**Kids Online Multimedia Courseware of Math and Animal**

BY

Lai Wan Ching

10ACB04470

A PROPOSAL

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfilment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEM (HONS)

BUSINESS INFORMATION SYSTEM

Faculty of Information and Communication Technology
(Perak Campus)

APRIL 2013

**UNIVERSITI TUNKU ABDUL RAHMAN**

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**DECLARATION OF ORIGINALITY**

I declare that this report entitled "Kids Online Multimedia Courseware of Math and Animal" is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature : _____

Name : Lai Wan Ching

Date : 3nd April 2013

**ACKNOWLEDGEMENT**

To complete this project, I would like to extend my sincere thanks to all individuals that help me a lot in this project.

First, I need to thanks my supervisor Dr Soong Hoong Cheng for guide me always when I encounter any problems when doing this project. I could not finish my project without his guidance.

Second, my moderator Ms Wong See Wan also had given me solution to solve the problems. Thus, I had clear objective to continue my project.

Last but not least, I need to thanks all of my friends who willing help me and give me advise when I need their help.

**ABSTRACT**

Interactive multimedia courseware can improve learning for kids and they will more motivate to learn themselves because interactivity and fun content is available. The purpose of develop this proposed online multimedia courseware is to help the kids self learning on math and animal course and also help their parents to teach the kids in a easier way to learning math and animal effectively. The main target of this proposed online multimedia courseware is the kids between four to seven years old kids. This project is to create interactivity online multimedia courseware which is math and animal for kids. The kids can use the courseware as their alternative tool for learning purpose. They can discuss and play with friends to improve social skill and can practice yet enjoy fun of the courseware. They also can play with the system anytime and anywhere as long as there is Internet available. The author also makes the courseware offline as well. The multimedia courseware wills not boring as traditional teaching style because it is contain interactivity between the courseware and the kids. Besides, the author had developed mini flash game in the courseware.

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**LIST OF ABBREAVIATIONS**

| | |
|---|---|
| HCI | Human Computer Interaction |
| GBL | Game Base Learning |
| 2D | 2 Dimension |
| 3D | 3 Dimension |
| MP3 | MPEG-1 Audio Layer 3 |

# Chapter 1.0 Introduction

## 1.1 Motivation and Problem Statement

Multimedia courseware of math and animal is the kids can learn and practice math and animal through interactive multimedia element. However, there are some of limitations of the existing online multimedia courseware and traditional teaching style.

### 1.1.1 Require to buy the existing online multimedia courseware

Some of the existing multimedia courseware is require buying in order to use. Normally, the parents will try to ignore the multimedia courseware and find for other free multimedia courseware for their kids to learn. They will not purposely spend money to buy the courseware because there is exist of many free multimedia coursewares online.

### 1.1.2 User-interface of exiting online multimedia courseware for kids is not user friendly.

The designer is aware that the intended users have reasonable technical skills and they do not put much attention into the user-friendliness of the system. Such systems usually include many features and options that may be too complex for the kids. Designers that are unfamiliar with the abilities of people with special needs often inadvertently place barriers on systems (Abascal & Nicolle, 2005; Abascal & Azevedo, 2007; Lewis, 2007).With the poor user interface, the users will not interest to learn anything to gain their knowledge. In addition, it will not motivate the students to learn online and they will just learn from the teachers at school. They will not ask if they are not understood about the subject or the things that teacher taught at school.

### 1.1.3 Without using animation, colorful design for math and animal courseware

For the kids, they are like to see cartoon and animation. If the systems just use simple static graphics to design the interface, it will make the kids feel boring to use the courseware although sound is included. They will motivate to play the courseware if they see the animation is move over the screen. Besides, the kids also prefer colorful things rather than just use few color. For example, the kids are prefer colorful background with the question provided rather than just use 1 color.

### 1.1.4 Take times to understand the content

The use of too many words in book will make the kids difficult to understand the meaning of content. Sometimes they are not understood what the meaning of content try to carry out after they read the content. If they do not understand the content, they are not able to learn well and feel it is very boring because there is no interactivity exists.

### 1.1.5 No voice teaching

The traditional teaching style by using book had no provide voice teaching for the kids. It is helpless because the kids unable to learn how to pronoun the word although they know how to spell the word.

**1.2 Project Scope**

The online multimedia courseware will focus on math and animal for kids which under four to seven years old. The kids can choose to learn the course as they like. It will be the alternative tools for the kids to learn themselves and practice through the game that provided in the system. In education and training point of view, interactive multimedia can improves learning process of the learners.

First and foremost, the online multimedia courseware will has two courses learning which is mathematics and animal. In math, the proposed courseware will teach the kids addition and subtraction. After that, the kids can practice through the mini flash game that develops by author. Animation, sound, text, and graphic will be included to the design of user interface. This project will try to follow the needs of kids to design the interface through the fact finding. A special effect will be add in if the answer is wrong or correct. For example, if correct will has sound effect or some animation while wrong also has those effect to let the kids know whether right or wrong.

In addition, for animal part of the multimedia courseware, the author will design a background such as forest and there will be a variety of animal in the background. The courseware will let the kids to learn the how the animals' yell and their pronoun. At the same method, when the kids is answer wrong there will be a voice message or sound and message will be show out. The correct answer also will be provided. Besides, this project will provide voice teaching. The kids can click the animals and will show the information of the animals. The kids can press voice teaching to teach how to pronoun the animal name.

Other than that, a mini flash game will be included to math and animal category so that they can learn and practice through the game and also will attract attention of kids. This project also will not include complex features to the user interface or a not user friendly user interface. This project will make the user interface as simple as it can yet tidy and nicely so that the kids can interact well with the system.

### 1.3 Project Objectives

Online multimedia courseware-math and animal is to let the kids can learn addition, subtraction, how animal yell and how to pronoun name of animal via online. They can learn through the system and play the education game that provided in the system. It will let the kids more interesting to learn from game. As the project objective is the solution to solve all the problems that state at problem statement.

#### 1.3.1 Free access for all individual

This project is to develop a free web base multimedia courseware that focuses on math and animal for kids. They are not require to buy the system in order to play the system so that those kids are interesting learn from online learning system can access anytime with free of charge. They also can play the math game and animal game in order to gain their additional knowledge. The author also will make the courseware in offline as well.

#### 1.3.2 Greatly Improve in User Interface

The designer must take consideration the target users of the system so that they can design the prototyping or user interface base on the user's needs and avoid complex features include to the system. The developer will design the user interface base on Human Computer (HCI) principle. For example, the text using must appropriate and alignment of filed must be tidy. With this, it will increase the kids' interest on the system and it will motivate the kids use the system to learn the course they want.

#### 1.3.3 Focus on animation content

Due to the problem of existing multimedia courseware, the design of content is too boring and can't grab the kids' attention. The developer is use questionnaire to measure the attractiveness. This project will focus and put more animation to design the content using Adobe Director and Adobe Flash. The button using also will be colorful or put some cute cartoon so that the kids will more interest to use the system. This project also will use more color to design the background. Interactivity is mutual action between

the learner, the learning system, and the learning material. Numerous studies have found that interactivity has a strong positive effect on learning (Bosco, 1986, Fletcher, 1989, 1990, Stanfford, 1990). For example, Bosco (1986) reviewed 75 learning studies and found that learners learn faster, and have better attitudes toward learning when using interactive multimedia.

### 1.3.4 Greatly reducing in time for understand the content

The use of icons, graphic, video or animation to represent the content since they are kids are better than use a lot of words to represent something. When they see a lot of words, it will make them not understand the meaning of word but if use some graphical they will more easily absorb the meaning. For example, if the system uses the deep word to represent something, the kids may not understand but if the system use cute cartoon icon to represent the word, the kids can understand it immediately. The most important is the system memorable to the kids.

### 1.3.5 Provide voice teaching

The author will provide voice teaching at animal course so that the kids can play the game at the same time also can learn how to pronoun the animal word and know how animal yell. The kids can according to the voice teaching and start learn to pronoun the word either at school or at home. It is help them a lot at educational field.

| Problem Statement | Objectives |
|---|---|
| Require to buy the existing online multimedia courseware | Free access for all individual |
| User-interface of exiting online multimedia courseware for kids is not user friendly. | Greatly Improve in User Interface |
| Without using animation, colorful design for math and animal courseware | Focus on animation content |
| Take times to understand the content | Greatly reducing in time for understand the content |
| No voice teaching | Provide voice teaching |

**Table 1.1 Summary of Problem Statement and Objectives (Source: The author)**

### 1.4 Impact, significance and contribution

This project will make the kids have motivation to learn the math and animal course. If they are not understood what the teacher taught at school, they can use this propose online multimedia courseware to increase their understanding because various multimedia elements are included in the system such as video and animation. As kids, they will more interesting to learn when saw video, graphic or animation rather than just explain by using word. When using word to explain something, they might not understand or will confuse. Besides, the kids will gain additional knowledge because they can practice through game of the system such as they can know how the animals yell which had taught in the courseware. Thus, it will improve their math and animal since on the early age.

Other than that, the learning process of the kids will become easier. For teacher, they could have an extra medium in order to train the kids in teaching and learning process from the early age. In conventional method, learning material such as book and toys are needed to develop their mind. But by using the propose courseware, the kids only need the software and a computer where we know that each family has a computer at home. The courseware also will more entertain the kids compare to books. In addition, our system is online; it is a good start to teach the children about internet technology because nowadays all things are involved in internet technology and it is also flexible to let the kids learn anytime and anywhere.

In addition, interactive learning with video, audio, graphics, animation, feedback and game can keep the kids interested and reinforces skills. It encourages the kids play the system again and again because the system is full of fun and challenge. The kids can absorb easily and apply in daily performance through continual practice. Thus, multimedia courseware can improve learning for kids.

**1.5 Background Information**

Students should be exposed in web-based multimedia courseware besides books or CD's in this era of ICT. There are a lot of advantages through courseware. This is one of the main reasons why courseware had been selected in the project development. Some of the advantages are to provide learning which is immediately available to every student in 24 hours a day. There is no need to track workbooks, CD ROMs and it provides easy navigation and interaction throughout the attractive content and testing.

Courseware is a software package to supplement or replace traditional course activities. The courseware contains useful information on mathematics and animal. The proposed courseware will focus on mathematics and animal course. This proposed courseware is developed for the kids whose age between four to seven years old. The learning process is very important in kids, due to this matter interactivity, the learning

environment and elements used in the online multimedia courseware development had to be analyzed among the peer. By analyzing on the learning process needed, a satisfying system is produced. Refer Bill Gates (1996), education will be an individual and personal. Fully suspension on teachers and textbook is considered primitive. It was not effective anymore for student's increase of knowledge.

Besides that, the information provided will be useful to kids. It can encourage the kids self learning and their parents no longer need to buy additional books to them. The information provided in courseware is more interesting and attractive compare to books. The content of books will make the kids feel bored and dull. The proposed courseware is interactively design in colorful graphic, attractive animation content and a mini flash game of math and animal are consist in the courseware. Other than that, the kids can watch video related to math and animal or play the fun game which is not relate to educational to release their stress. It also can help the kids build a basic knowledge of access Internet to use the system.

# Chapter 2.0 Literature Review

## 2.1 Learning Theory

There are three basic leaning theories which are behaviorism, cognitivism, and constructivism.

### 2.1.1 The basics of behaviorism

As a learning theory, behaviorism can traced back to Aristotle whose essay "Memory" that focus on associations being made between events such as lighting and thunder. Hobbs (1650), Hume (1740), Brown (1820), Bain (1855), and Ebbinghause (1885) are the philosophers that follow Aristotle's thoughts.

Behaviorism theory is focus on the study of overt behaviors that can be observed and measured (Good & Brophy, 1990). It views the mind as a "black box" and observes quantitatively in the sense that response to stimulus and the processes occurring in the mind is totally ignoring.

**Strength**

The learner is concentrate on a clear goal and the cues of goal will be responded automatically by learner.

**Weaknesses**

The learner cannot respond due to the learner may find themselves in a situation where the stimulus for the correct response does not occur.

### 2.1.2 The basics of cognitivism

"Cognitive theorists recognize that much learning involves associations established through contiguity and repetition. They also acknowledge the importance of reinforcement, although they stress its role in providing feedback about the correctness of responses over its role as a motivator. However, even while accepting such behavioristic concepts, cognitive theorists view learning as involving the acquisition or reorganization of the cognitive structures through which humans process and store information. (Good and Brophy, 1990, pp. 187).

**Strength**

Use same way to train the learners to do a task to enable consistency.

**Weaknesses**

It may not the best way or suited to the learner or the situation although the learners learn a way to accomplish task.

### 2.1.3 The basics of constructivism

Bartlett (1932) pioneered what became the constructivist approach (Good & Brophy, 1990). Constructivists believe that "learners construct their own reality or at least interpret it based upon their perceptions of experiences, so an individual's knowledge is a function of one's prior experiences, mental structures, and beliefs that are used to interpret objects and events." "What someone knows is grounded in perception of the physical and social experiences which are comprehended by the mind." (Jonasson, 1991).

The assumptions of constructivism – Merrill:

- Construct knowledge from experience.
- Learning is a personal interpretation of the world.
- Learning is an active process in which meaning is developed on the basis of experience.

- Conceptual growth comes from the negotiation of meaning, the sharing of multiple perspectives and the changing of our internal representations through collaborative learning.
- Learning should be situated in realistic settings; testing should be integrated with the task and not a separate activity.

