Make Education Fun!

By

Jennifer M. Hufford

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

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Abstract

Make Education Fun! is an, interactive, multimedia project that was designed to help 4th grade students have fun learning arithmetic and English. This is a CD based project which allows a student to take the program wherever he or she has access to a computer. It was created with the latest software tools, such as Macromedia Flash 8 Professional. This educational CD was created to help improve a student's ability to get better test and homework grades and to be more enthusiastic about learning a particular subject. It includes colorful interface, easy navigation, and fun games to allow them to understand the subjects. It also includes simple explanations to help the student understand why he or she missed the problem they were working on.

Make Education Fun!

1. Statement of the Problem

When it comes to education, how many children actually think that it is fun to learn? Children do not want to come home from school and do homework. They would rather go outside and play. What if there was a program to help them learn school subjects and allow them to have fun? With children learning about computers at such an earlier age now, they already know who to do the basic things, such as clicking a mouse. With this CD, not only will a child be able to learn about arithmetic and English, they will also better their computer skills.

By the end of the fourth grade, students should be able to understand how to add, subtract, multiply, and divide large whole numbers. They should also know Basic English skill, such as reading, writing, spelling, and parts of speech. Some students have problems with these areas. They do not feel confident that they are as smart as the other students. They do not want to participate in class activities in fear that they may get the question wrong. This product will help increase a student's confidence and allow them to be able to participate in the classroom and allow them to answer the question as best as they can.

2. Description of the Solution

Many people do not have access to the Internet for different reasons. That is why having an educational CD would be better than having an educational Web site. Every parent wants their child to learn and be successful. With a CD dealing with arithmetic and English, a child would be able to learn these subjects wherever they go. All they would need is a computer that has a CD drive.

2.1 Product Description and Intended Use

This program is a CD based application for students in the fourth grade. It focuses on two subjects: arithmetic and English. It helps teach the students how to recognize certain arithmetic functions. It helps them develop their vocabulary skills and teach them how to use words correctly. The arithmetic section allows the students to view how a problem can be broken down. The English section allows the students to learn new words and teaches them how to use them in sentences.

A key element of this application is the graphical interface. The interface is friendly and fun for students to work with. It is easy to navigate to the other sections of the subject. For example, if a student was working in the addition section of the arithmetic area, he/she could stop at anytime and switch to a different section, such as subtraction, multiplication, or division.

Many students are able to do their homework without any problems. If they do run into a problem, they are able to ask for help if it is needed. When it comes to taking a test, some students tend to forget how to do the problems. The teacher with whom I worked, allowed me to see some of her students' test scores. She then showed their homework scores. They got a perfect score on the homework, but they did not do so well on the tests. This program gives the students confidence about answering the problems correctly.

This particular application allows students to use this program wherever they have access to a computer with a CD drive, such as at school or home. It has potential to help better the students' education and allows them to perform better in the classroom on tests and homework.

2.2 User Profile

There is one main category of users: fourth grade students. By using the application, the students have the potential to better themselves in the areas of arithmetic and English.

Teachers could also be another user/group. They could use this CD application in class as some type of activity to help their student/s learn the material better and become more confident in what they are doing. They could help guide the student to choose the best answer.

All a user needs to have to use this program is a computer with a CD drive. The user should know how to use a mouse and a keyboard and to be able to insert the CD and run the CD.

2.3 Design Protocols

The emphasis of this application is programming and multimedia. The main focus is on the content of the subjects and the functionality of the program. The design for the interface is fun, bright, easy to read and easy to navigate through. I used Macromedia Flash 8 Professional to create this program. The color scheme is bright, with bold colors that students should enjoy. They consist of reds, blues, yellows, greens, and many others. I added animations to some of the slides.

3. Deliverables

To provide a fun learning environment for students, certain criteria were developed. The following deliverables were defined during the design phase of the project:

- A multimedia CD to allow fourth grade students to learn more about arithmetic and English created with Macromedia Flash 8 Professional.

- The project provides a fun and easy navigational interface for the student or students using the program. The interface includes:
    - Fun icons
    - Bright colors
    - Animations
    - Easy navigation

- The project provides a way for students to learn and solve arithmetic problems as well as learn how to use correct vocabulary.

- The project provides the student with information on how to solve arithmetic problems in the areas of:
    - Multiplication
    - Division
    - Addition
    - Subtraction

- The project allows the student to explore different areas of English, including:
    - Facts and Opinions
    - Synonyms and Antonyms
    - Past and Present Tenses

- The project provides the student with feedback indicating if his/her answer is right or wrong. The project challenges the students' problem solving skills.

- The project shows the difference between certain vocabulary words and gives definitions that are easy to understand. There is an animated introduction to the program created in Macromedia Flash 8 Professional.

4. Design and Development

This section discusses the timeline for the project and the overall budget of the project.

4.1 Budget

	Item	Explanation	My Cost	Actual Cost
Software	Macromedia Flash 8 Professional	Using through the University	$0.00	$149.00
	Adobe Photoshop CS 2	Using through the University	$0.00	$599.00
	Window XP with Service Pack 2	Own	$0.00	$199.99
Other	Memorex 50-Pack 52x CD-R Disc Spindle	Own	$0.00	$19.99

