic or Challenge Games

The fifth item of the Deliverables states that once the topic of the game has been selected then the user will have a choice of games which is decided by age groups. The two levels to choose from are a Basic level or the Challenge level. The levels have been described earlier in section 2.2 Design Protocols. From this point the EI specialist or

parent can decide which games are appropriate for the child. The screen shot shown below is the Animals Basic/Challenge page.

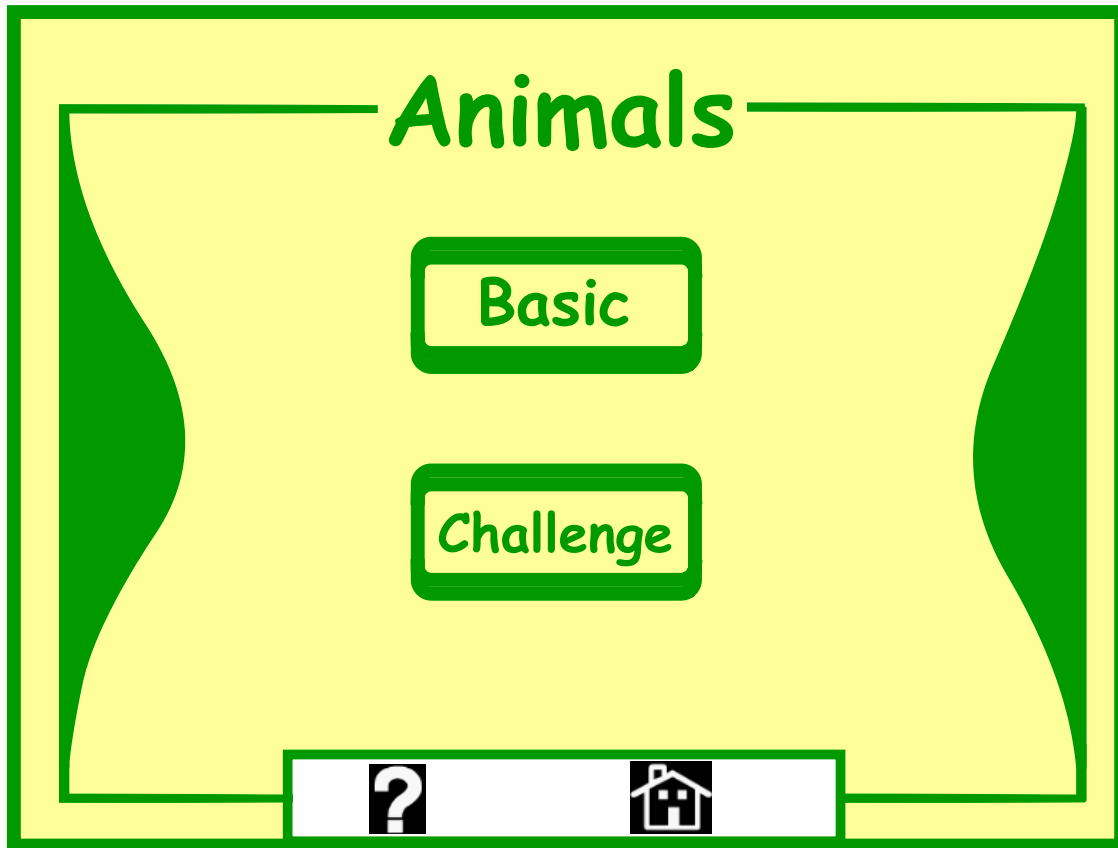


Figure 8. Animals Basic/Challenge page

5.3 Colors and Shapes - Basic level

The sixth Deliverable covers the Colors and Shapes Basic level games. Once the user has selected the Basic level, he/she will be directed to select from a list of five games. The games are Identify Shapes, Match Shapes, Size Relations, Identify Colors, and Match Colors. The game titles are self explanatory to the secondary user, however once a game is selected the user can go to the bottom left corner of the menu bar and

select the question mark icon. A popup window will describe the game and the areas of focus. Below, in Figure 9, is the Identify Shapes Help popup window.