(Merrill, 1991, in Smorgansbord, 1997)

**Strength**

Because the learner is able to interpret multiple realities, the learner is better able to deal with real life situations. If a learner can problem solve, they may better apply their existing knowledge to a novel situation. (Schuman, 1996)

**Weaknesses**

In a situation where conformity is essential divergent thinking and action may cause problems. Imagine the fun Revenue Canada would have if every person decided to report their taxes in their own way. (Schuman, 1996)

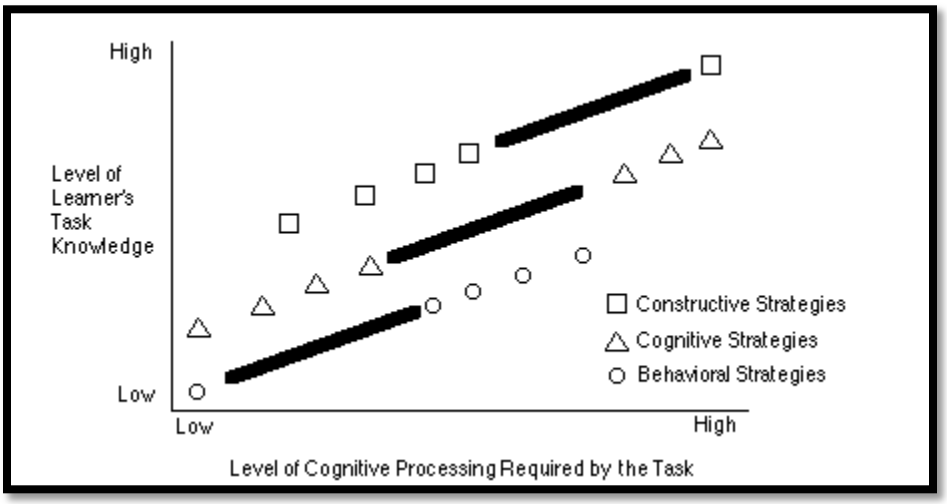



**Figure 2.1 Comparison of the associated instructional strategies of behavioral, cognitive, and constructive**

Source: http://www.usask.ca/education/coursework/802papers/mergel/mergel.pdf

Base on the Figure 2.1, Ertmer and Newby (1993) believe that the strategies promoted by different learning theories overlap (the same strategy for a different reason) and that learning theory strategies are concentrated along different points of a continuum depending of the focus of the learning theory.

## 2.2 Learning Mathematics Through Games

Benefits of using games in mathematical program base on article by Davies (1995).

- Meaningful situation: mathematical skills are created by games.
- Motivation: the children are enjoying in playing game compare to traditional teaching style.
- Positive attitude: the children will not be fear of failure and error because games provide opportunities for building self-concept and develop positive attitudes towards mathematics.
- Increase learning: the children can gain more knowledge through games due to increase interaction between children, opportunities to test intuitive ideas and problem solving strategies.

## 2.3 Game Base Learning (GBL)

Game base learning is referring to involve computer games in education. Several aspects of learning process are supported through games. The learners are encouraged to combine knowledge from different areas to solve the problem and they also can test the outcome of the games changes base on their solution. Besides, the learners also are encouraged to discuss the problem with other team members to improve their social skill. The individual can use game to make learning fun and live up their classroom. By using game, it can motivate students to learn outside the classroom. The students can learn more effectively by immerse them in the material and they also can learn from their mistake.

Features of GBL:

- GBL motivate the students to learn better by using competitive exercise, either pitting the students against each other.
- Games can engage players in a learning activity through storyline with a fantasy element.
- The instructor needs to make sure the learning material is essential to scoring and winning in order to create a truly educational game.

## 2.4 ADDIE Model

According to Molenda (2003), ADDIE model is a colloquial term used to describe a systematic approach to instructional development, virtually synonymous with instructional systems development. It is mean that ADDIE model is a generic instructional design model that use to develop instructional materials. It is also a model which provides an organized process. The phases included are Analysis, Design, Development, Implementation and Evaluation (Formative and Summative).

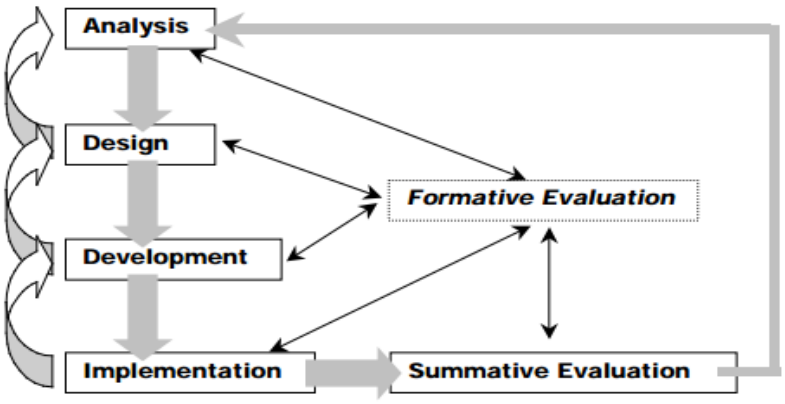



**Figure 2.2 ADDIE model**

Source: http://metalab.uniten.edu.my/~iskandar/project/july%2009/ADDIE.pdf

### 2.4.1 Analysis

At the analysis phase, the designer needs to identify and consider

- Learning problem
- The goals and objective
- The audience needs
- Existing knowledge and other relevant characteristic
- Learning environment
- Any constraints
- Delivery options
- Timeline

### 2.4.2 Design

It will be a systematic process to specify the learning objective. At the design phase, detailed storyboard and prototypes will be made. Beside, the designer also will determine the look and feel, graphic design, user interface and content.

### 2.4.3 Development

During development phase, the content and learning materials base on design phase will be created.

The step of development:

- Alpha Release
- Beta Release
- Final Release
- Client Signoff on final release

### 2.4.5 Implementation

During implementation, a plan will be developed to focus on action and procedure of training the learner and teacher. The designer will delivered or distribute the materials to the student group and the effectiveness of the training material is evaluate after delivery.

### 2.4.6 Evaluation

Evaluation phase is to measures the effectiveness and efficiency of the instruction. It is occur throughout the entire instruction design process. It can be within the phases, between phases and after implementation. There are two types of evaluation which is formative and summative.

Formative evaluation is evaluated during ongoing process and between phases. It is to improve the instruction before the final version is implemented. Summative evaluation is occurs after the final version is implemented. It is to evaluate the effectiveness of overall of instruction.

## 2.5 Introduction of Multimedia

Multimedia is one of the terms that can be mean by many different things to different people. According to Peck (1997), "Multimedia is a combination of two or more media types, which are text, graphic, animation, photography, video, and sound. Usually it has both sound and visual support and multimedia productions are usually developed and controlled by computer." (Peck, 1997).

Besides that, according to McGloughlin (2001), "Multimedia is a combination word of "multi" and "media". Multi is refer to various, while media is refers to combination software and hardware that used for communication. Multimedia is an interactive presentation computer application that incorporating media elements such as graphic, animation, text, video, and sound, on a computer." (McGloughlin, 2001).

Furthermore, according to Hofstetter (2001), “Multimedia is use of the computer to present and it is a combination of text, audio, video and graphic with tools and links that let the user to interact, navigate, create and communicate.” (Hofstetter, 2001). There are three components to define multimedia. First, a computer that can be see and hear, and can be interact. Second, there must be a connection with the information. Third, there must be a navigational tool that let the user to traverse the information. If one of the components is missing, it is not called multimedia.

In short, multimedia is a word that combines both “multi” and “media”. It needs two or more media elements to form multimedia. Multimedia used for enhances in communication, control the media production, and enhance a content or message.

### 2.5.1 The Components of Multimedia

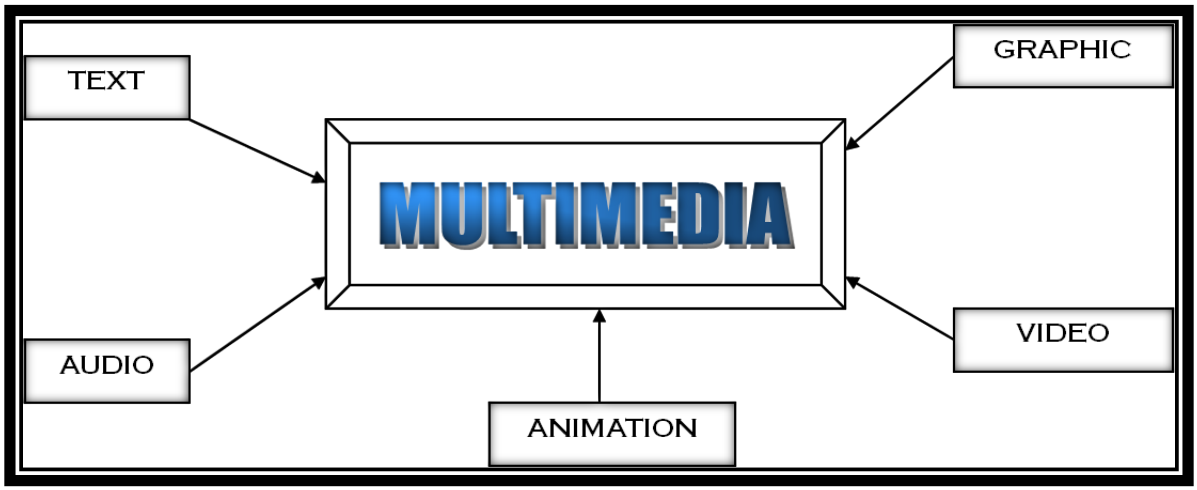



**Figure 2.3 Multimedia Elements**

Source:
http://www.google.com.my/url?sa=t&rct=j&q=introduction+to+multimedia+ppt&source=web&cd=1&ved=0CCkQFjAA&url=http%3A%2F%2Fcsnotes.upm.edu.my%2Fkelasmaya%2Fweb.nsf%2Fc9b5447d007d62cd4825730600112380%2Fc88399b87c9fda254825

75e80030c71b%2F%24FILE%2Fchapt%252001.ppt&ei=IaGKT4iJLIrxrQePk43VCw&usg=AFQjCNFpGNbqRHZ5R6jAyz331OfLaYXU-w

#### *2.5.1.1 Text*

The typographical principle is the creation of a complete text by reusing identical characters. Text has a dual nature which is visual language and a graphic element in its own right. Text in digital form is a representation of language. We need relate bit pattern stored in a computer's memory or transmitted over a network to the symbols of a written language. The visual aspects becomes relevant with such issues as the precise shape of the characters, their spacing, layout of lines, paragraph and larger divisions of text on the screen or page when display the text. There are four type of text, which are printed, scanned, electronic, and hypertext.

- Printed Text

  Printed text normally is in the paragraph which is on the paper and words. The user need to covert the text into machine-readable form by using scanner in order to let the computer to read the printed text

- Scanned Text

  Scanned text is also belonging to a printed text that converts into machine-readable form. The scanner usually produced scanned text. There are several types of scanners, which are handheld, flatbed, and sheet-fed.

- Electronic Text

  Electronic text is a machine-readable form that can be read by a computer and allow to electronically transmitting over networks. Electronic Text is allow the user to search by using key words.

- Hypertext

  Hypertext is a process of linking which makes the multimedia interactive. Hypertext refers to text that has been linked. Usually hypertext is blue in color and once the user clicks on it, it brings the user to another page.

#### *2.5.1.2 Graphics*

The graphical image can be used to ass emphasize, direct attention, illustrate concepts and provide a background for the content. There are two types of graphics which is bitmap and vector.

- Bitmap Graphics

  Bitmap graphics is a type of graphic composed of pixels in a grid. The image consists of each pixel or "bit" which contain color information. Resizing a bitmap graphics can result in distortion and jagged edges because bitmap graphics format have a fixed resolution.

- Vector Graphics

  According to Patrick (2006), "vector graphics is the creation of digital images through a sequence of commands or mathematical statement that place lines and shapes in a given two-dimensional or three-dimensional space". A vector is a representation of both a quality and a direction at the same time in physics. In vector graphics, the file that results from a graphic artist's work is created and saved as a sequence of vector statements.

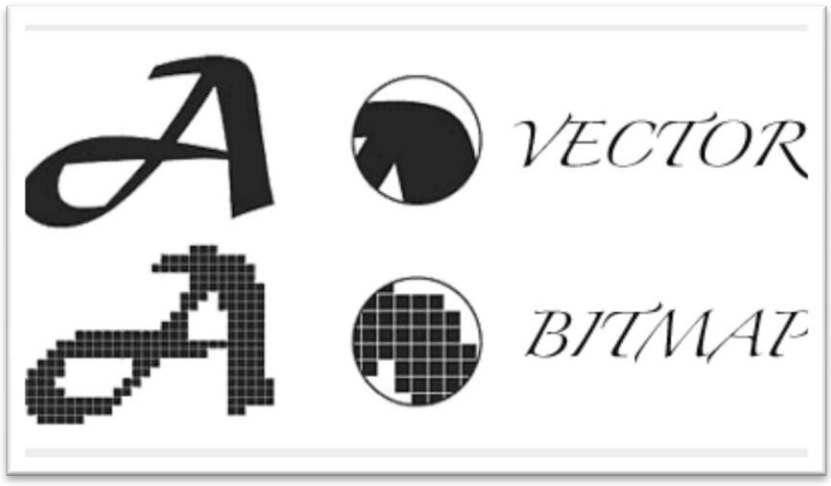



**Figure 2.4 Bitmap and Vector**

Source: http://rachhawkins.blogspot.com/2011/04/raster-and-vector-images.html

#### *2.5.1.3 Audio*

Audio is use in multimedia application as the application is require sound effects, music and use of speech. There are two type of audio which is analog and digital audio.

- Analog Sound

  Analog sound has information stored as varying strength magnetic fields or heights of grooves or electronic signals which can be amplified and fed directly to speakers without decoding. Making a copy always involves at least some changes in the signal shape.

- Digital Sound

  Digital sound is stored as bytes of information on the media which are made into sound by computer like processing. Exact copies can be made of the original.

#### *2.5.1.4 Video*

Multimedia program get powerful impact by video. Below are the following reasons why digital video is going popularity now.

- Easy edit the video clips.
- In the computer, the digital video files can be stored like any other files.
- The quality of video is maintained.
- Can transfer the video files within a computer network.
- Non-linear editing is allowed in any part of the video.

However, the size of these digital video files are large and take long time to transfer the file when using Internet. Video can be classified into 2 types, which are analog video and digital video.

- Analog Video

  Analog video is the original video recording method that stores continuous waves of red, green and blue intensities. The number of rows is fixed in analog video. Besides, there are no real columns, and the maximum detail is determined by the frequency response of the analog system.
- Digital Video

  Digital video is audio/visual in a binary format. The information will be presented as a sequence of digital data rather than in a continuous signal as analog information is.

#### *2.5.1.5 Animation*

Animation is used widely in multimedia application. It is a process of making the static image that look like it is moving. In traditional animation, the animated cartoon is made from a series of drawing that simulating motion with the slightly change from one drawing to another. The animation can be categories into four types: frame animation, vector animation, computational animation, morphing. Besides, animation can be 2D or 3D animation.

- 2D Animation

  2D animation is a set of pictures that move rapidly to create illusion of movement in two dimensional environments, which are coordinate x and y. the object of 2D animation is draw by vector method, so it can be clear and easy to create a smooth animation. Besides, 2D animation is easy to create compare to 3D animation because 2D animation can be draw by using hand or sketch.

- 3D Animation

  3D animation is created in three dimensional (coordinate x, y and z) so that the object is look more realistic and not look like a drawing. Besides, 3D animation can be rotate 360 degree, so that the 3D animation is similar to the real life object. Moreover, 3D animation is more attractive compare to 2D animation.