Figure 1. Budget

4.2 Timeline

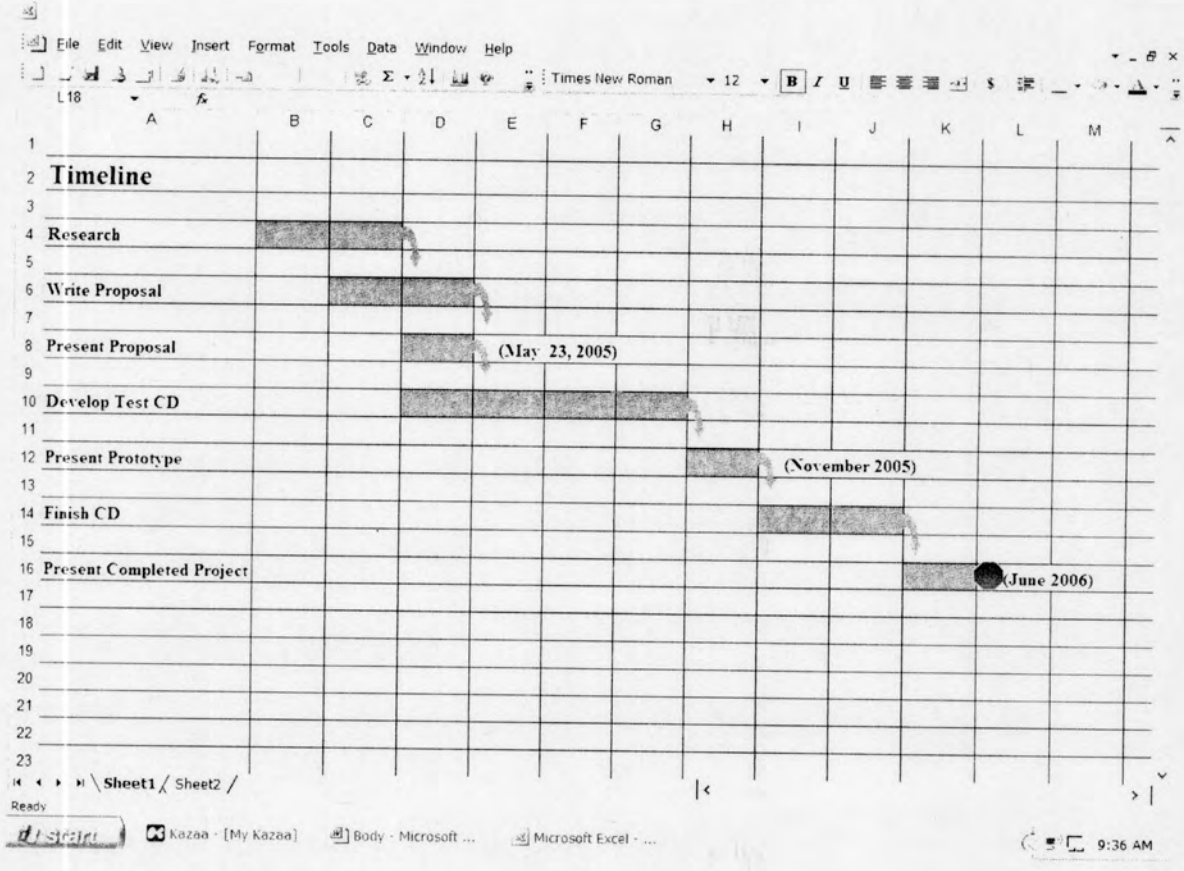

Figure 2. Timeline

5. Proof of Design

This section explains how the project deliverables were satisfied and the obstacles that took place while creating the project.

5.1 Make Education Fun! Welcome screen

The first impression of the program is important. It shows students that the program is full of bright colors and has a kid friendly feel to it. It invites the students to explore the program and try the problems in which it entails (see Figure 3.).

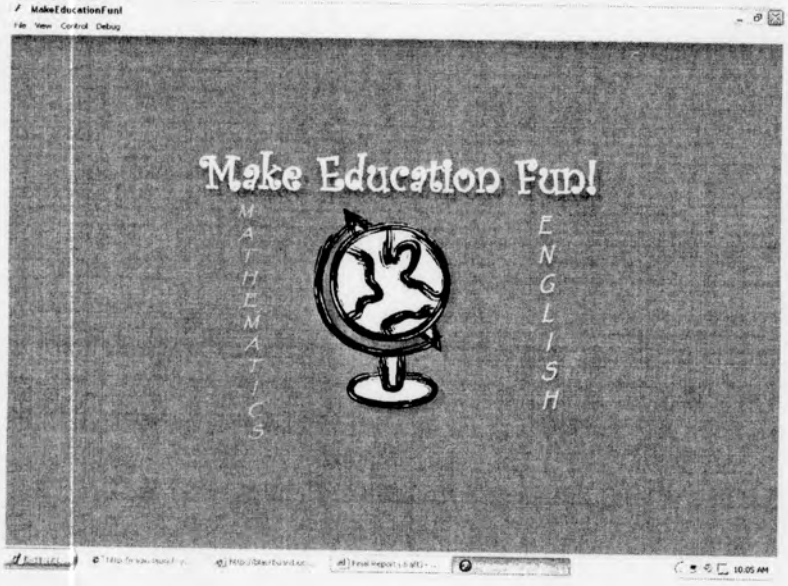

Figure 3. Make Education Fun! Welcome screen

5.2 Mathematics Welcome Screen

The mathematics welcome screen allows students to see what they will see when they enter the mathematics area of the program. The student has a choice of which section to start. They can either choose addition, subtraction, multiplication, or division. Each section is set up as a hyperlink and when clicked will go to the starting page of that certain area (see Figure 4.). When a student answers each question, they will click the "Check Answer" button. When this button is clicked, a message appears letting them

know if they answered the question correctly or incorrectly. The student will then proceed to the next question after they are told if they have answered the problem correctly or incorrectly.

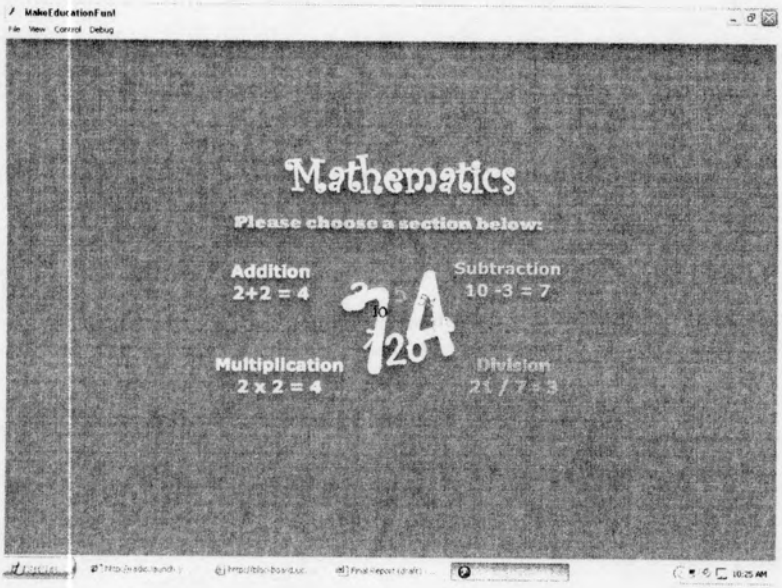

Figure 4. Mathematics Welcome Screen

5.2.1 Addition Welcome Screen

This screen lets the student know that they are in the addition area of the mathematics section. It gives them a definition about what addition facts are.