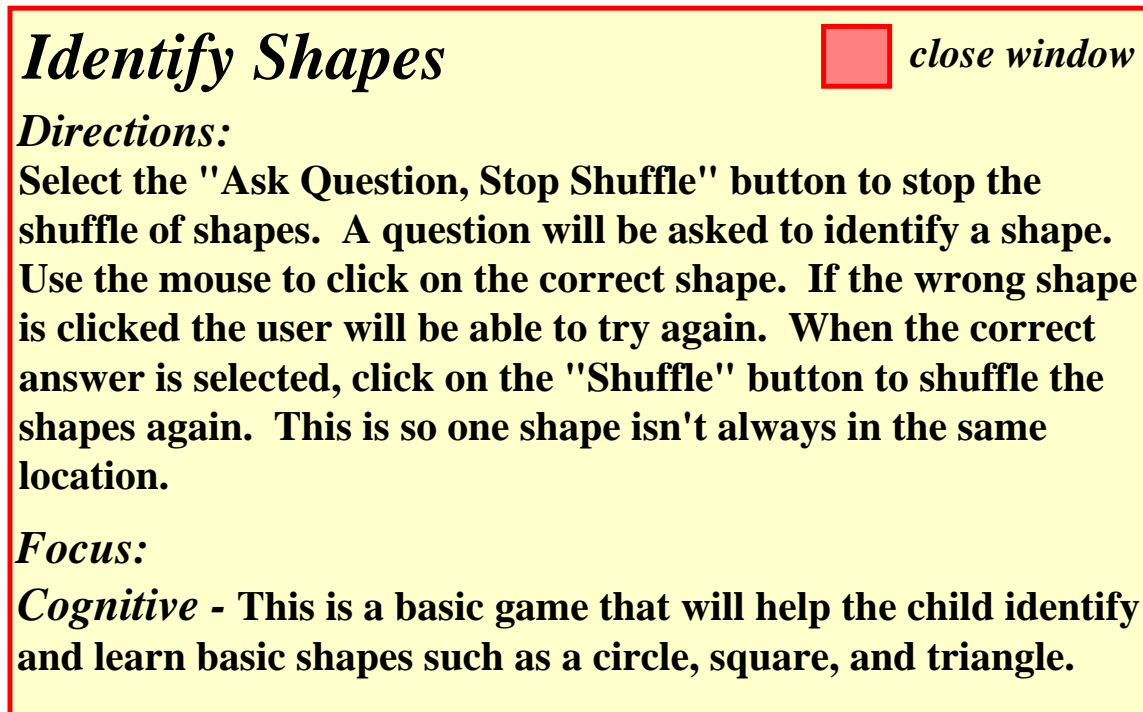


Figure 9. Identify Shapes Help popup window

5.4 Colors and Shapes - Challenge level

The Challenge level of the Colors and Shapes topic covers the seventh Deliverable. If the user selects the Challenge level, he/she will be directed to select from three games. The games are Sort Objects from Pile, Sort Colors from Pile, and Identify Capital Letters. These games are a little more difficult because they apply similar concepts of what the child should have learned in the Basic section of Colors and Shapes. These concepts are the identification of basic colors and shapes. The child should be familiar with basic colors and shapes for this Challenge section.

5.5 Animals - Basic Level

The eighth deliverable goes over the Animal Basic games. There are two games to choose from, Match Baby Animal with Mom and Identify Animal Sounds. The concept of the Match Baby Animal with Mom is to help the children with size relations. This game focuses on cognitive delays by allowing the child to relate to size differences through animals. The Identify Animal Sounds game also focuses on cognitive delays by allowing the child to associate animals with their sounds.