All in all, the proposed multimedia courseware will consist of text, sound, graphic, and animation. The author decided to choose electronic text and hypertext to use for the proposed courseware. It is because electronic and hypertext can be read by the computer and the text is easy to edit.

Besides that, for the sound component, the author will be using both types of sound, which are analog and digital sound. The author will record the analog sound by using telephone and then convert it into digital sound and implement into the proposed system.

Moreover, the author decided to use both types of graphic, which are bitmap and vector graphics. The author will use less on bitmap graphic and use more on the vector graphic, because vector is good to draw and quality is better than bitmap graphic.

Lastly, for the animation component, the author will use the 2D animation instead of 3D animation, it is because 3D animation is require more skills and time to create compare to 2D animation. Besides, 3D animation is required higher processor which is costly and takes longer time to render.

### 2.5.3 Benefits of Multimedia

#### *2.5.3.1 Ease of use*

Multimedia can make the application easier to use compare to non-multimedia application. Besides, with the multimedia interface, the application or system can easier to operate. With the proper multimedia elements, it can provide user-friendliness and the user can be spent less time to use the application or system.

#### *2.5.3.2 Intuitive Interface*

To succeed a system, the multimedia interface must be intuitive. Intuitive interface means that using proper icons, images, visual and audible responses, and provide clear input for user. With the intuitive interface, the user can use the system directly without training.

#### *2.5.3.4 Better Understanding*

In educational field, multimedia allow the students to better understanding than the traditional material, such as textbook. Textbook consists of text and few static pictures which is dull and boring. On the other hand, with multimedia elements, it provides richer information to the students.

#### *2.5.3.5 Interaction and Better Retention*

Instead of using text, the multimedia elements such as video and animation, allow the user to interactive it and provide better retention. Usually kids and students are hard to understand by using text to make explanation. While using multimedia, it provides visualization, audio narration, and interactivity feature that kids and students can be more understand and better retention.

#### *2.5.3.6 Fun and Efficiency*

The multimedia application can be make it more fun to use and more efficient. The multimedia application introduce fun elements can help and guide the user to do job more efficiency.

#### *2.5.3.7 Powerful*

Multimedia is powerful in the presentation because it consists of text, sound, graphic, video, and animation. The user can understand the content easily rather than using traditional presentation system which is consists most of the text.

In short, since the multimedia have many of benefits, thus, the proposed courseware will consists of multimedia which can provide better presentation, intuitive interface for the kids. Besides that, with the multimedia components, it can provide fun and efficiency and better retention toward the kids because there is involve interaction between the kids. Moreover, multimedia also is one of the effective ways for the students to learn the math and animal. The students are able to learn more and reduce the learning time which less time away from the traditional learning in the classroom by using textbook and explain by the teacher.

### 2.5.4 Limitation of Multimedia

#### *2.5.4.1 Multimedia in Website*

Due to some users having low bandwidth, hence, some website is not suitable to use multimedia. Besides, with the large amounts of traffic and server issues, the website cannot consists of large file size of multimedia elements.

#### *2.5.4.2 Costly*

To develop a multimedia application or system, it requires proper skills and techniques such as programming, drawing skills and etc. Besides that, to run the

multimedia application, it requires multimedia equipment which is computer, speaker, mouse, keyboard or other devices.

#### *2.5.4.3 Require Specialized Skills*

To develop a succeed multimedia application, the developer need to have specialized skills such as using proper color for the background, music, icon, and etc. If the application consists of too much text, the user will feel annoying. On the other hand, if the application consists of too little text, the user cannot understand the content.

#### *2.5.4.4 Require Basic Computer Skills*

To use the multimedia application, the users need to have basic computer skills such as if the user's computer does not consists of FLV player, the user know how to download and install the FLV player.

### 2.5.5 Application of Multimedia

#### *2.5.5.1 Multimedia in Education*

First of all, teachers primarily require access to learning resources, which can support concept development by learners in a variety ways to meet individual learning needs. The development of multimedia technologies for learning offers new ways in which learning can take place in schools and the home. It enables the teachers to have access to multimedia learning resources, which support constructive concept development, allows the teacher to focus more on being a facilitator of learning while working with individual students. Extending the use of multimedia learning resources to the home represents an educational opportunity with the potential to improve student learning.

The tools for implementing multimedia Education are: edutainment CD titles, Computer-Based Training modules (CBT) and electronic course, computer aid-learning

system, the internet and digital. Multimedia application not only can raise the interest and reduce learning time of learners but also provides convenient way to let the learner because multimedia educations tools is portable, thus student can learn anytime anyplace. (Ma, 2007)

Multimedia components can be implemented into learning materials for kindergarten kids, primary school students, secondary school students, and also university / colleges students. It enhances the learning progress of the learners and it reaches the time and cost efficiency respectively. Kahn (2003) claimed that at some point in recent history, word got around that education without entertainment was worthless.

Employing multimedia tools into the learning environment is a rewarding, but complex and challenging task. All of the multimedia formats available: text, sound, video, animation and graphics, already exist in one form or another in most libraries. Student can explore an almost infinite variety of information. All these explorations can certainly lead to new discoveries, but unless consumption is followed by production, the story ends.

#### *2.5.5.2 Multimedia in Training*

Multimedia has been a favorite area for organizations as a means of training employees claimed Mishra and Sharma (2004). To remain competitive in today's tight labor market, online training has become a prevalent means through which organizations can train employees more rapidly, more effectively, and at less expense than the past (Mcrea, Gay, and Bacon, 2000; Urdan & Weggen, 2000). Nevertheless, as the implementation of online training has become widespread, many unfounded beliefs persist with regards to the effectiveness of particular delivery methods. One example is the perception that integrating multimedia into course delivery in undeniably beneficial. (Kahn, 2003)

According to United States Department of Defense data (as cited by Oblinger,

1991, p. 4), we have short-term retention of approximately 20% of what we hear, 40% of what we see and hear, and 75% of what we see, hear, and do. Trainees complete courses with multimedia in one-third of the time as those receiving traditional instruction, and reach competency levels up to 50% higher. And in most cases the overall cost of instruction is lower. (Gantt, 2000)

Interactive multimedia in education and training emerges out of the need to share information and knowledge on the research and practices of using multimedia in various educational settings. There have been many experiments and innovations in the field of education and training regarding knowledge delivery. From face-to-face to virtual education, different technologies have played great roles at different times. In the last two decades, due to the advent of computer technologies, information delivery has got new meaning. Development, access, and transfer of text, sound, and video data have given a unique face to classrooms, libraries, and training and resource centers, in the form of interactive multimedia programs. (Mishra and Sharma, 2004)

Today the World Wide Web (WWW) offers instructors a vast array of multimedia projects and resources that offer real-time guideposts for quality multimedia production. There are many kinds of multimedia that are successfully being explored for computer use, entirely presented on the Web, digitized for softcopy to be used locally on CD ROMs, and applied as a rich mixture to various computerized training situations. (Gantt, 2000)

#### *2.5.5.3 Multimedia in Entertainment*

The field of entertainment uses multimedia extensively. One of the earliest applications of multimedia was for games. Multimedia made possible innovative and interactive games that greatly enhanced the learning experience. Games could come alive with sounds and animated graphics. Multimedia in entertainment industries includes games on CD-ROMs, Propriety systems like X-Box and Playstation 2, Mp3 players like

iPods, Digital Broadcasting like high definition television, direct broadcast satellite, Audio or Video.

Multimedia plays an important role in entertainment industry. Combining of multimedia elements can grabs attention of audience. Multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animations. In the Arts there are multimedia artists, whose minds are able to blend techniques using different media that in some way incorporates interaction with the viewer. One of the most relevant could be Peter Greenaway who is melding Cinema with Opera and all sorts of digital media. Another approach entails the creation of multimedia that can be displayed in a traditional fine arts arena, such as an art gallery. Although multimedia display material may be volatile, the survivability of the content is as strong as any traditional media. Digital recording material may be just as durable and infinitely reproducible with perfect copies every time. (Zehra, 2008)

Further, multimedia entertainment was historically not considered as a topic deserving of serious study. Yet, two main reasons attract, today, an increasing number of researchers and practitioners. The former is the explosive growth of the multimedia entertainment market, from its niche position to a multi-billion dollar industry with an ever-increasing trend. Analysts report the following. In February 2004, 51 million people were using Microsoft's Windows Media Player, Apple sold over 2,016,000 iPods during the 4 th quarter of 2004 as compared to 336,000 one year ago, Jupiter Research estimates in 1.7 billion $ the 2009 online music market in the US, the gaming industry surpasses even the cinematography industry expecting to increase the sales up to 31.6 billion $ in 2009. The latter reason is represented by the correlation between problems that emerge while developing innovative multimedia entertainment applications and those typical of more serious settings in the Computer Science fields. Multimedia entertainment is at the same time a great technological challenge and a wide still-increasing market. New scenarios arise considering multimedia entertainment applications lining in anytime, anywhere, any device dimensions. (Cacciaguerra, n.d.)

***2.5.5.4 Multimedia in Science / Medical Science***

Multimedia has been widely used in science education and also medical science as well. In terms of healthcare, multimedia involves in the applications of telemedicine. For example Teleconsultation (TC), Mass Customized/Personalized Health Information and Education (MCPHIE), Lifetime Health Plan (LHP), Continuing Medical Education (CME), and etc

In the past decade, a significant amount of resources has gone into development of new technology in surgery, including minimally invasive surgery. These advances have yielded enormous potential benefits to the patient. These benefits might be offset, however, if more resources are not redirected into improving techniques for surgical training. Multimedia interactive computer-based training is a proven training method that has been successfully applied in other industries. The integration of high-quality multimedia interactive training programs into current laparoscopic training programs and surgical residency programs should help to increase the safe adoption of laparoscopic procedures. (Ramshaw, Young, and Garcha, 2000)

Computers attract children; children like to deal with them. Computers appeal to children more than drawing booklets. Multimedia is a synergetic means of audio, video, the written text, pictures and animations. It is well suited to show situations, it can be interactive, and it can be used to develop skills. It is the task of the doctors, pedagogues and parents to treat amblyopia and help children overcome the dimness of their vision by using computers to make children think of the occlusion of one of their eyes as a game. This will help them to better vision. It is important to be able to generalize and draw conclusions. Further tasks are to improve the visual memory and develop the visual imagination. (Sik-Lányi & Lányi, 2001)

Science, and especially school science, is often a very practical subject. It involves observing, measuring, communicating and discussing, trying things out, investigating, handling things, watching and monitoring, recording results. These are all things we see happening in the science classroom. ICT can help in virtually all of these

activities. Science involves abstractions, difficult ideas and theoretical entities that cannot be seen or handled. Multimedia and ICT generally can help as much in this 'thinking' aspect of science as they can in the practical aspect. (Barton, 2004)

## 2.6 Animation Techniques

### 2.6.1 Introduction of Animation

According to Lamb and Keller (1997), "Animation is a process of applying motion to the static picture by the employment of variety techniques. In short, animation is a designed to enhance the meaning of the multimedia project." (Lamb & Keller, 1997). The traditional animation such as Flipbook method, is create by drawing page by page with the slightly change, and then flip rapidly to create illusion of movement. Today, animation is primarily computer based and is much easier to create animation.

According to Peck (1997), "Animation is any movement on the computer screen. A box move from left to right is also a form of animation. If use the animation proper time, it is a powerful medium." (Peck, 1997). Three level of animation used are consist in multimedia presentation, which are beginner, moderate, and advance. The first level which is beginner and in this level there are requires no graphic experience such as flying titles, fade, movement, and importation. Besides, the user need to understanding of animation techniques and software at moderate level. Lastly, requires full understanding and experiences with the graphic, animation programs, and modeling are in the advanced level

In short, animation is a rapid display of a set of pictures that create illusion of movement. Animation is widely use in video games, information kiosk, electronic appliances, websites, TV, advertisement, and etc. To create an animation, there are several principles need to consider, which are squash and stretch, anticipation, staging, timing, and appeal.

### 2.6.2 Type of Animation

There are two types of animation, which are 2D (two-dimensional) animation or 3D (three-dimensional) animation. Animation can be simple like 2D logo enter and exit from a program, or complex like 3D model with rendering and shading (Peck, 1997).

#### *2.6.2.1 2D Animation*

2D animation is a series of frames that move rapidly in two dimensional environments. Each of the frames consists of static object. According to Maaby (2008), "2D animation is rapidly movement displaying several pictures to create the illusion of movement in coordinate x and y. The animated movie is made by using several drawings and showing them rapidly after each other and it can fool the human brain to think that the drawing is moving." (Maaby, 2008).

Usually 2D animation can be creating by using Adobe Flash. The Adobe Flash is one of the animation program that using timelines, keyframes, and layer to create vector animation. There are two types of method to create 2D animation, which are celluloid animation and path animation. Celluloid animation is the animator sketch the character with different actions or positions, and then each of the frames have the different images and move rapidly to create illusion of the movement. Next, path animation is opposite of the celluloid animation. Path animation is resized or reshaped the object without changing object itself.

#### *2.6.2.2 3D Animation*

3D animation is created in three dimensional so that the objects do not look like drawing and more realistic. According to McGloughlin (2001), "Computer-generated 3D animation is an illusion. The animator creates object or animation that looks like 3D but it is in flat surface." (McGloghlin, 2001). Besides, according to Roj (2011), "3D animation is the process of giving illusion of movement to models, inanimate, or drawing objects in corrdinate x, y, and z." (Roj, 2011).

The 3D animation is similar to the real life object in real world because it allows rotating 360 degree. The 3D animation software that can create 3D animation is Autodesk 3Ds Max, Blender, Cinema 4D, Autodesk Maya, and etc. Other method to capture the 3D movement is using motion capture method. Motion capture is a technique that recording the movement or the motion of the real things, usually is the human.

### 2.6.3 Comparison between 2D and 3D Animation

| | 2D Animation | 3D Animation |
|---|---|---|
| **Environment** | 2D (x and y) | 3D (x,yand z) |
| **Create by Using Computer** | ✓ | ✓ |
| **Create by Using Hand-Drawing** | ✓ | × |
| **Realistic** | × | ✓ |
| **Easy to Produce** | ✓ | × |
| **Render Speed** | Fast | Slow |
| **File Size** | Small | Large |
| **Time Spending to Produce** | Fast | Slow |

**Table 2.1 Comparison between 2D and 3D Animation (Source: The author)**

According to jealouseating.com (2011), “2D Animation is now one of the most developed careers in the educational field.” (jealouseating.com, 2011) Besides that, Blake Setter (2011) stated that, “we can also give the information to the people with help from animated video.” (Setter, 2011).