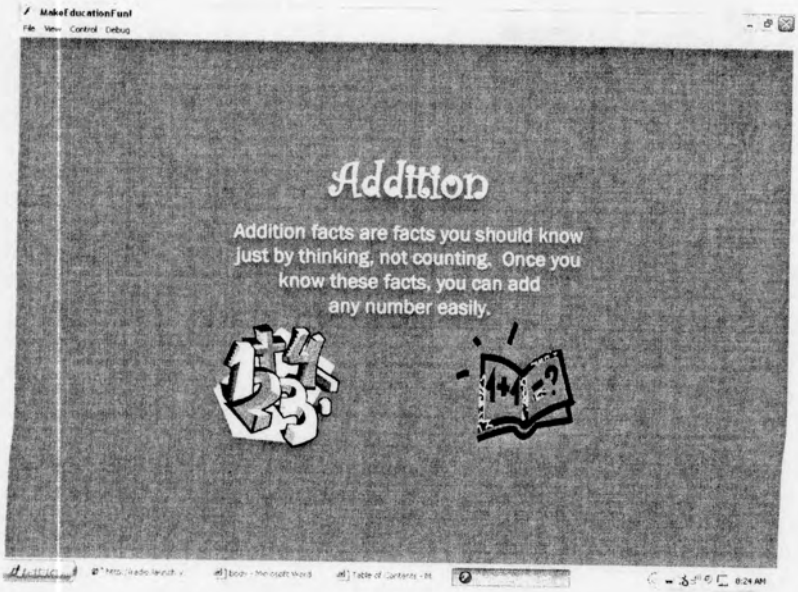

Figure 5. Addition Welcome Screen

5.2.2 Addition Sample Problem

The problems in this section were taken from various books from the fourth grade teacher with whom I was working. These problems meet the criteria for a fourth grade student's level of learning during the year. The problems in this area are the types of problems a student in the fourth grade should be able to know how to do. For example, in the sample problem below, the student will add the numbers together for each problem on the right and drag the number on the left with the correct answer to the box on the right. Once they have done that for all four of the problems, the student will click the "Check Answer" button and then go on to the next problem.

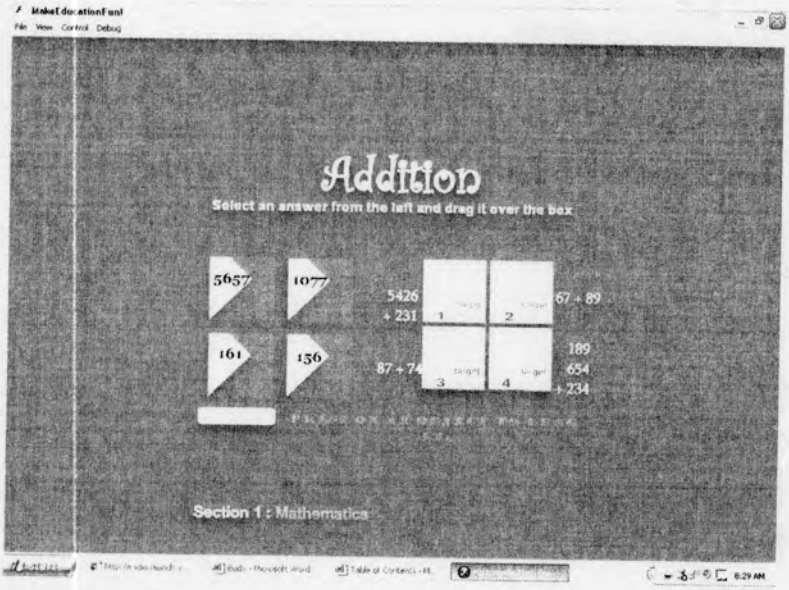

Figure 6. Sample addition problem

5.2.3 Subtraction Welcome Screen

This screen lets the student know that they are in the subtraction area of the mathematics section. It gives them a definition about what subtraction facts are.

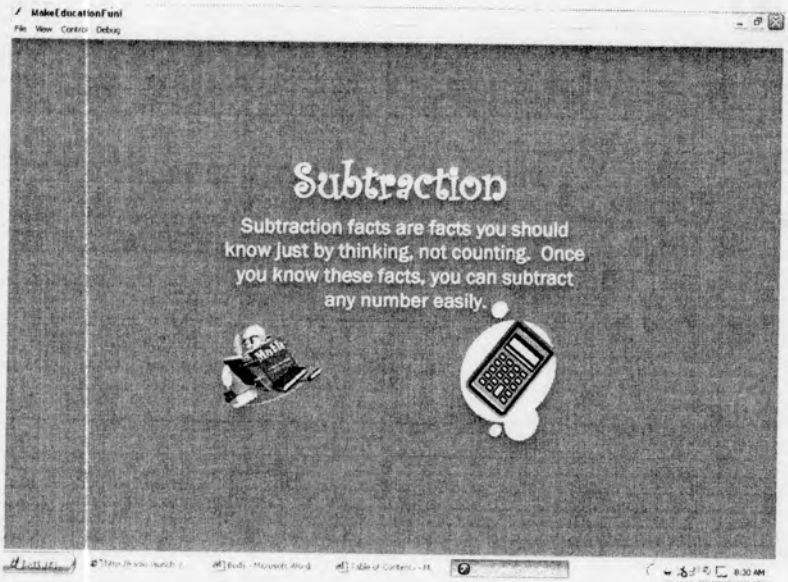

Figure 7. Subtraction Welcome Screen

5.2.4 Subtraction Sample Problem

The problems in this section were created the same way as they were in the addition section. These problems are more challenging than the addition area of the section. For these problems, the student will read the question and choose the correct answer by clicking on the box below.

Figure 8. Sample subtraction problem

5.2.5 Multiplication Welcome Screen

This screen gives the student a definition of multiplication.