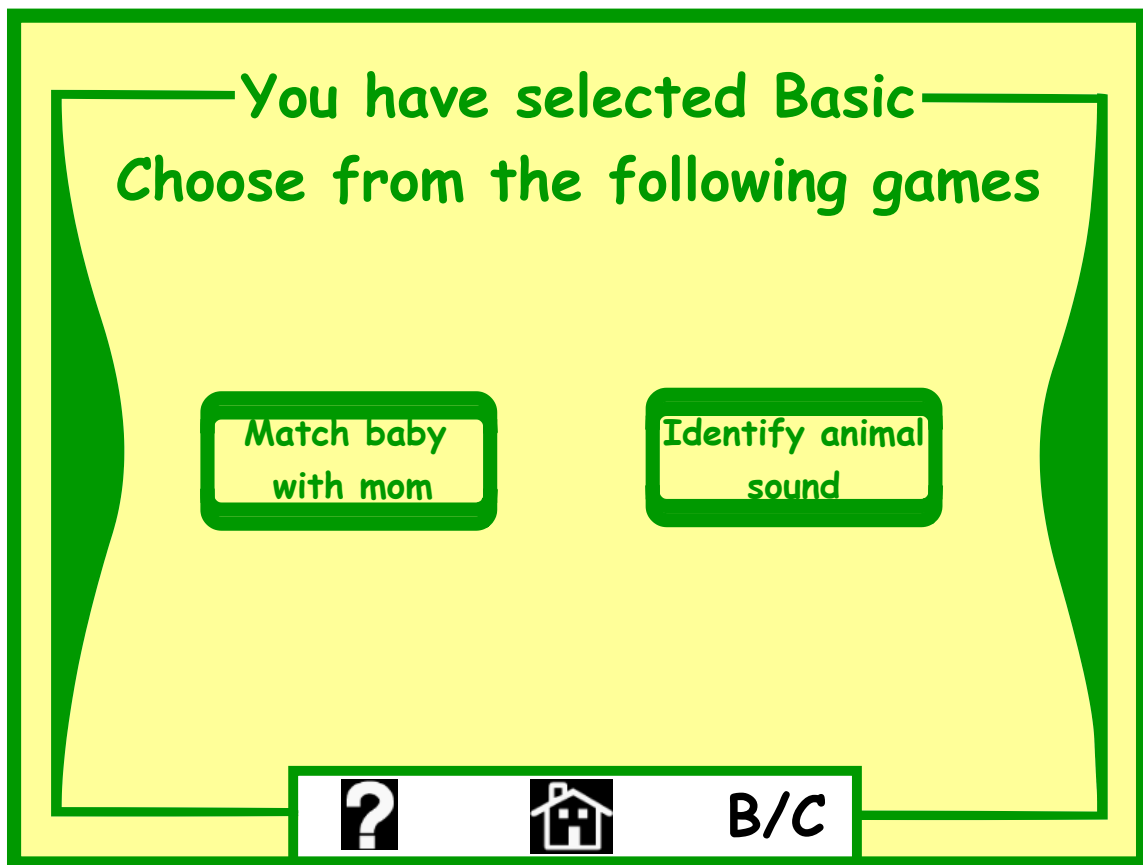


Figure 10. Animals Basic games page

5.6 Animals - Challenge Level

The Animals Challenge games are the ninth Deliverable. Identify People and Animals on the Farm and Count Animals are the games offered for this section.

Identifying people and Animals on a Farm allow the child to apply what they have

learned in the Basic Animals games. This game helps the child identify animal sounds with the correct animal by dragging an animal from a pile to the correct animal sound located on one of the four corners of the screen. The Count Animals game is simple rollover game used with the mouse. Every time the child uses the mouse to rollover an animal, it counts the animals on the screen.