On the other hand, according to digitalfp.com (2010), “3D images can be viewed from any angle, but 3D animation needed more time to render compare to 2D animation, so 2D animation is ideal choice for developing games meant for low bandwidth.” (digitalfp.com, 2010). Moreover, the 3D animation is needed more time to load if it is hosting into Internet.

Therefore, 2D animation is a good choice for the interactive courseware on mathematics and animal module. Besides, 2D animation is preferred because it needs less time to load in Internet, low bandwidth to support it. In addition, the proposed system is a courseware system and the target audience is kindergarten, thus using 2D animation is sufficient for the proposed courseware

## 2.7 What is Interactivity?

### 2.7.1. Introduction to Interactivity

Interactivity is the dialog that occurs between a human being and a computer program in computers. Usually there are involve immediate user to run the program, if there is without the immediate user, they are called batch or background programs (Emily 2005). Games are full of interactivity so it usually thought of as fostering a great amount of interactivity. However, although order entry applications and many other business applications are also interactive, those applications are in a more constrained way which is offering fewer options for user interaction.

We are not only interacting with the browser (the Web application program) but also with the pages that the browser brings to u on the World Wide Web. According to Emily (2005), "the implicit invitations called hypertext that link you to other pages provide the most common form of interactivity when using the Web (which can be thought of as a giant, interconnected application progam)."

All in all, interactivity is allowing the user to interact with the data for appropriate purpose. Interactivity can be seen in our daily life which are video and computer games, conversation, non-linear narratives, productivity application, and storytelling as well. In courseware system, Interactivity means that the user can communicate with the system through the computer based learning by releasing interactive visual or simulation experiments (Johari, 2007).

### 2.7.2 Interactivity Level

The different people have the different view of the interactivity level. It is only a slightly different and almost measured with the same meaning. According to Crawford (2006), "the definition of interactivity can apply on-line or off-line to games, web surfing, learning or just about any activity." (Crawford, 2006). Crawford (2006) has 5 levels of the interactivity, which are observation, participation, action, agency, and ownership.

**Level 1: Observation**

Observation is a lowest level of interaction which is level 1. Observation requires simple input from the users. This level is lacks of "think" and "listen" components such as television and large lecture halls.

**Level 2: Participation**

Participation as the name implies requires some, albeit minimal, involvement from the users. For example, web surfing, small classrooms, books, and e-learning. The users are more involved in the direction and content of the story than in Level 1.

**Level 3: Action**

Action, is the level 3 of interactivity level, it requires users' significant input. This level involved "listen", "think", and "speak". The examples of this level are branching, ranking, and sorting.

**Level 4: Agency**

The fourth level is Agency, which refers to action and outcome. This level is same as previous level that also requires users' significant input but is direct link to real world actions and outcomes.

**Level 5: Ownership**

Ownership is last level in the interactivity level. It is beyond learning where users integrate the content into the daily lives. In this level, the user knows the content well to start the cycle over and teach it to the next generation.

All in all, based on Crawford (2006) 5 levels of the interactivity, the proposed courseware system consists of teaching, mini games and tutorial section. The teaching in proposed system is in level 1 (Observation) because it is lack of thinking and just observe how it works. Besides, the mini games are in level 4 (Agency) which is refers to action and outcome in the games. Lastly, tutorial section is in level 3 (Action) that needed student to answer the multiple choices questions.

Besides that, according to bonlinelearning.com (2011), "The level of interactivity is depending on target audience, budget limitations, technological limitations, and the nature of the content. The development time and level of complexity is depending on the level of interactivity." (bonlinelearning.com, 2011). Bonlinelearning.com (2011) has 4 level of interactivity, which are passive, limited interaction, complex interaction, and real-time interaction.

**Level 1: Passive**

The users merely receive the information. For example, the user read the text on the screen, view charts, graphics, illustrations, and use navigational buttons to navigate the program or system.

**Level 2: Limited Interaction**

This level requires simple responses from the users. For example, scenario-based multiple choices, column matching related to the graphic presentation and text. Usually it requires text or audio to make the responses

**Level 3: Complex Interaction**

Complex Interaction level consists of complex application simulation that requiring the user to enter data into field. It is a scenario-based branching logic that the user experiences on incorrect responses and makes their own decision.

**Level 4: Real-Time Interaction**

This level is the user directly involved in a life-like set of complex cues and responses. For example, real life 3D simulation, use of gaming technology, and real-time learning and assessment.

In short, the teaching math and animal in proposed system is in level 1 (Passive) which allows the students merely receive the information such as how addition and subtraction work in math part while how animal yell and how to pronoun animal's name in animal part. While for the mini games in proposed system is in level 4 (Real-Time Interaction) which is require complex cues and responses from the kids.

### 2.7.3 Usefulness of Interactivity

According to Elmansy (2009), "Interactivity does not only makes the system more attractive and interesting for audience, but also helps the audience digest the content by using their senses to interact with the system. Interactivity can include several input mechanisms, such as responding to text or audio using input devices such as keyboard, mouse or microphone." (Elmansy, 2009).

Moreover, according to Keng Siau (2006), "Interactivity is a very important component of teaching and learning and is a key to success in education field. Enhancing interaction can lead to better and more effective learning. However, lack of interactivity has been diagnosed as one of the major pedagogical issues facing many educational institutions." (Keng Siau, 2006).

Furthermore, interactivity is very useful and is a key factor in education field. When there are interactivity is present, the users are not only more motivated to learn, but also more participative, and more attentive. Besides that, interactivity can also influence the users' learning outcomes, such as achievement and attitude (Keng Siau, 2006).

However, Elmansy (2009) stated that, "The amount of interactivity in the system depends on the nature of the content. For example, if a system requires the audience to listen to audio while watching a presentation on their monitor, do not provide much interactivity. On the other hand, instructional courses and educational games system depend on user interaction." (Elmansy, 2009).

Therefore, the proposed interactive multimedia courseware with the proper interactive component can increase the critical variable in learning. It can increase users' motivate to learn, participative and the attentive in learning. Besides, interactive also can increase the speed of learning because users will easily to remember and recognition what they response in the system.

## 2.8 What is Multimedia Courseware?

### 2.8.1 Introduction of Multimedia Courseware

According to Yang Jing (2005), courseware is educational material intended as kits for teachers or trainers or as tutorials for students, usually packaged for use with a computer. Courseware can encompass any knowledge area, but information technology subjects are most common. Courseware is frequently used for delivering education about the personal computer and its most popular business applications, such as word processing and spreadsheet programs. Hick (1997) state that multimedia courseware is the use of different communications mediums within a single computer program used to present information. By communications mediums, we mean audio for music, sound effects, or voice-over narration, still photographs and / or graphics to help the end user understand the message that is being presented, video to further explain or illustrate ideas.

### 2.8.2 Benefit of Multimedia Courseware

According to Hick (1997), there is several benefit of the interactive multimedia courseware:

#### *2.8.2.1 Interactive*

Interactivity is mutual action between the learner, the learning system, and the learning material. Numerous studies have found that interactivity has a strong positive effect on learning (Bosco, 1986, Fletcher, 1989, 1990, Stanfford, 1990). For example, Bosco (1986) reviewed 75 learning studies and found that learners learn faster, and have better attitudes toward learning when using interactive multimedia.

#### *2.8.2.2 Flexible*

Multimedia courseware on CD-ROM can be used at various places such as at work on the desktop or at a learning centre, at home and while travelling. Other than that, multimedia courseware is available on networks, Intranets or the Internet. Thus, these distributed learning approaches make even more flexibility.

#### *2.8.2.3 Improve Learning*

Interactive multimedia learning is takes less time; more enjoy and increase learning which show in numerous studies over the years. The learner also will easily understand compare to reading textbook. In a review of numerous meta-analysis studies Najjar (1996:30) found that "learning was higher when information was presented via computer-based multimedia systems than traditional classroom lectures".

#### *2.8.2.4 Cost effective*

Although multimedia courseware may have higher up-front development costs, but overall studies have shown that it is less expensive and more effective than traditional classroom learning. It can save on expensive and time-consuming travel, facility rentals, lodging, the loss of productivity caused by sending learners away and other expenses.

#### *2.8.2.5 Engaging*

Interactive learning involve live-action video, graphics, feedback, expert advice, and questions and answer which make the learner more interest on learning and reinforce their skills. It is encourage learners to return to the program again and again because it is exciting, challenging and fun to use. Thus, learning can quickly absorb and integrated into daily performance.

From the above benefits, the proposed multimedia courseware of math and animal can help kids easily understanding the content instead of reading textbook. Besides that, interactive learning elements will be involved to the proposed courseware so that the kids can learn yet enjoy fun of the courseware.

### 2.8.3 Limitation of Multimedia Courseware

#### *2.8.3.1 Require Basic Computer Skills*

To use the courseware, the students need to have a basic computer skill, which is need certain software to play the courseware such as Adobe Shockwave Player. The students need to know how to download the software in order to play the courseware.

#### *2.8.3.2 Less Communication*

The kids like to communicate with a computer program or application rather than their parents. In this situation, it will cause lack of communication for the kids and will cause them do not like to talk with parents or friends. With the courseware, they will become less communicate with teacher and friends also.

#### *2.8.3.3 Isolated*

Student may feel isolated and unsupported while using courseware for learning. And not all instruction is available to help the student. So the students need to work independently without assistance. (1stopbiztro.com, 2011)

### 2.8.4 Comparison between Multimedia Courseware and Traditional Teaching

| | **Multimedia Courseware** | **Traditional Teaching (Textbook)** |
|---|---|---|
| **Interactivity** | ✓ | × |
| **Ease of Build** | × | ✓ |
| **Costly** | × | ✓ |
| **Improve Learning** | 4/5 Stars | 2/Stars |
| **Flexibility** | 4/5 Stars | 2/Stars |
| **Engaging** | 5/5Stars | 1/Stars |

**Table 2.2 Comparison between Multimedia Courseware and Traditional Teaching-Textbook (Source: The Author)**

From the table above, there is some reason why author decided to develop a multimedia courseware. It is because interactivity is involve in the courseware and courseware has animation, graphics and sound which will not feel boring compare to textbook. Hence, it will improve learning of kids in speed because they more easily understand the content.

## 2.9 Compare with Existing Online Multimedia Courseware

### 2.9.1 Kaboose – Cannon Math

It is an educational math game Cannon Math for kids. The kids can learn about addition, angles and force with the fun interactive educational content that make math fun.

**Strength**

- At the first page is attractive because use the animation to design the screen before get start to play.
- The button using colorful.
- Music is included.
- When mouse over the button (GO) the word will change color.
- It has showed the guideline of how to play for the user.
- Before start answer the question, it has give you practice of how to adjust the angle and shoot for the correct answer.


**Figure 2.5 Cannon Math**

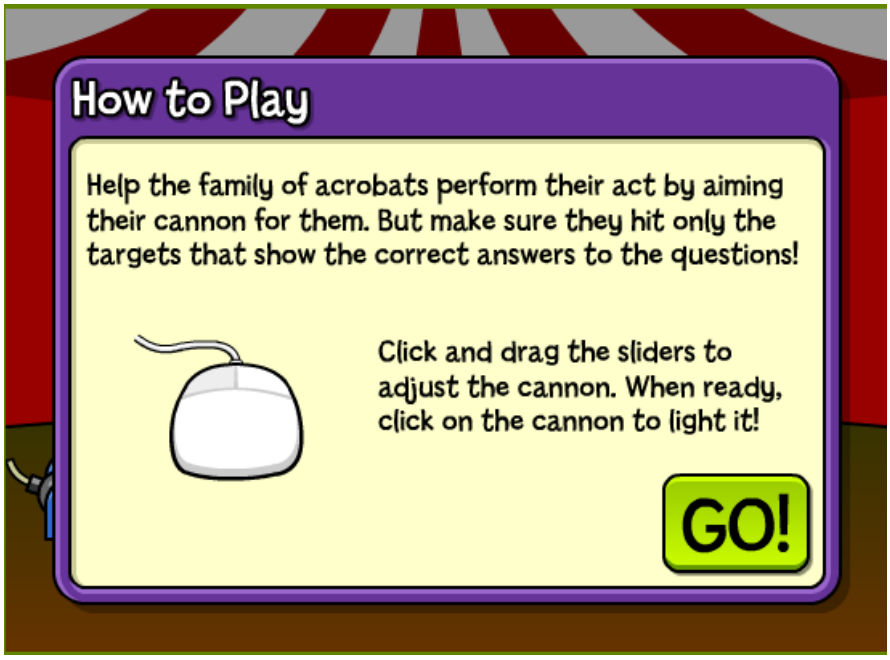



**Figure 2.6 Guideline of Cannon Math**


**Figure 2.7 Practice of Cannon Math**

**Weaknesses**

- Cannon Math is included the complex features. It is very difficult to let the kids adjust the angle and power and shoot for the correct answer. Although the kids know the answer, but they are unable to shoot for the correct answer. The feature used is not user friendly.
- There is no button to switch off the music when you feel annoying of the music.

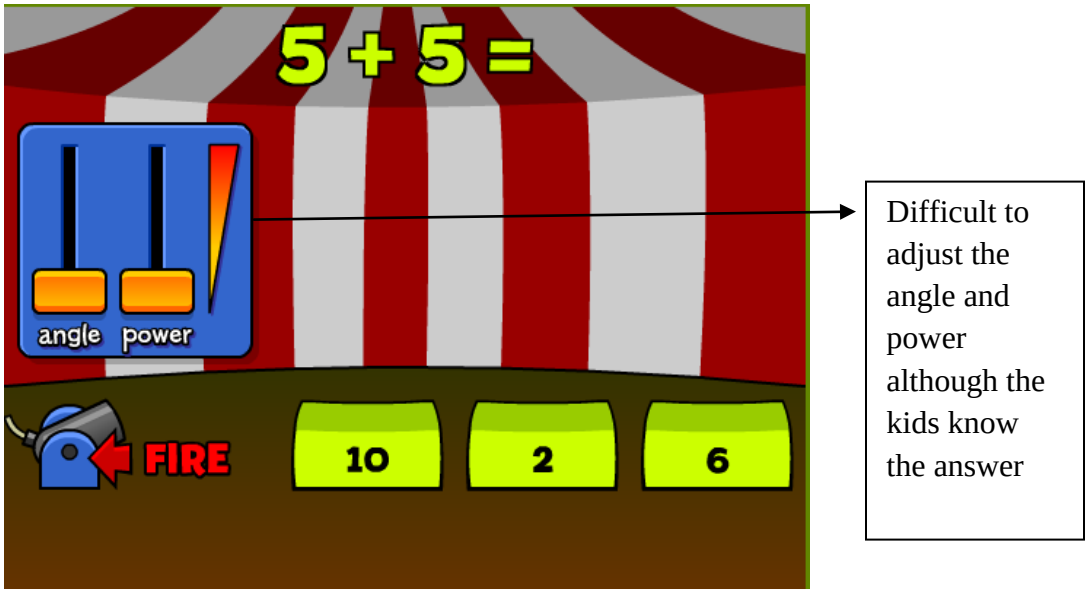



**Figure 2.8 Play Cannon Math**

### 2.9.2 The kidz page.com – Math Picture Puzzle

It is software that use math puzzle to reveal the picture that behind of the puzzle. Each of the puzzle will has a question and the answer will show beside. The kids need to drag the answer and drop to the puzzle. If the kids are answer correctly, the puzzle will disappear and a part of the picture will be show but if the answer is wrong, the answer will still remain at the puzzle.