Figure 9. Multiplication Welcome Screen

5.2.6 Multiplication Sample Problem

The problems in this section meet the criteria for a fourth grade student's level of learning over the school year. These problems were created to challenge the students' ability to solve multiplication problems. For this question, the student needs to choose either "True" or "False" and then click the "Check Answer" button.

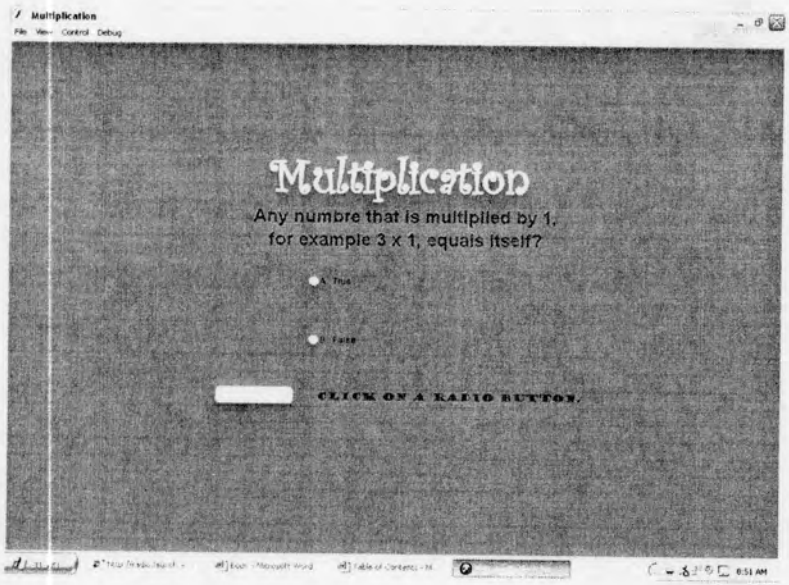

Figure 10. Sample multiplication problem

5.2.7 Division Welcome Screen

This screen gives the student brief definitions of what a quotient, dividend, and divisor are.

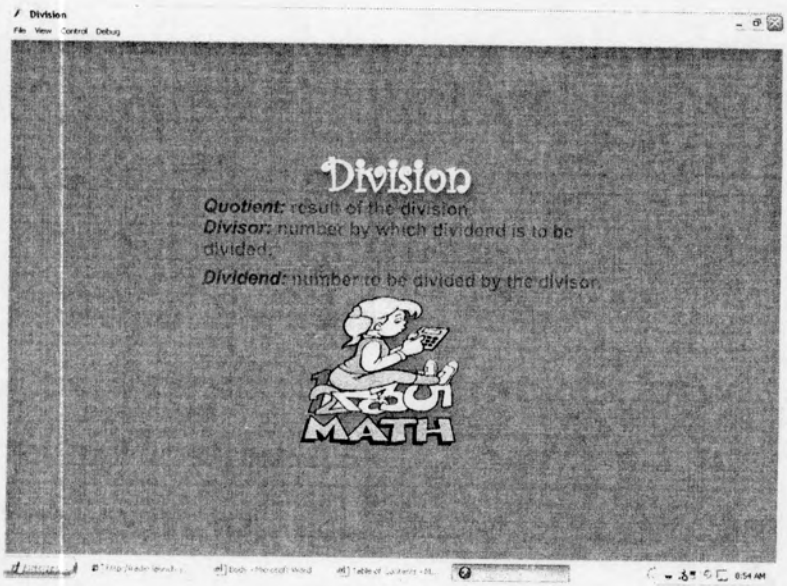

Figure 11. Division Welcome Screen

5.2.8 Division Sample Problem

These problems were created to help a student learn how to do different types of division problems. This problem is much like the example problem in the addition area. The student will choose which problem on the left goes with the correct answer on the right. The student will drag the problem from the left and place it on top of the answer on the right.

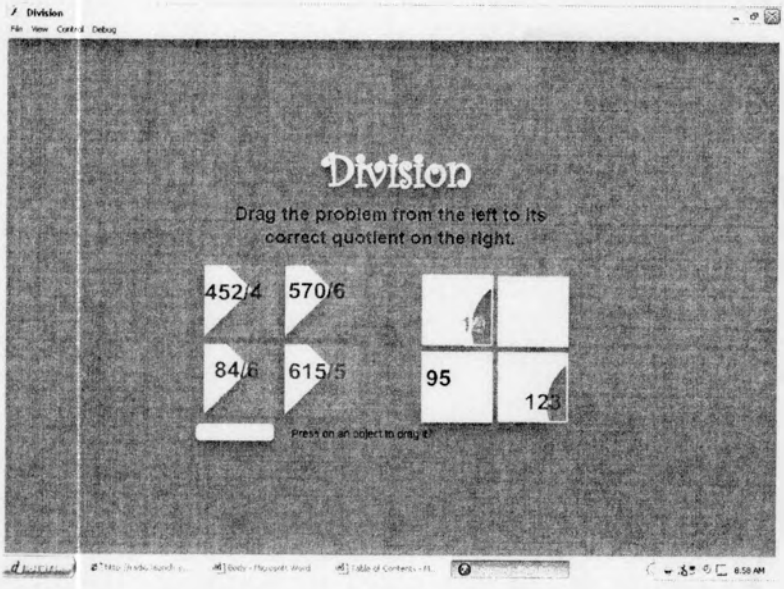

Figure 12. Sample division problem

5.3 English Welcome Screen

The English screen allows a student to choose from three areas: Antonyms and Synonyms, Past and Present Tense, and Fact or Opinion. Each topic is a hyperlink, so when the student clicks on the section he/she wants to work on, it will go directly to that certain section (see Figure 13.). The students will know whether they answered the question correctly or incorrectly after they click the "check answer" button.