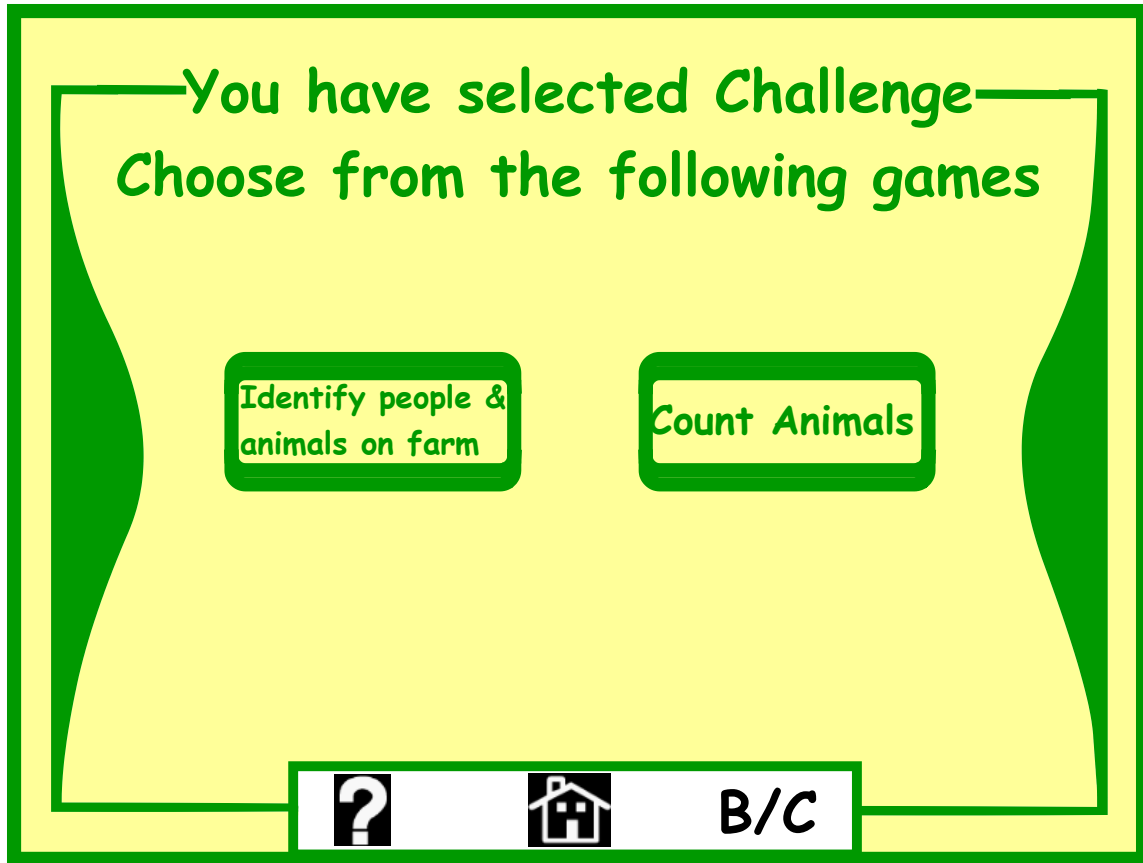


Figure 11. Animals Challenge game page

5.7 All About ME - Basic Level

The All About Me, Basic level has two games to choose from, Identify Numbers on Keyboard and Identify Letters on Keyboard. These two games are great interactive games for children who suffer from Fine Motor delays. These games allow the child to

interact with the keyboard and number pad by selecting certain letters or numbers on the keyboard. This teaches the child to isolate one finger in order to touch a key.

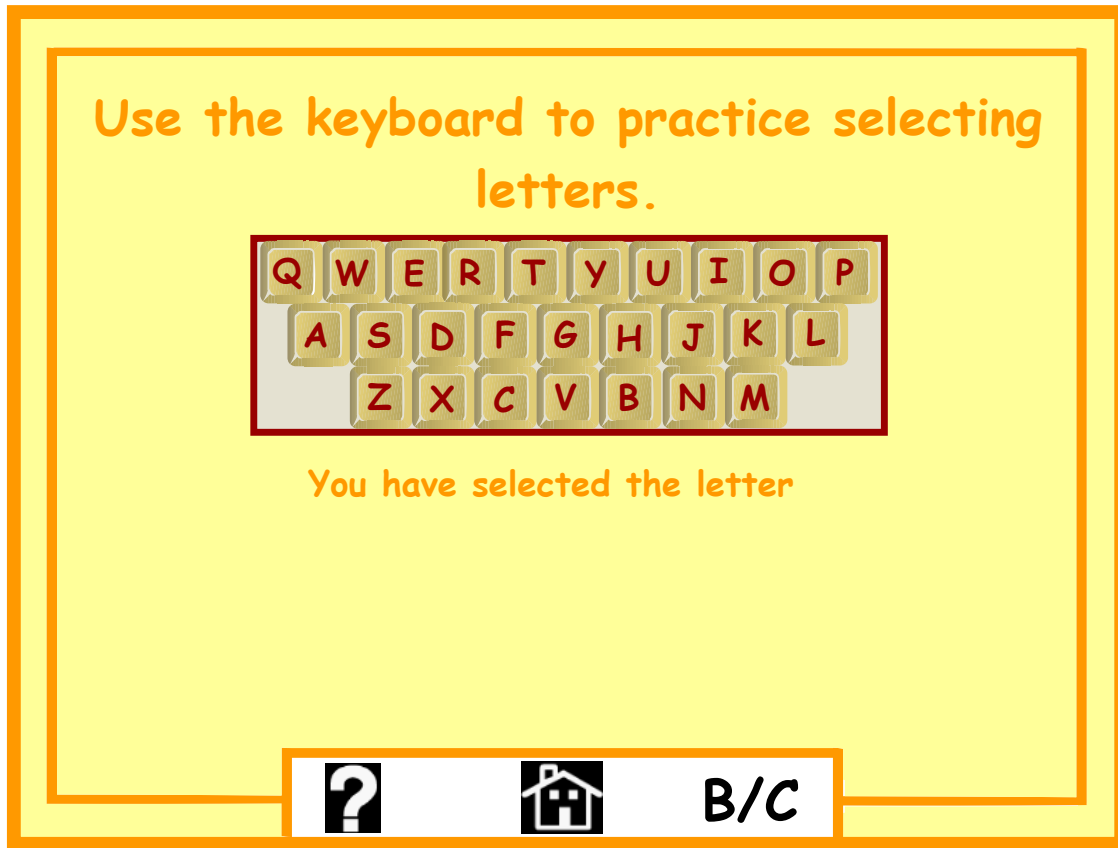


Figure 12. Identify Letters on the Keyboard game

5.8 All About ME - Challenge Level

The Challenge level has three games to choose from, Count Number of Objects in Room, Identify Weather, and Identify Facial Parts. These three games could be advanced for the basic user because they apply several basic concepts. The game Count Number of Objects in a room allows the child to explore and count different objects in a variety of scenes. The child is to rollover objects in each room, the name of the object will appear when it is rolled over. The child then must count the number of objects they have rolled over in that scene. The Identify Weather game allows the child to decide what clothing is