**Strength**

- Use colorful word to design the answer.

- Increase curious of the kids so that the kids will answer all the questions to see the picture.
- User friendly.
- Have addition, subtraction, multiplication, and division. Every fraction will have different picture background.
-

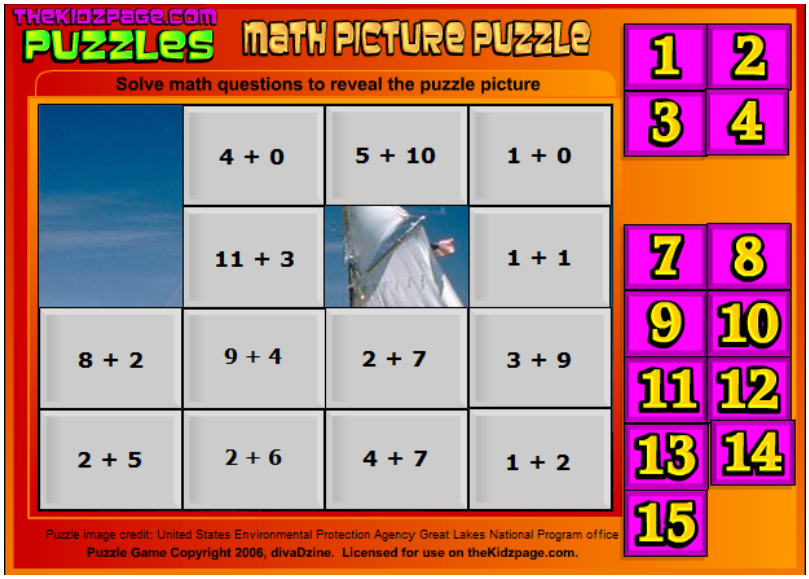



**Figure 2.9 Math Picture Puzzle with Right Answer**

**Weaknesses**

- No music include to the system.
- No animation include to the system will make the kids feel the system is boring.
- When the answer is wrong, no special effect or message to show the answer is wrong. (the question and answer will not disappear )

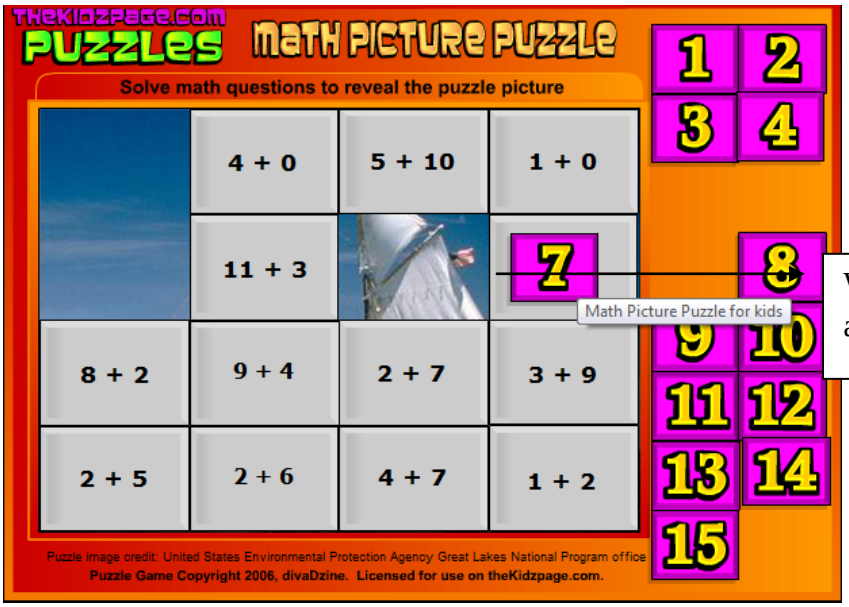
- 


**Figure 2.10 Math Picture Puzzle with Wrong Answer**

### 2.9.3 Game for kids – Backyard Animals

This is the game where need the kids to categorized the animal between mammals, reptiles, bird, insect, and amphibians.

**Strength**

- The sound of animal is included when the animals are display.
- The animals are included the animation features.
- A pretty background is provided to match the animals.
- A guideline has been provided before start to play the game.
- User friendly.
- Display the score at the top.

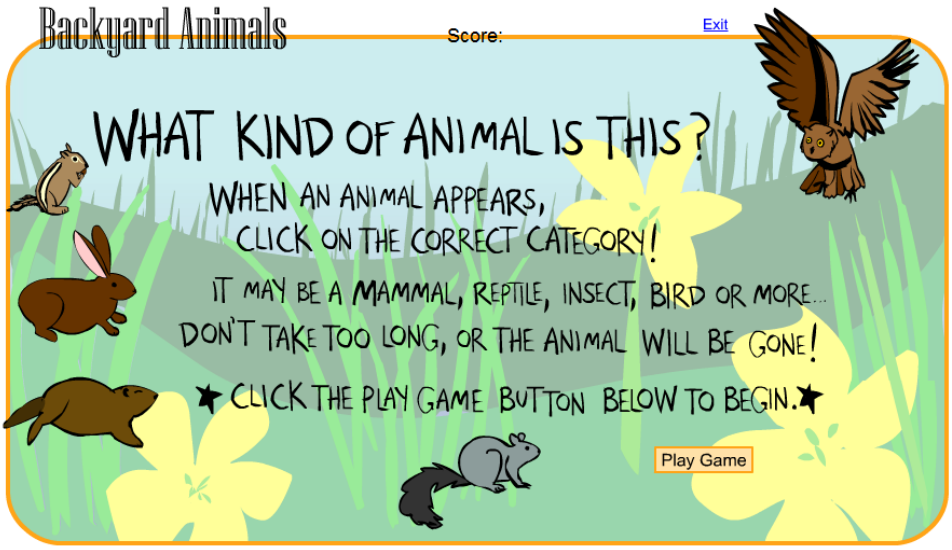



**Figure 2.11 Guideline of Backyard Animals**

**Weaknesses**

- If the kids take too long to choose the answer, the animals will be gone.
- The kids cannot know whether their answer is correct because each answer will be show under the category with different color if the kids din not mentions the score that show at the top.
- There is no obvious special effect or message that says the answer is wrong.

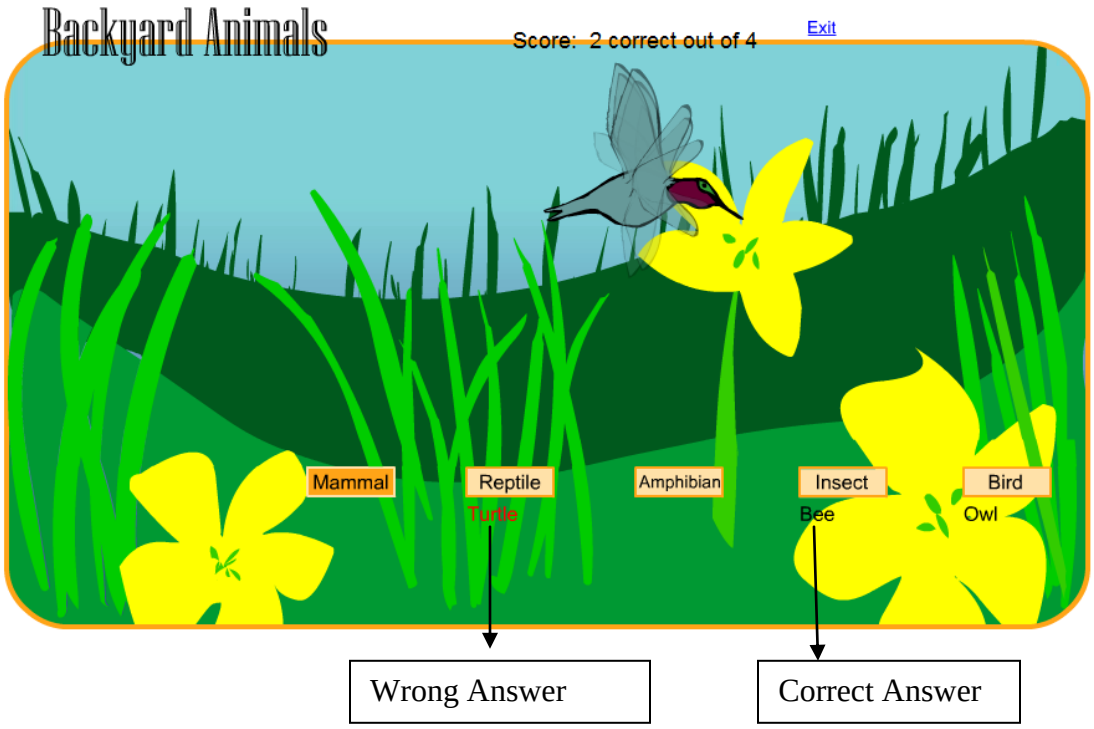



**Figure 2.12 Backyard Animal Game**

### 2.9.4 Summary of Comparison with Existing e-Learning System

| Games | 5 Multimedia elements included (sound, text ,animation, video, graphic) | Guideline provided | Effect or message provided for correct and wrong answer | User friendless | Voice teaching |
|---|---|---|---|---|---|
| **Kaboose -Cannon Math** | × (no video) | √ | √ | × | × |
| **The kidz page.com -Math Picture Puzzle** | × (only has graphic) | × | × | √ | × |
| **Game for kids -Backyard Animals** | × (no video) | √ | × | √ | × |
| **My proposed online multimedia courseware** | √ | √ | √ | √ | √ |

**Table 2.3 Table of Comparison between Existing Courseware and My Proposed Online Multimedia Courseware**

## 2.10 Fact Finding

To collect the more information about the system and understand the user requirements, the author uses few techniques to do fact finding and analysis such as research, observation and questionnaire.

### 2.10.1 Research

The author review and do some research from various sources from website such as follow:

- http://www.sheppardsoftware.com/content/animals/kidscorner/kidscorner_games.htm
- http://funschool.kaboose.com/formula-fusion/numberfun/games/game_cannon_math.html.

The author is try find the existing online multimedia courseware of math and animal to make comparison with her proposed courseware. Besides that, the author also uses the existing courseware as the reference for the proposed multimedia courseware.

### 2.10.2 Observation

Observations can also be either direct or indirect. Direct observation is observe the interaction, behavior and processes as they occur. For example, observing the kids play the math game with the flash game provided to determine whether they can interact well with the system. Indirect observation is you watch the interaction, behavior and processes. The author will prefer use direct observation because it is an effective technique for understanding how the user corporate with the system properly. Through observation, the author can get the first hand experience of the actual operation and the information or data collected is reliable and accuracy due to the author is collect in real time.

### 2.10.3 Questionnaire

Questionnaire is a technique use to collect information from number of people. It is consists series of questions frame together in logical manner. The author uses paper-pencil-questionnaire to extract the information from the kids' parents since the kids may not understand the meaning of the questions. Their parents will help them answer the questionnaire base on the guidance of their kids when using the existing online multimedia courseware.

## 2.11 Data Collection

### 2.11.1 Observation

There are 3 way to collect the observation data and the author use these three methods to do the data collection.

**1. Recording sheets and checklists.**

Collect the observation data and include both preset questions and responses of the kids when interact with the system. These forms will be used to collect the data which can be easily described in advance.

**2. Observation guides**

The author will list out the interaction, behavior and processes to be observed with space to record open-ended narrative data.

**3. Field notes**

The author can collect observation data and do not include preset questions or responses because field notes are open-ended narrative data that can be written or dictated onto a tape recorded.

#### *2.11.1.1 Test Scenario of Observation*

Name: Tan Mei Ying

Test Scenario:

She is 5 years old and she is the cousin of the author. The author observes how her cousin uses the existing online multimedia courseware to practice her mathematic. The author chooses an existing courseware -math for her and asks her to interact with the system. After observe, the author ask her what the problem she faces and what requirements she need to add in to the system and record down. The author will follow her requirements to design the system so that all users can use the system well. For example, the kids are like colorful things, animation and sound rather than present all the things by words so the designer will try to follow the kids' requirement to ensure the system can attract the attention of kids. Another important thing is the system must be user friendly and make it as simple as it can so that kids can interact well with the system.

### 2.11.2 Questionnaire

Since the kids may not understand what is the meaning of the questions, so the author decide explain the question to the kids and help them circle the answer. Below is the result analysis of the questionnaire.

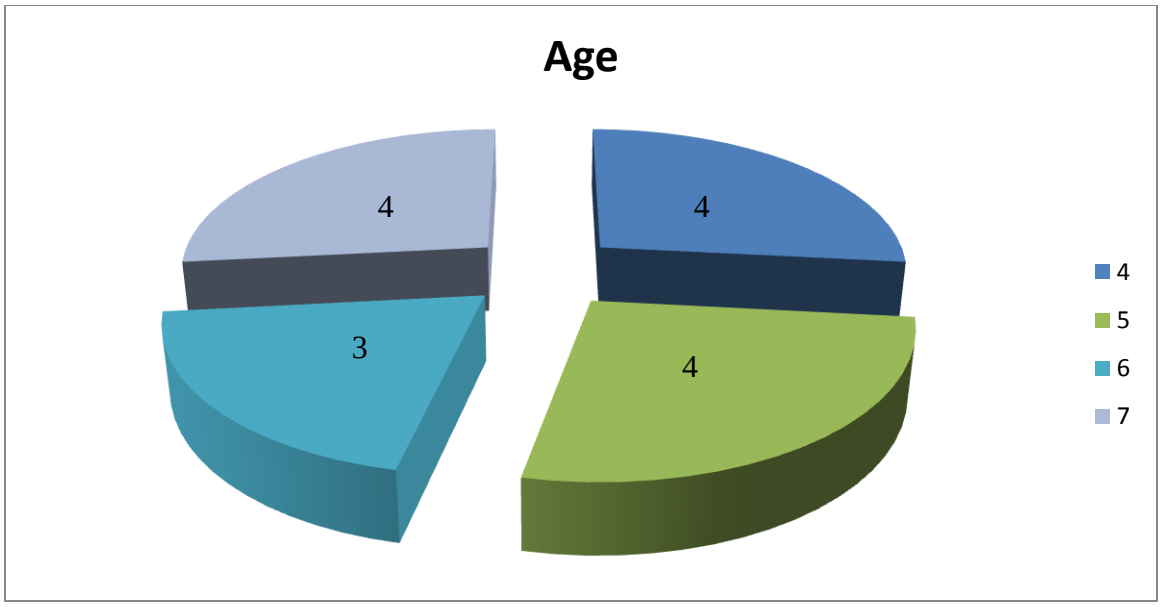



**Figure 2.13 Ages of the Respondents**

The result showed that there are 4 out of 15 respondents are 4 years old and 4 respondents are 5 years old. The rest is 3 respondents are 6 years old and 4 respondents are 7 years old.