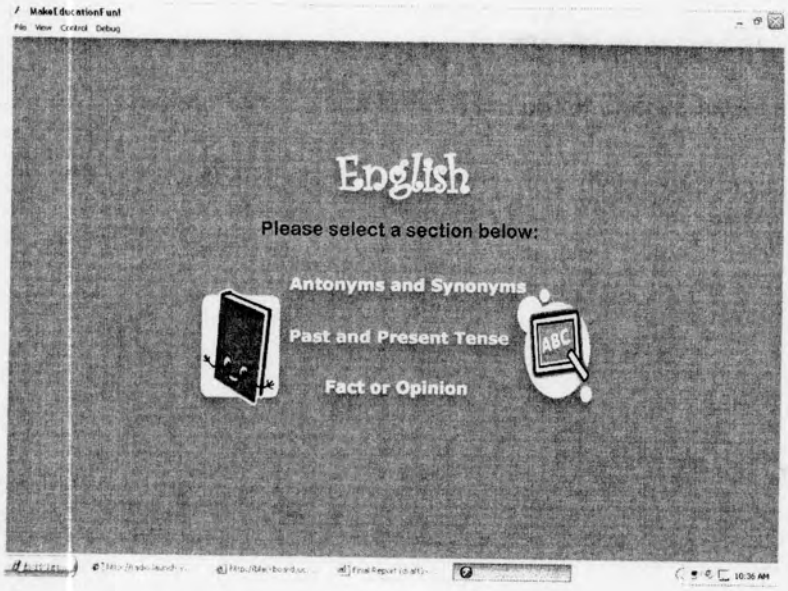

Figure 13. English Welcome Screen

5.3.1 Antonyms and Synonyms Welcome Screen

This screen gives a definition synonyms and antonyms. By having the definition on the welcome screen, it allows the student to know what he/she needs to look for while answering the questions in this area of the English section.

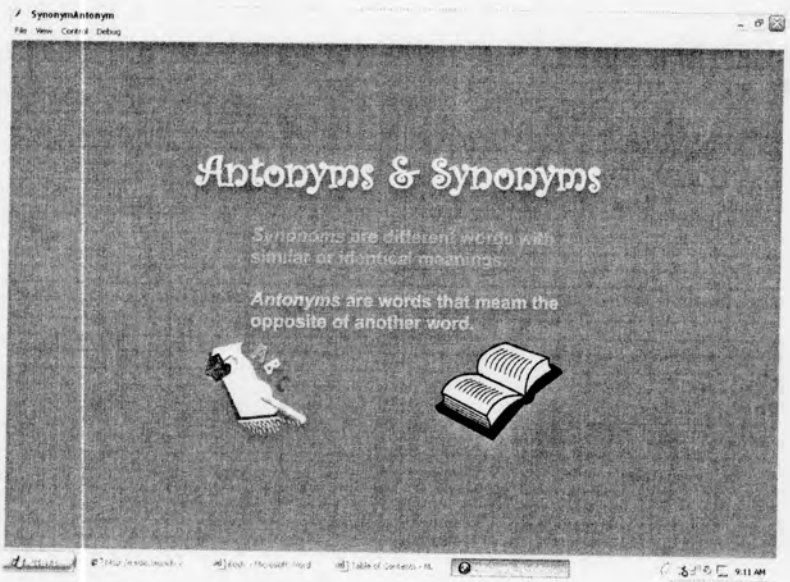

Figure 14. Antonyms and Synonyms Welcome Screen

5.3.2 Antonyms and Synonyms Sample Question

This particular screen has the student choose which word does not belong. The student will click on the box with the word that does not belong with the others.

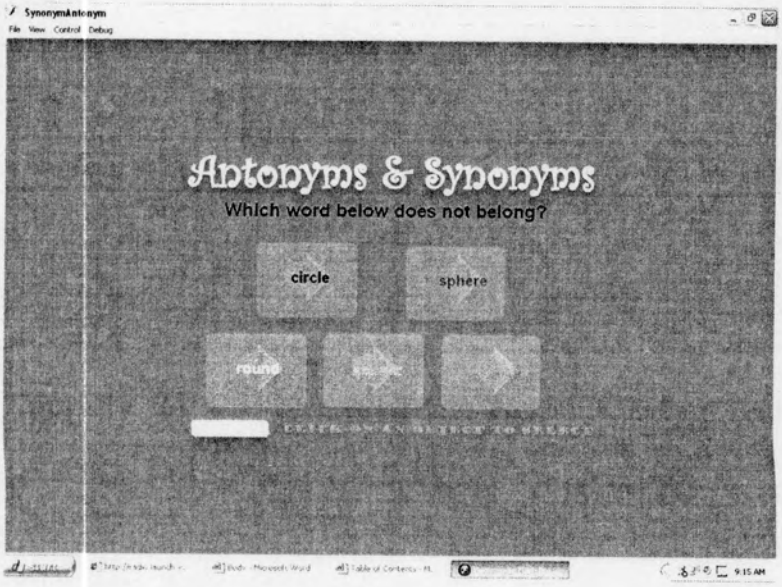

Figure 15. Sample antonyms and synonyms question

5.3.3 Past and Present Tense Welcome Screen

This screen lets the student know what the specific objective of this area in the English section is.

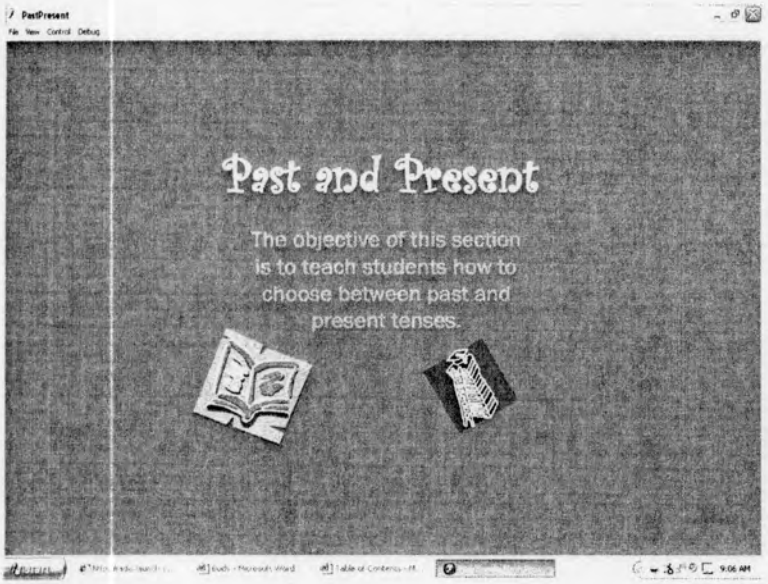

Figure 16. Past and Present Tense Welcome Screen

5.3.4 Past and Present Tense Sample Question

The problems in this section help the students figure out which is the correct tense, of specific word, to use in a sentence. For this problem, the student chooses which word is the correct tense to complete the sentence.