necessary for the displayed season. Each article of clothing can be dragged onto the boy or girl in each scene. This game focuses on the child's hand control of the mouse. If the clothing is not put directly on the boy or girl it will not stay and return its position. The same concept is used for the Identify facial parts game. The child is to decorate a blank face with eyes, eyebrows, nose, mouth, and ears.

5.9 Parent Help section

The twelfth deliverable states that all games must explain the area of focus (receptive language, fine motor delays, and cognitive delays) in the Parent Help section. The Parent Help section which is located on the Main Navigation screen only gives a brief description of each game. I believe it was more appropriate to have a detailed description along with the areas of focus in each individual game's Parent Help section. When the help icon is selected in each game a popup window appears. It is here that the games instructions and the area of focus are explained. (See Figure 9).

5.10 ActionScript

ActionScripting is a large part of how the software functions. The very first screen the user will see is the introduction screen. Every screen and game after the introduction page is a separate movie that loads only with user interaction. When the user clicks the button of a specific topic or game, then that movie is loaded in place of the other. By loading movies within movies this cuts down on the initial size of the file when the user is initially trying to load the software.

5.11 Sound, Text, and Development

The final three deliverables indicate that even though sound will be used, text will be the main explanation of the games. Since this is a teacher/student environment, the

Early Intervention specialist and/or the parent is required to assist the child with the software. This includes interacting with the child such as reading the directions to them, and helping the child to get acquainted to using a computer and the software.

The goal of the Ready to Grow software is to give the young children who receive early intervention, another alternative to learn. The games in Ready to Grow focus on helping the child develop their skills.

6. Testing Procedures

Testing began when I was about 75% complete. I had completed most of the games when I handed the unfinished software to Ms. Fages. She had already selected a group of five children who had some experience with a computer. She did this to save herself time from getting the child accustomed to the computer. The feedback from the testing was generally positive. This is because Ms. Fages had an idea of all the games she thought would work best for the children. The only minor changes I had to make were to keep all of the shape's color consistent throughout the program and to use the exact same objects throughout. Ms. Fages wanted to eliminate any confusion between the shapes colors and similar objects used too frequently

7. Conclusions and Recommendations

7.1 Conclusions

This project was created because there was a need for a young children's software that concentrates on learning delays. This software provides children from ages 18 to 36 months with games that children with learning delays can relate to. All the games were developed to the liking of an Early Intervention specialist. I provided a simple user interface with plenty of additional help information for the novice user. The project was

prepared in Macromedia Flash MX 2004 with ActionScript 2.0 and Macromedia Fireworks 2004. Ready to Grow was proposed and created over the three quarter Senior Design sequence. I have proven that all of the deliverables have been met. The project is a success because it is being used as a learning tool for developmentally delayed children who are receiving early intervention from Ms. Fages.

7.2 Recommendations

Throughout the beginning of development I soon encountered that learning Flash is definitely a lot harder than expected. For someone who has no experience in Flash they might find it a little difficult. I feel that even today I am still learning new ideas and different ways to create in Macromedia Flash. I would advise anyone who doesn't know Flash and is creating a timely project to start learning as early as possible.

I found that the most challenging part of Flash is ActionScript. ActionScript 2.0 is the object oriented programming language used in Macromedia Flash MX 2004. While writing code in ActionScript uses the same idea as writing code in any other object oriented language, what I found to be difficult is knowing which movie level to load your movie into. This proved to be a challenging time in the development, yet it was the easiest to fix once I figured out what I was doing wrong. I was actually loading all swf files into different levels when I should have been loading each swf file into level zero. I found out that loading into different levels was more for a web based Flash application. On the web when you click on a different link to open another swf file then you will need different levels to put your swf files in.

The most interesting aspect of Flash is your design. Flash gives the user the ability to design incredible animations without having to do a lot of the grunt work.

From motion tweening to shape tweening the user has the ability to give objects movement. I found that the Flash timeline was similar to another program that I knew, Photoshop. The timeline did take some getting used to. I definitely had to be aware of which layer I was drawing in or adding animation to.