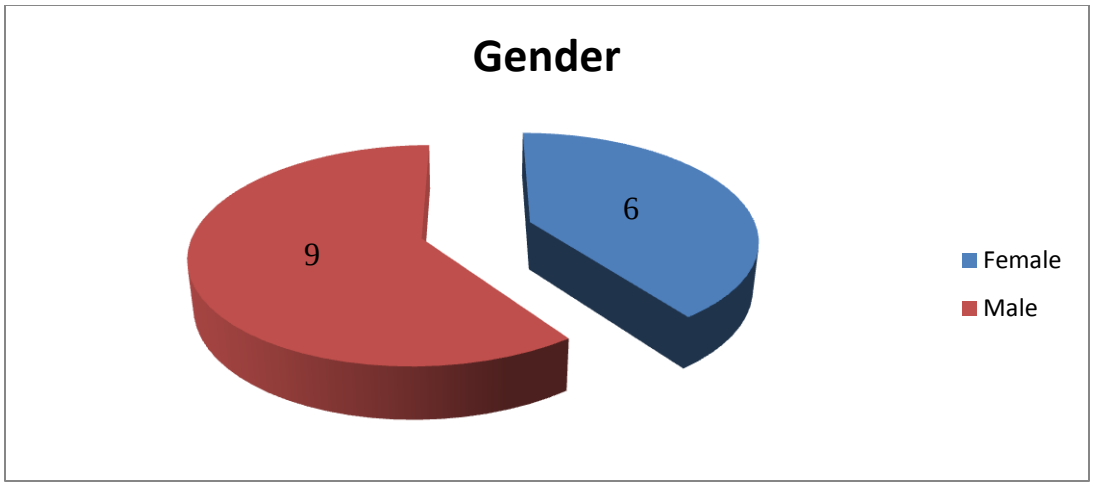



**Figure 2.14 Genders of Respondents**

The Figure 2.14 shows that there are 9 respondents are male and 6 respondents are female over 15 respondents.

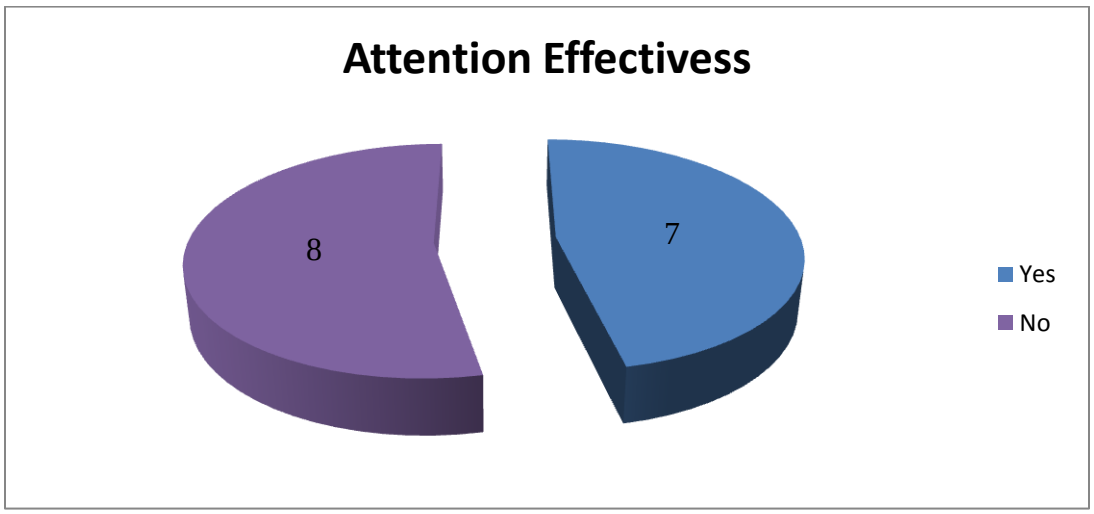



**Figure 2.15 Effective of Attention of the Existing System**

The author needs to know whether the existing courseware can grab the attention from the kids. The figure 2.3 shows that there are 8 respondents feel the existing online

multimedia courseware cannot grab their attention while 7 respondents feel the existing online multimedia courseware can grab their attention.

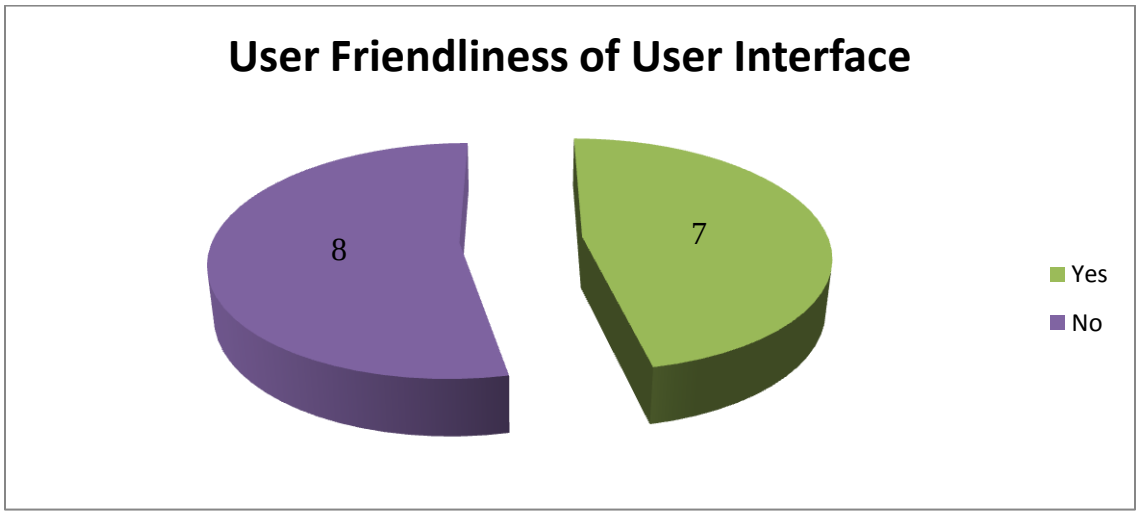



**Figure 2.16 User Friendliness of User Interface for Existing System**

The Figure 2.16 shows that there are 8 respondents feel the user interface of existing system is not user friendly since they cannot corporate well with the system while 7 kids feel there is user friendly.

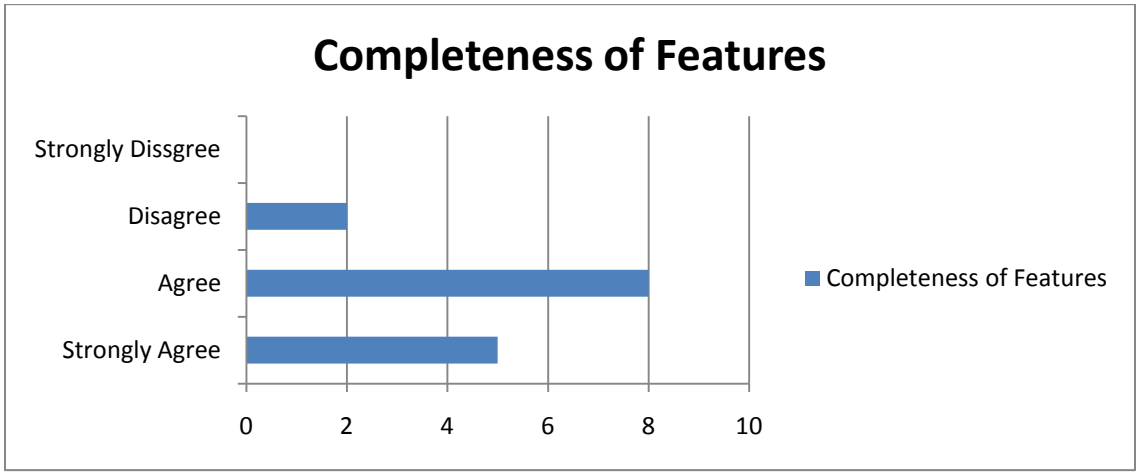



**Figure 2.17 Completeness of Features Required By Respondents**

The Figure 2.17 shows that 5 respondents are strongly agree the existing system has all the features required by a general user and 8 respondents agree the existing system has all the features required by a general user while 2 respondents are disagree the existing system has all the features required by a general user.

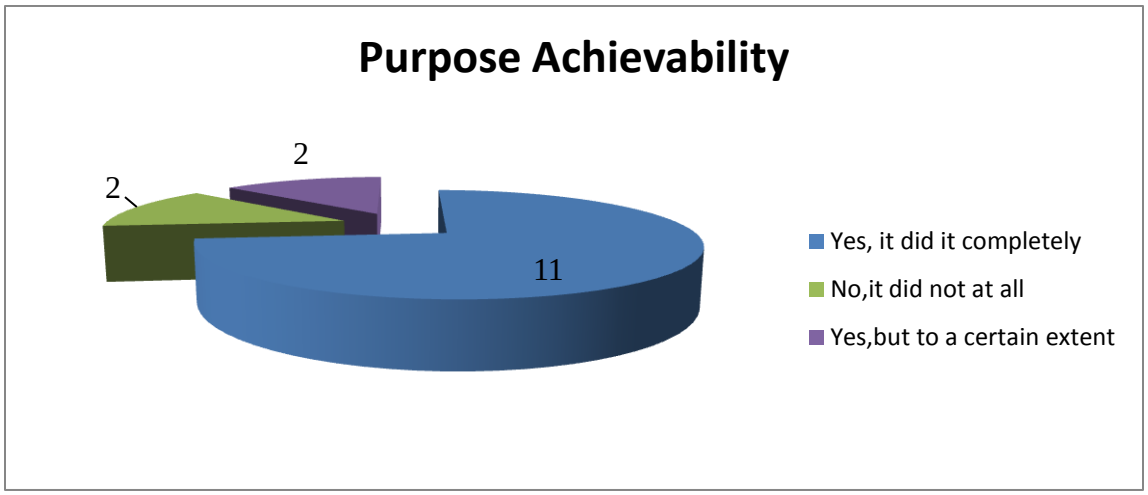



**Figure 2.18 Purpose Achievability of Respondents Using Existing System**

Form the figure 2.18, the author can know that 11 respondents are feel the existing system solve their purpose and 2 respondents are feel the existing system solve their purpose only to a certain extent while 2 respondents are feel the existing system no solve their purpose.

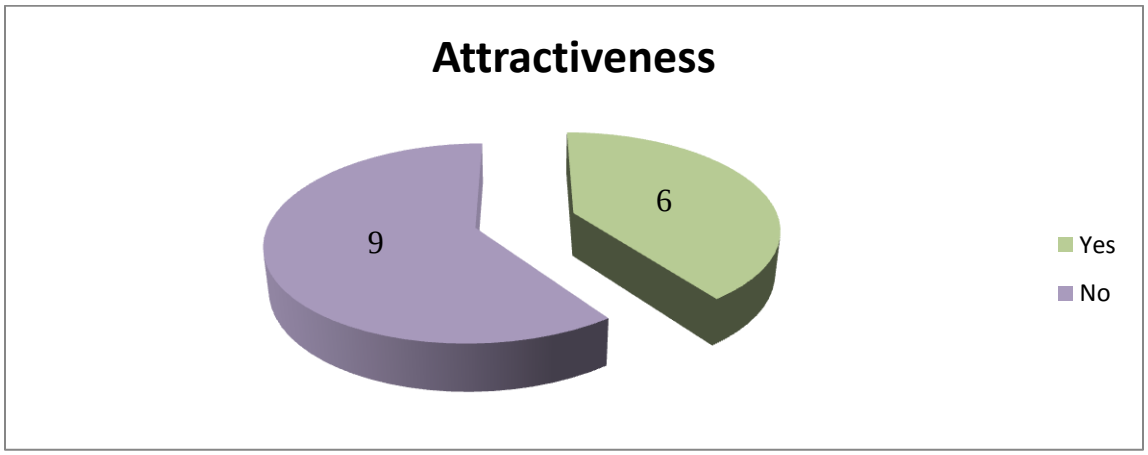


**Figure 2.19 Attractiveness of the Existing System**

The author able to know the result from Figure 2.19 which 9 respondents feel the design of existing courseware no attractive while 6 respondents feel there is not attractive.

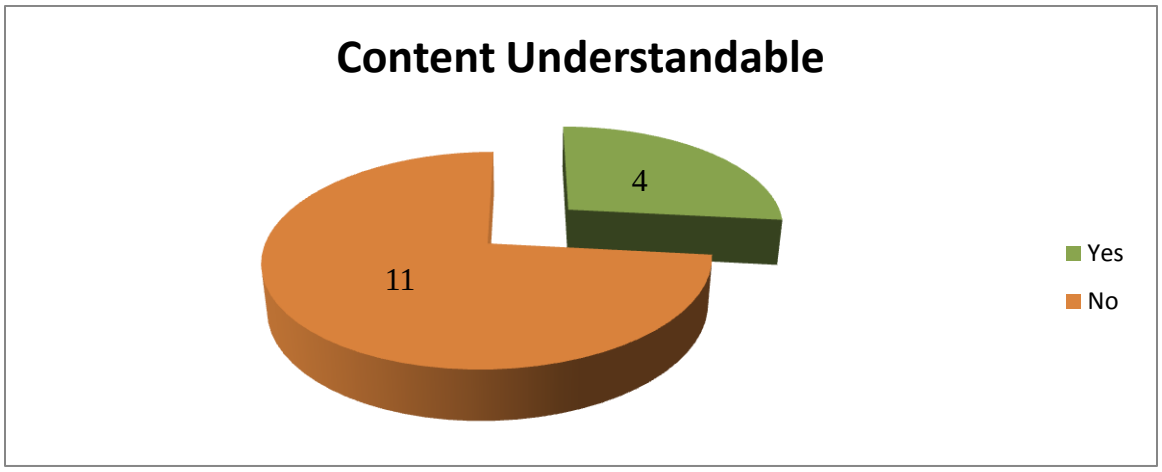



**Figure 2.20 Content Understandable of Exiting System**

The author is use questionnaire to test the respondents whether understand the content of the existing courseware. From the Figure 2.20 which show 11 respondents feel the content of existing courseware is not easy to understand while 4 respondents feel the content is easy to understand.