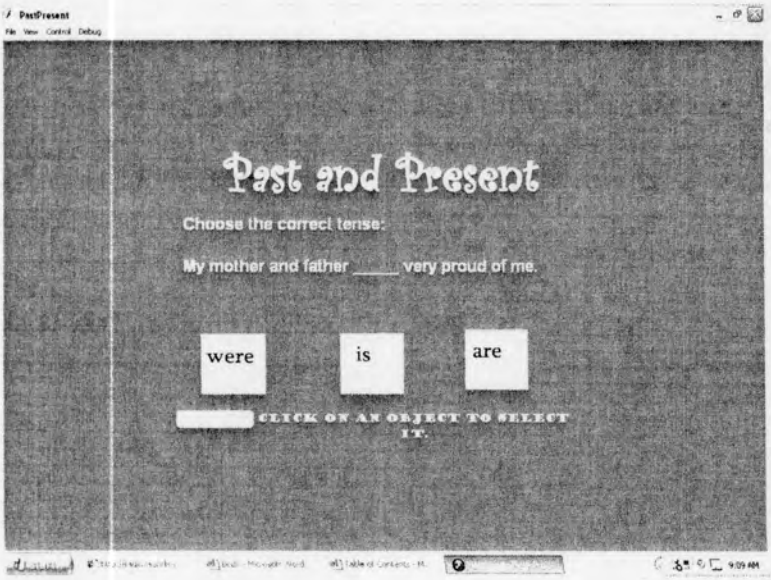

Figure 17. Sample past and present tense question

5.3.5 Fact or Opinion Welcome Screen

The purpose of this welcome screen is to let the students know what the difference is between a fact and an opinion. It gives a basic definition of each to make it easier for the students to pick the correct answer to the questions.

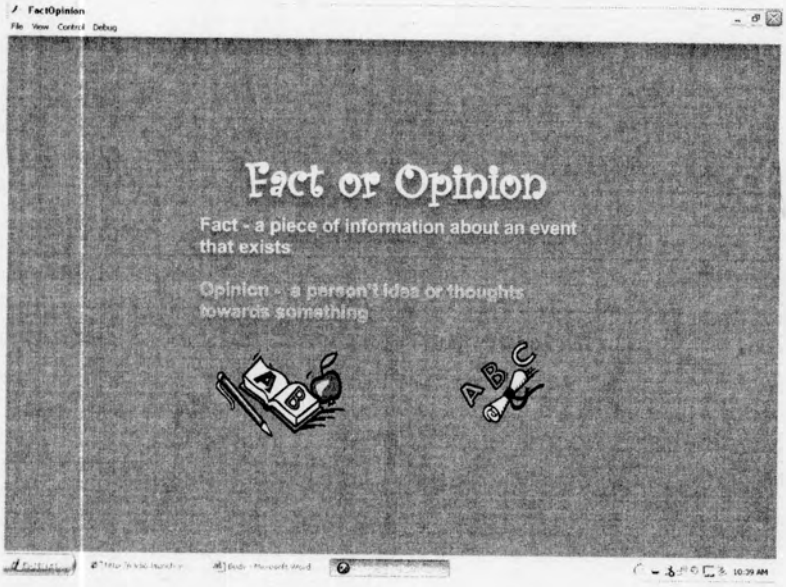

Figure 18. Fact or Opinion Welcome Screen

5.3.6 Fact or Opinion Sample Question

This section helps the student differentiate between what a fact is and what an opinion is. Fact and opinions seem to be the more challenging area in the subject of English portion. It is hard for some students to determine if the stated sentence is someone's opinion or if it is a stated fact.

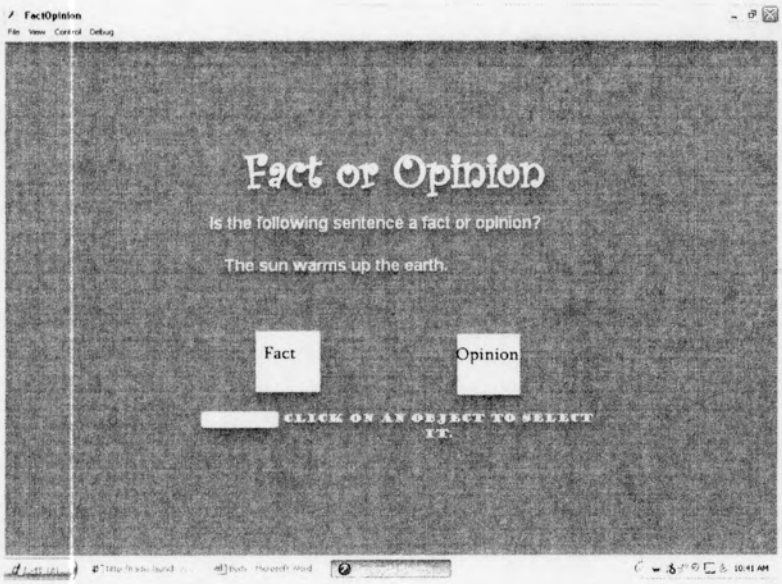

Figure 19. Sample fact or opinion question

5.5 Congratulations Screen

At the end of each area in the mathematics and English sections, the student will see a screen congratulating them. This screen shows that they have completed that particular portion of the section they were working in (See Figure 20.). There is a separate congratulations screen for each portion of both the mathematics and English sections.

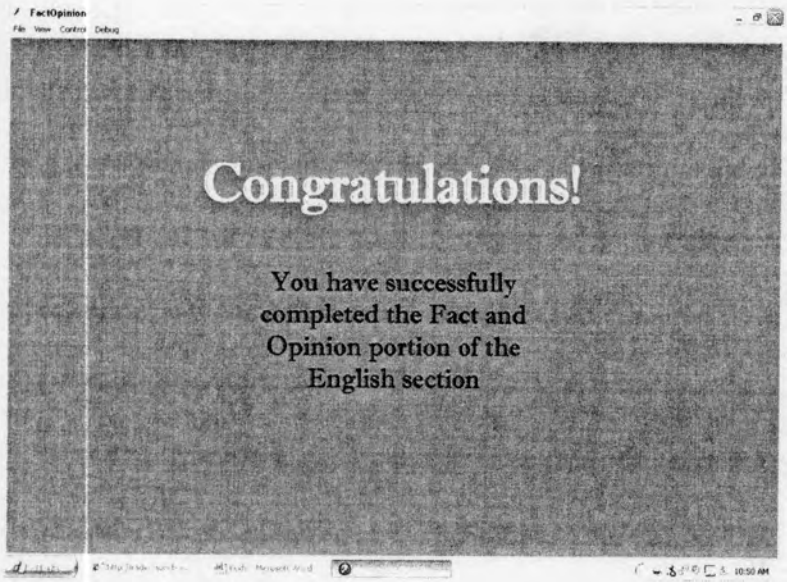

Figure 20. Sample congratulation screen

6. Obstacles Encountered

While creating this project, I encountered many obstacles. There were some errors which I had not seen before. Since I did not know Flash that well, I was not sure about how to get around them. I went back and did some more research and fixed the problems. The main problem was in the library of the project. There were many objects named the same and that caused objects to overwrite one another. More testing should have been done during the creation of the project. The more testing that is done, the better the project is going to be. More research should have been done during the beginning of the creation of the project.

7. Testing Procedures

Testing went on throughout the entire project. When the final project was finished, I took the product to a local elementary school and allowed the fourth grade students take a look at it. They told me what they liked and didn't like about the product. For example, some of the students did not like the color of the background. I used a

yellow background at first and they told me that it was too bright and it hurt their eyes. I changed the color to a more subtle purple color. They also told me that I needed more graphics that showed that this project was for young students. They had the opportunity to let me know what they think that I should do in order to make my product better.

8. Conclusions and Recommendations

8.1 Conclusions

This project was created to allow students learn mathematical and English skills. It allows them to take it wherever they want as long as they have access to a computer with a CD drive. In the beginning, I was going to create an educational Web site, but then decided that having a CD would be more convenient for some students that do not have Internet access. For the preparation of the project, I used Macromedia Flash 8 Professional. The project was completed over a three quarter Senior Design sequence. The budget for this project is approximately $970.00. The deliverables for this project were fulfilled. Testing was performed to guarantee the product's usability. I learned the hard way by not testing the project more while it was being created.

8.2 Recommendations

There were some setbacks while working on this project. One of the major set backs was learning the Flash program. I learned the hard way that setting aside some time to really get to know the program was needed. I would highly recommend understanding the product as much as possible and asking for help when it is needed.

Appendix A.
Code Snippets

C 1. Sample Code Snippets

Below is some of the code that was used to create the quiz format of the questions in both the mathematics and English sections.

Sample Quiz Format Code

```
this._visible = false;

if(getTimer() > 1000){
        if(!startFlag){

                // 1-1: Initialize an instance of the Quiz Class
                _parent.QuizTrack = new Quiz();

                // 1-2: Set object properties
                _parent.QuizTrack.randomize = Randomize;
                _parent.QuizTrack.quest_to_ask = QuestionsToAsk;
                _parent.QuizTrack.login_file = LoginURL;
                _parent.QuizTrack.activity_ID = Activity_ID;
                _parent.QuizTrack.activity_name = Activity_Name;
                _parent.QuizTrack.results_page = Results;
                _parent.QuizTrack.start_time = Math.round(getTimer()/1000);;
                _parent.QuizTrack.level = _parent;
                _parent.QuizTrack.setQuestArray();

                // 1-3: FSCommands send quiz initialization data to the JS in the
Publish Template
                _parent.QuizTrack.initStartQuiz();

                startFlag = true;
                stop();
        }
} else{
        play();
}
```