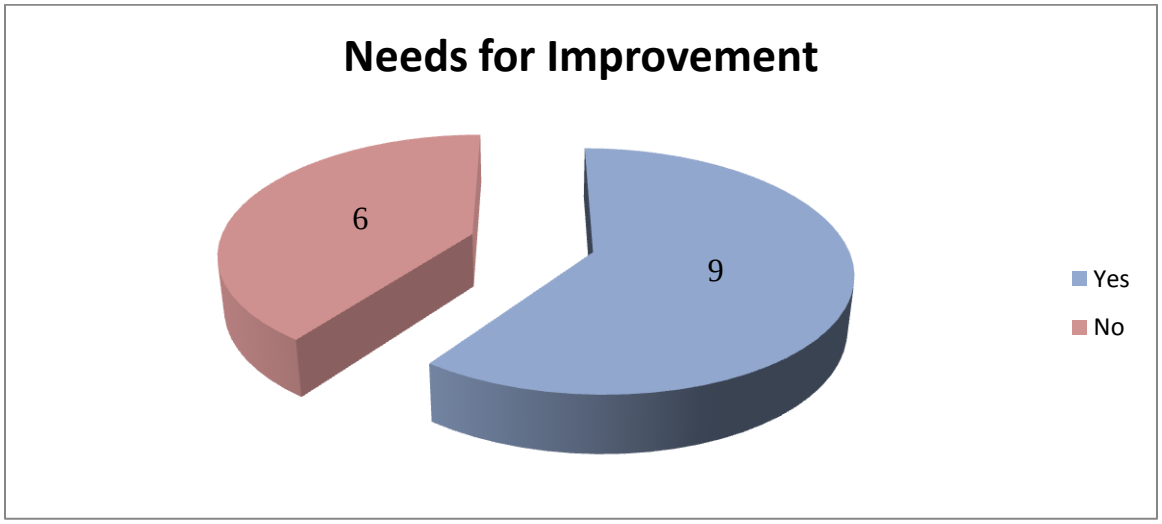


**Figure 2.21 Needs for Improvement for Existing System**

From Figure 2.21, there are 9 kids feel the design of the existing online courseware should be improve while 6 kids feels there is no necessary to improve the design of the system

Base on the result, the existing online multimedia courseware of math and animal for kids has some limitation which is the courseware is not attractive and the content of the system is hard to understand by the kids. The existing courseware also can't grab their attention and the user interface is not user friendly enough. Therefore, it is need for solution to solve the entire problem of existing system. This proposed courseware will make it more attractive by put more animation and colorful things to the system and make the content as simple as it can so that the kids can understand well. The kids can learn from the learning process if there is improvement from the existing courseware. This proposed courseware also will apply human computer interaction to design a user friendly interface.

# Chapter 3.0 Methodologies

## 3.1 ADDIE Model

### 3.1.1 Analysis

The author will identify the problem of existing online multimedia courseware and the problem of why the kids unable to use the courseware as their tools for learning. Besides that, the author also will identify the whether the kids like to use courseware compare to textbook and also the problem of traditional teaching. After that, the author will identify the objective to solve the problem statement. The objective is to develop a full interactivity online multimedia courseware at the field of math and animal for the kids. The author also wills analysis the needs of the kid.

The delivery method is online so that there is no transmission medium needed and the kids can have a basic knowledge of interact with the computer using online courseware.

### 3.1.2 Design

The author will base on the learning objective to design a prototype of the courseware of math and animal for the kids. The author also will determine the user interface is user friendly for the kids and the graphics design will more focus on animation so that can attract the kids. The content using will try to focus on graphics rather than word. It will make the kids easier to understand.

### 3.1.3 Development

The author will base on the prototype that design at the design phase to develop the courseware. All multimedia elements will be included to the system which is text, audio, animation, video and graphics. The using of text won't be too small and will add in color so that the kids can see clearly. The video also will include teaching the kids

learn math and animal as well. Besides, it will be include audio as well to make the system more interesting such as sound effect, background music and teaching the kids pronounce the animal name. To make the interface look good, button, decoration and graphics will be use. The most important element in multimedia is animation. Animation will be use to attract the attention and motivation of the kids to learn the interactivity online multimedia courseware. The developer will use Adobe Director and Adobe Flash to design the animation of the system.

### 3.1.4 Implementation

The author will deliver the product to the target audience-kids and let them go through the system. After the development phase, the proposed multimedia courseware is being exported into an executable format (.exe extension file type) as offline courseware. The author will make the courseware as offline and the kids can play without the internet. At the same time, the courseware also will publish as Shockwave File (.dcr file type). It is to embed the courseware to the website so that the kids can play the courseware anytime anywhere as long as internet is available.

### 3.1.5 Evaluation

The author will measure the system is effective for the kids to learn and opportunities to improve the kids' on-job performance. The author also will measure how well the project achieved its goals. The problem that the kids interact with the system also will be evaluated and make improvement for the system and will improve base on the feedback from the user.

### 3.1.6 Reason of using ADDIE model

The reason of developer choose ADDIE model to develop the courseware because ADDIE model is a generic, systematic, and step by step framework. This model can ensure course development does not occur in a haphazard, unstructured way. Besides, ADDIE model can ensure the learners will achieve the goals of the course and evaluation of learner's need is allowed so that the author can develop the base on the learner needs. The author also can evaluate each phases or between phases before go to implement the final version if discover any mistake of a phase.

Other than that, ADDIE model is also designed to ensure the design and development of training materials for learners. Last but not least, evaluation of effectiveness of the courseware will be made and make improvement from the user feedback.

## 3.2 Implementation Issues and Challenges

The major difficulties and challenges in online multimedia courseware-math and animal is the design of user interface and system. The author need to base on kids' requirement to design the user interface of the system. Although the kids are prefer animation and colorful things, but if u put the animation that they dislike also will affect they use the system. Besides, different kids like different color so is hard to use the colors that match all the kids. Base on the data collection – questionnaire, many kids are unsatisfied the design of the system and feel the existing system is not attractive. So it is hard to define what pattern of design can match most of the kids.

Besides, the author is facing what the features can add to the system so that the kids will more interesting to use the system. The features must be simple because the kids will don't know use complex features and play with the features. In addition, because the kids are too young, sometimes they don't know what they want actually and their express ability is not so good. With this situation, the author is hard to design the system base on user requirements. In the system development life cycle, the author must need to identify the user requirement and the author face big trouble at identify the user requirement..

Last but not least, the author had never using flash to design the animation. This is the big challenge for the author because the author needs to learn how to use the software and the coding to develop the system.

## 3.3 Timeline

### 3.3.1 Final Year Project 1

| Title | Period |
|---|---|
| **Analysis** | 51 days |
| **1.0 Introduction** | |
| **1.1 Motivation and Problem Statement** | |
| **1.1.1 Require to buy the existing online multimedia courseware** | 1 day |
| **1.1.2 User-interface of existing online multimedia courseware for kids is not user friendly** | 1 day |
| **1.1.3 Without using animation, colorful design for math and animal courseware** | 1 day |
| **1.1.4 Take times to understand the content** | 1 day |
| **1.1.5 No voice teaching** | 1 day |
| **1.2 Project Scope** | 1 day |
| **1.3 Project Objectives** | |
| **1.3.1 Free access for all individual** | 1 day |
| **1.3.2 Greatly improve in user interface** | 1 day |
| **1.3.3 Focus on animation content** | 1 day |
| **1.3.4 Greatly reducing in time for understand the content** | 1 day |
| **1.3.5 Provide voice teaching** | 1 day |
| **1.4 Impact, Significance and Contribution** | 1 day |
| **1.5 Background Information** | 1 day |
| **2.0 Literature Review** | |
| **2.1 Learning Theory** | |
| **2.1.1 The basics of behaviorism** | 1 day |

| | |
|---|---|
| **2.1.2 The basics of cognitivism** | 1 day |
| **2.1.3 The basics of constructivism** | 1 day |
| **2.2 Learning mathematics through games** | 1 day |
| **2.3 Game Base Learning** | 1 day |
| **2.4 ADDIE Model** | |
| **2.4.1 Analysis** | 1 day |
| **2.4.2 Design** | 1 day |
| **2.4.3 Development** | 1 day |
| **2.4.5 Implementation** | 1 day |
| **2.4.6 Evaluation** | 1 day |
| **2.5 Introduction of Multimedia** | |
| **2.5.1 The Components of Multimedia** | 1 day |
| **2.5.2 The Importance of Multimedia** | 1 day |
| **2.5.3 Benefits of Multimedia** | 1 day |
| **2.5.4 Limitation of Multimedia** | 1 day |
| **2.5.5 Application of Multimedia** | 1 day |
| **2.6 Animation Technique** | |
| **2.6.1 Introduction of Animation** | 1 day |
| **2.6.2 Type of Animation** | 1 day |
| **2.7 What is Interactivity?** | |
| **2.7.1 Introduction to Interactivity** | 1 day |
| **2.7.2 Interactivity Level** | 1 day |
| **2.7.3 Usefulness of Interactivity** | 1 day |
| **2.8 What is Multimedia Courseware?** | |
| **2.8.1 Introduction of Multimedia Courseware** | 1 day |
| **2.8.2 Benefit of Multimedia Courseware** | 1 day |
| **2.8.3 Limitation of Multimedia Courseware** | 1 day |
| **2.8.4 Comparison between Multimedia Courseware and Traditional Teaching** | 1 day |
| **2.9 Comparison of Existing Online Multimedia Courseware** | |
| **2.9.1 Kaboose – Cannon Math** | 1 day |

| | |
|---|---|
| **2.9.2 The kids page.com – Math Picture Puzzle** | 1day |
| **2.9.3 Game for kids – Backyard Animals** | 1 day |
| **2.9.4 Summary of Comparison with Existing Online Multimedia Courseware** | 1 day |
| **2.10 Fact Finding** | |
| **2.10.1 Research** | 1 day |
| **2.10.2 Observation** | 1 day |
| **2.10.3 Questionnaire** | 1 day |
| **2.11 Data Collection** | |
| **2.11.1 Observation** | 1 day |
| **2.11.2 Questionnaire** | 7 days |
| **Design** | 21 days |
| **1.0 ADDIE Model** | |
| **1.1 Analysis** | 1 day |
| **1.2 Design** | 1 day |
| **1.3 Development** | 1 day |
| **1.4 Implementation** | 1 day |
| **1.5 Evaluation** | 1 day |
| **2.0 Implementation Issue and Challenges** | 1 day |
| **3.0 Requirement Specification** | |
| **3.1 User Requirement** | |
| **3.1.1 Functional Requirement** | 1 day |
| **3.1.2 Non-Functional Requirement** | 1 day |
| **3.2 System Performance** | |
| **3.2.1 Hardware Requirements** | 1 day |
| **3.2.2 Software Requirements** | 1 day |
| **3.3 Design and Verification Plan** | 2 days |
| **4.0 Storyboard Design** | 9 days |
| **Finalize Final Year Project 1 Documentation** | 1 day |

| | |
|---|---|
| **Preparation Work for Presentation** | 1 day |

**Table 3.1 Final Year Project 1 Planning**

| Year : 2012 | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No** | **Planning** | **Jan** | | | | | **Feb** | | | | **March** | | | | **April** | | | |
| | | **W 1** | **W 2** | **W 3** | **W 4** | **W 5** | **W 1** | **W 2** | **W 3** | **W 4** | **W 1** | **W 2** | **W 3** | **W 4** | **W 1** | **W 2** | **W 3** | **W 4** | **W 5** |
| **1** | **Analysis** | | | | | | | | | | | | | | | | | |
| **2** | **Design** | | | | | | | | | | | | | | | | | |
| **3** | **Finalize Final Year Project 1 Documentation** | | | | | | | | | | | | | | | | | |
| **4** | **Preparation Work for Presentation** | | | | | | | | | | | | | | | | | |

**Table 3.2 Gantt Chart 1- Final Year Project 1**

### 3.3.2 Final Year Project 2

| Title | Period |
|---|---|
| **Development** | 53 days |
| **1.0 Determine the final storyboard design** | 2 days |
| **2.0 Design and Develop Multimedia Courseware** | |
| **2.1 Math** | |
| **2.1.1 Menu** | 1 days |
| **2.1.2 Buttons** | 1 days |
| **2.1.3 Graphics** | 2 days |
| **2.1.4 Animation** | 3 days |
| **2.1.5 Audio** | 1 days |
| **2.1.6 Video** | 1 days |
| **2.1.7 Game (addition and subtraction)** | 7 days |
| **2.2 Animal** | |
| **2.2.1 Menu** | 1 days |
| **2.2.2 Buttons** | 1 days |
| **2.2.3 Graphics** | 2 days |
| **2.2.4 Animation** | 3 days |
| **2.2.5 Audio** | 1 days |
| **2.2.6 Video** | 1 days |
| **2.2.7 Game** | 7 days |
| **2.3 Fun Game** | 14 days |
| **3.0 Implementation the content/materials** | 5 days |
| **4.0 Design Review and Modification** | 2 days |
| | |
| **Implementation** | 11 days |
| **1.0 Online and Offline Multimedia Courseware Testing** | 7 days |
| **2.0 Install Multimedia Courseware into target audience's** | 4 days |

| | |
|---|---|
| **computer** | |
| | |
| **Evaluation** | 7 days |
| **1.0 Conduct Surveys** | 4 days |
| **2.0 Analyze Surveys** | 1 days |
| **3.0 Evaluate Overall Project** | 2 days |

**Table 3.3 Final Year Project 2 Planning**

| **Year : 2013** | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No** | **Planning** | **Jan** | | | **Feb** | | | | **March** | | | | **April** | | | |
| | | **W 1** | **W 2** | **W 3** | **W 4** | **W 5** | **W 6** | **W 7** | **W 8** | **W 9** | **W 10** | **W 11** | **W 12** | **W 13** | **W 14** | **W 15** | **W 16** |
| **1** | **Development** | | | | | | | | | | | | | | | | |
| **2** | **Implementation** | | | | | | | | | | | | | | | | |
| **3** | **Evaluation** | | | | | | | | | | | | | | | | |

**Table 3.4 Gantt Chart 2 – Final Year Project 2**

## 3.4 Requirement Specification

### 3.4.1 User Requirement

User requirements capture is a process used to understand what users need and aspect from the system. The information that is collected can used to identify a list of content, features and functionality of the new service must have in order to satisfy the needs of its users. User requirement capture can save time by validating the scope of a project base on user need before start to develop the system. The method that the developer uses to capture user requirement is use case diagram.