Sample HotSpot Code

```
*/
        Section 1: Event Handling Functions

        1-1: onHSinit()                    // Initialize stage graphcis and scripts
        1-2: onHSReset()                   // Handles reset button events
        1-3: onHSButton()                  // Handles control button events
        1-4: evalHS()                      // Evaluates interaction results

        Section 2: Initialize Objects and Arrays from user parameters

        Section 3: Initialize Session Tracking and Graphic States

        3-1: Initialize this session with the Session Array
        3-2: Initialize HotSpot properties with the host script
        3-3: Initialize stage assets
        3-4: Hide component assets at runtime

*/


// SECTION 1: EVENT HANDLING FUNCTIONS


// 1-1: Initialize the stage assets

function onHSinit(){

        var router = _parent.SessionArray[_parent.session];
        var len = router.hot_spot.length;

        for (var i=0; i < len; i++){

                _parent[router.hot_spot[i]]._alpha = router.UPalpha;

                _parent[router.hot_spot[i]].onPress = function() {

                        if(router.scoreFlag != true){

                                this._alpha = router.DNalpha;
                                router.setComponentState(router.Assets.ControlButton,
true);
                                router.setComponentState(router.Assets.ResetButton,true);
                                router.setFeedback(1);
```

```
                        if (this.finished != true){
                                this.finished = true;
                                this.selected = true;
                        }
                }
        }
}


// 1-2: Handles reset button clicks

function onHSReset(){

        var router = _parent.SessionArray[_parent.session];
        var len = router.hot_spot.length;

        for(var i=0; i < len; i++){
                with(_parent[router.hot_spot[i]]){
                        _alpha = router.UPalpha;
                        selected = false;
                        finished = false;
                }
        }

        router.resetFlag = false;
        router.setFeedback(0);
        router.setComponentLabel(router.Assets.ControlButton, router.label_state);
        router.setComponentState(router.Assets.ControlButton, false);
        //router.setComponentState(router.Assets.ResetButton, false);
}


// 1-3: Handles control button clicks

function onHSButton(){

        var router = _parent.SessionArray[_parent.session];
        if(!router.buttonFlag || router.buttonFlag == false){

                router.setComponentState(router.Assets.ResetButton, false);
                evalHS();
                var result = (router.result == "C") ? 2 : 3;
```

```
            router.setFeedback(result);
        }

        if(router.result == "C"){

            if(!router.scoreFlag || router.scoreFlag == false){
                if (router.correct_array.length > 1) {
                    router.correct_response = "{"+router.correct_array+"}";
                } else {
                    router.correct_response = router.correct_array;
                }
                if (router.answer_array.length > 1) {
                    router.student_response = "{"+router.answer_array+"}";
                } else {
                    router.student_response = router.answer_array;
                }
                router.sessionStop();
                router.submitScore();
                router.scoreFlag = true;
            }
            router.setNavigation();

        }else if (router.result == "W"){

            if(router.numOfTries > 1){
                if (!router.resetFlag || router.resetFlag == false){
                    router.resetFlag = true;
                    router.setComponentState(router.Assets.ResetButton, true);
                    router.setComponentState(router.Assets.ControlButton,
false);
                    router.numOfTries--;
                }
            }
            else {

                if(!router.scoreFlag || router.scoreFlag == false){
                    if (router.correct_array.length > 1) {
                        router.correct_response =
"{"+router.correct_array+"}";
                    } else {
                        router.correct_response = router.correct_array;
                    }
                    if (router.answer_array.length > 1) {
                        router.student_response =
"{"+router.answer_array+"}";
                    } else {
```

```
                                router.student_response = router.answer_array;
                        }
                        router.sessionStop();
                        router.submitScore();
                        router.scoreFlag = true;
                }
                router.setNavigation();
        }
    }
}


// 1-4: Evaluate user input and return the result

function evalHS(){

    var router = _parent.SessionArray[_parent.session];
    var len = router.correct_response.length;
    var evalObj = new Array();
    var answer_format = new
Array("a","b","c","d","e","f","g","h","i","j","k","l","m");
    router.answer_array = new Array();
    router.correct_array = new Array();

    var v=0;
    for(var i=0; i < len; i++){
        if(_parent[router.hot_spot[i]].selected == true){
            evalObj[i] = true;
            router.answer_array[v] = answer_format[i];
            v++;
        }
        else {
            evalObj[i] = false;
        }
    }

    var w=0;
    for (var j=0; j < len; j++){
        if (router.correct_response[j] == true){
            router.correct_array[w] = answer_format[j];
            w++;
        }
    }

    for (var n=0; n < len; n++){
```

```
                if (router.correct_response[n] != evalObj[n]){
                        router.result = "W";
                        break;
                }
                else {

                        if((n+1) == len){
                                router.result = "C";
                                for(var i=0; i < len; i++){
                                        _parent[router.hot_spot[i]].finished = true;
                                }
                        }
                }
        }
}


//SECTION 2: INITIALIZE OBJECTS AND ARRAYS FROM USER PARAMETERS

Correct_Response = new Array();
hot_spot = new Array();

var z = 0;
for(var j=0; j < 8; j++){
        if(this["hsName"+(j+1)] != ""){
                hot_spot[z] = this["hsName"+(j+1)];
                Correct_Response[z] = this["Correct_Response"+(j+1)];
                if(_parent[hot_spot[z]]) z++;
        }
}

Feedback_List = new Array();
Feedback_List[0] = Initial_Feedback;
Feedback_List[1] = Correct_Feedback;
Feedback_List[2] = Incorrect_Feedback;
Feedback_List[3] = Evaluate_Feedback;
Feedback_List[4] = Tries_Feedback;

Assets = new Object();
Assets.QuestionField = Assets1;
Assets.FeedbackField = Assets2;
Assets.ControlButton= Assets3;
Assets.ResetButton = Assets4;

ButtonLabels = new Array();
```

```
ButtonLabels[0] = undefined;
ButtonLabels[1] = ButtonLabels1;
ButtonLabels[2] = ButtonLabels2;
ButtonLabels[3] = ButtonLabels3;
ButtonLabels[4] = ButtonLabels4;

function toBoolean( str ){
        if(typeof(str) == "boolean"){
                return str;
        }else if(str.toLowerCase() == "true"){
                return true;
        }else{
                return false;
        }
}

if(toBoolean( Feedback ) == false || typeof(Number(Num_Of_Tries)) != "number"){
        Num_Of_Tries = 1;
}


// SECTION 3: INITIALIZE SESSION TRACKING AND GRAPHIC STATES


/* 3-1: Create a SessionArray to hold this session instance.
      If the SessionArray already exists, then add this
                session instance to a new index.
*/

if(!_parent.SessionArray){
        _parent.session = 0;
        _parent.SessionArray = new Array();
} else {
        _parent.session++;
}

_parent.SessionArray[_parent.session] = new LToolBox();

var router = _parent.SessionArray[_parent.session];


// 3-2: Initialize DragDrop properties with the host script

router.assets_path = eval(this._parent);
router.Assets = Assets;
```

```
router.interaction_id = Interaction_ID;
router.interaction_type = "C";

router.question = Question;
router.hot_spot = hot_spot;
router.correct_response = Correct_Response;
router.UPalpha = UPalpha;
router.DNalpha = DNalpha;

router.tracking = Tracking;
router.weighting = Weighting;
router.objective_id = Objective_ID;

router.navigation = Navigation;
router.navLabel = Go_To_Label;
router.navAction = Go_To_Action;
router.buttonLabels = ButtonLabels;

router.feedback = Feedback;
router.numOfTries = Num_Of_Tries;
router.feedback_list = Feedback_List;

router.buttonFlag = false;
router.resetFlag = false;
router.scoreFlag = false;


// 3-3: Initialize the stage assets

router.setTextField(Assets.QuestionField, Question);

if(toBoolean( Feedback ) == false){
        router.setTextField(Assets.FeedbackField, "");
}

router.initControlButton(onHSButton);
router.setFeedback(0);

router.setComponentLabel(Assets.ResetButton, ButtonLabels[4]);
router.setComponentState(Assets.ResetButton, false);
router.setComponentListener(Assets.ResetButton, onHSReset);

onHSinit();
router.sessionStart();
```

```
// 3-4: Hide the component graphics at runtime
this._visible = false;
```

Figure 21. Sample quiz format and hotspot code

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