From the Figure 3.4, the kids can see the description of the author and courseware. The kids can also choose the course they want either math or animal course. If the users choose the math course, they can learn how the addition and subtraction work and can practice through the game. They also can watch the math video which is provide in the courseware. For animal course, the user can learn how the animal yell and voice teaching of the animals' name also will include. At last, they also can watch the animal video. Besides, the author can update and maintain the system.

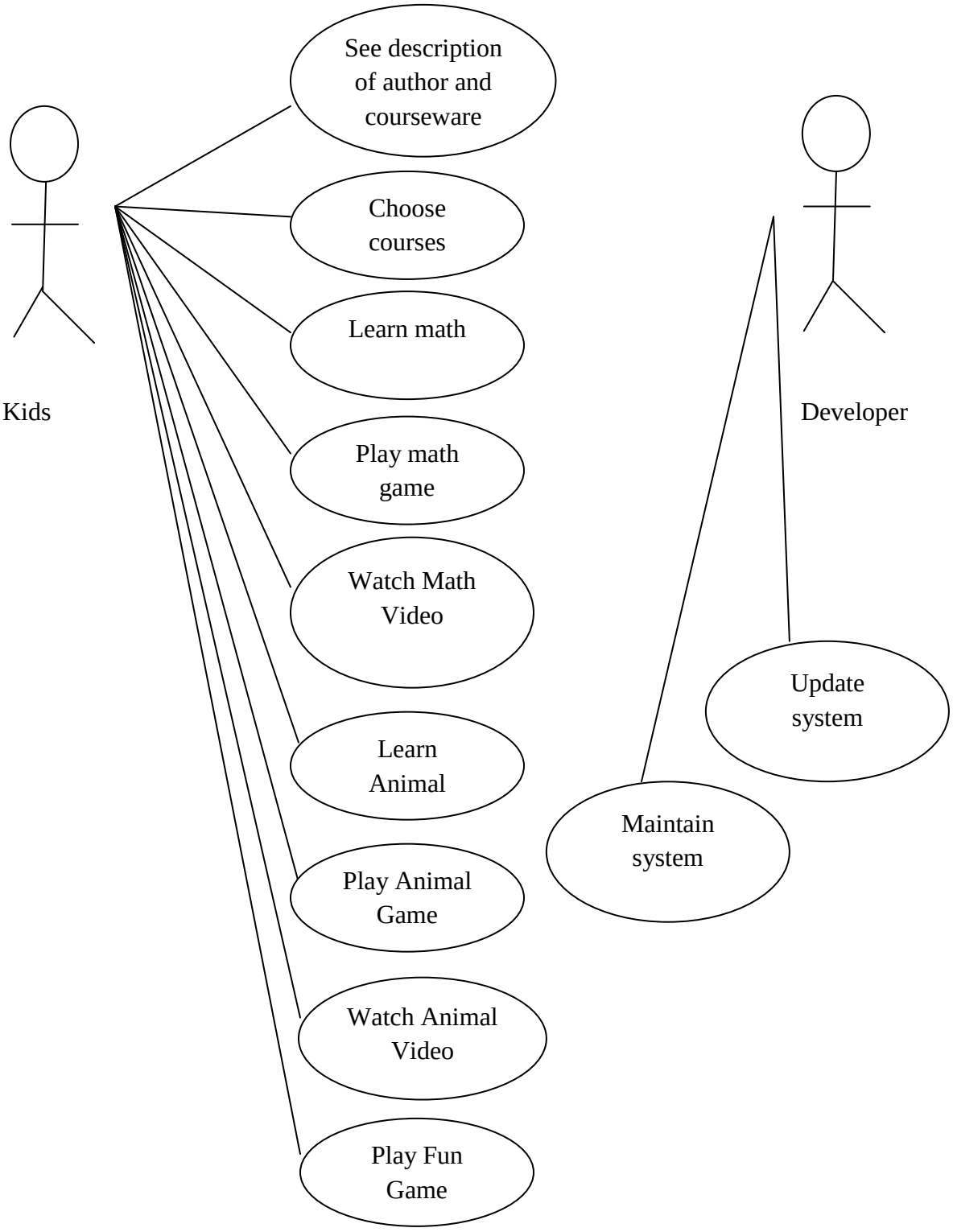



**Figure 3.1 Use Case Diagram (Source: The author)**

#### *3.4.1.1Functional Requirement*

Functional requirement is describe what s system can do and the function it should be perform in certain condition. These are the functional requirement proposed multimedia courseware-math and animal for kids.

- The kids can choose the course they want to learn which is math and animal.
- The kids can choose to learn the math related to addition and subtraction before practice.
- The kids able to practice through mini math flash game.
- Video regarding math also had been provided in the courseware.
- The courseware allows the kids to learn how to pronoun animals' name and what sound should the animal make. Voice teaching for the animal course.
- Same as math course, the kids also can practice through the animal game which develops by author.
- The animal course also has provides video regarding the animals name and the sound make by them.
- To reduce stress and attract child, the author has add in additional game which is a car parking game to entertain the kids.
- The author can maintain and update the system in the website.

#### *3.4.1.2 Non-Functional Requirement*

Non-functional requirement is the requirement that the system must meet the specific measurement. Below are the non-functional requirement that the e-learning system-math and animal need.

- Performance: The response time of the system must be fast. For example, when the kids choose the answer, the system must be fast respond whether the answer is correct or wrong. If correct will has special effect but if wrong also will tell you the answer is wrong.
- Reliability: The system must not be encounter error when the kids play with the system.

- Ease of use: The system should be usability as the design interface should be simple and not complicated by the kids so that the kids can use the system to learn the course that provide in the system.
- Accurate: Accurate answer should provide when the kids are answer wrong the question.

### 3.4.2 System Performance

#### *3.4.2.1 Hardware Requirements*

Online multimedia courseware is an online course so that it must require a basic level of hardware to access properly all course material that provide from the e-learning system and also develop the system.

| Hardware | Specification | Description |
|---|---|---|
| **Processor** | User -1.3 Ghz or higher.<br>Developer - Minimum 2.20 Ghz | Dictates how fast your computer can perform particular functions. |
| **Memory** | User - At least 1 GB of RAM (random access memory).<br>Developer – At least 2 GB RAM | To store information on user computer, including files and software programs. |
| **Modem** | Baud rate of at least 56 K (baud rate measures the amount of information processed per second) | Download information more quickly with high-speed internet |
| **Sound Card and Speaker** | 16-bit sound card or higher | Need sound card and speakers install to your computer to hear the audio and video file |
| **Input device such as keyboard and mouse** | Any brand of input device. | For user and developer input. |

| | | |
|---|---|---|
| **Graphic card** | 16 bit color or higher | To display the graphics and animation. |

**Table 3.3 List of Hardware Requirements (Source: The author)**

### *3.4.2.2 Software Requirements*

| Software | Description | Usage |
|---|---|---|
| **Operating System** | - Windows XP,Vista or 7<br>- 32-bit Operating System or 64-bit Operating System | An up-to-date operating system is a requirement for many online programs. |
| **Browser** | Internet Explorer 7,8<br>Mozilla Firefox 3.5, 3.6<br>Google Chrome | Web browser use to search online learning system |
| **Microsoft Office** | It includes MS. Word, PowerPoint, Project, Visio and etc. | For documentation purpose. |
| **Adobe Director** | create and publish compelling interactive games, demos, prototypes, simulations, and multimedia courseware. Integrate virtually any major file format, including FLV and native 3D content. | Arrange all the modules well and combine all sub modules into a single courseware. Sound also had been imported to the courseware. |
| **Adobe Flash** | The industry standard for | Create animation of the cartoon, |

| | | |
|---|---|---|
| | interactive authoring and delivery of immersive experiences that present consistently across personal computers, mobile devices, and screens of virtually any size and resolution. | button and so on. Game also develops using Flash. |
| **Adobe Photoshop** | It delivers breakthrough capabilities for superior image selections, image retouching, realistic painting, and 3D extrusions. | Perform image editing for the courseware designs. |
| **Gold Wave Editor** | It's a professional digital audio editor. It does everything from the simplest recording and editing to the most sophisticated audio processing, restoration, and | Use to edit the audio and use for the courseware. |
| **Jodix WMA to MP3 Converter** | It converts audio formats From WMA to MP3 format. Also including re-sampling. Audio format conversion is performed directly without storing | Use to convert the format of audio to standard format so that can be import to the Director. |

| | | |
|---|---|---|
| | any temporary files. | |
| **Sound Recorder** | A build in sound recorder in the computer. | Use to record the sound from internal computer such as Google Translate. |

**Table 3.4 List of Software Requirements (Source: The author)**

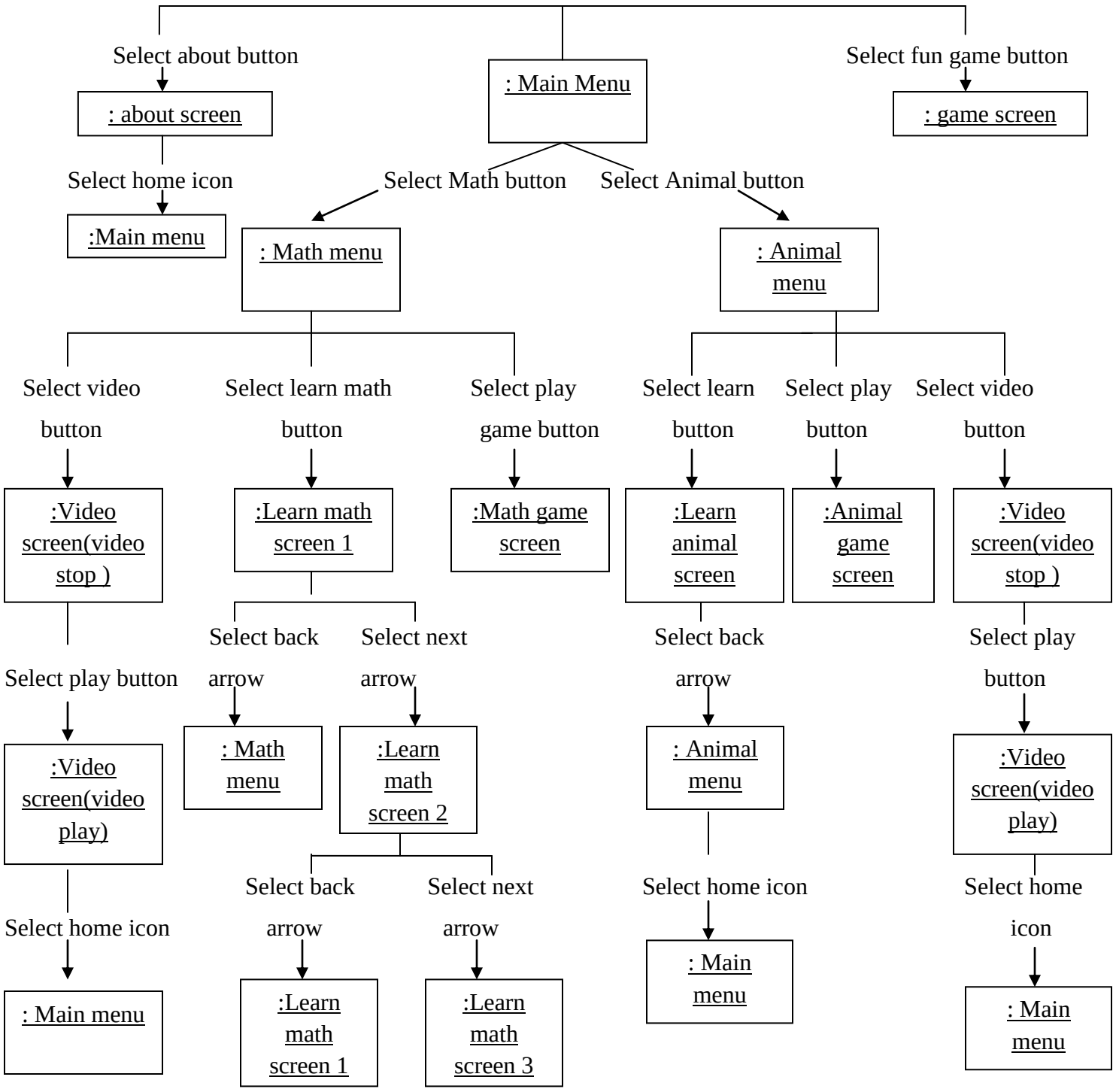
### 3.4.3 Design and Verification Plan

User interface prototypes are use to describe the user interface of the proposed courseware. The limitation of prototype is can often bogged down in the details of how the interface will actually work. Therefore, it will miss the high-level relationship and interaction between the interfaces objects (usually screens) of the application. The diagram that allows you to model all these high-level relationship is interface-flow-diagrams (Page-Jones, 1995; Ambler, 1998a; Ambler, 1998b).

From the Figure 3.5, there will be a main menu for the system. Inside the menu will be two courses available for the kids which are math and animal course and fun game to let the kids choose. The kids can either choose one course to learn. If the kids choose math, the system will process to math menu to give the kids choose what option they want such learn math, play game or watch video. The courseware will go to math lesson if the kids choose learn math which is regarding addition and subtraction while the kids can practice through the game if they choose game option. If the kids are interest to watch the video they can choose go to watch video option.

For animal course, same as math menu there also will be 3 option let the kids choose which is learn animal, animal game and animal video. If the kids want to learn animal first they can go choose learn animal. There will be teaching the kids voice teaching of animals' name and the sound make by each animal. The courseware will proceed to animal game if the kids choose animal game while if the kids wish to watch animal video, the courseware also will link to the animal video screen.

Besides that, a fun game is added to the proposed courseware to reduce the stress of the kids. The game is a car parking game where the kids need to control the car to a valid location car parking.



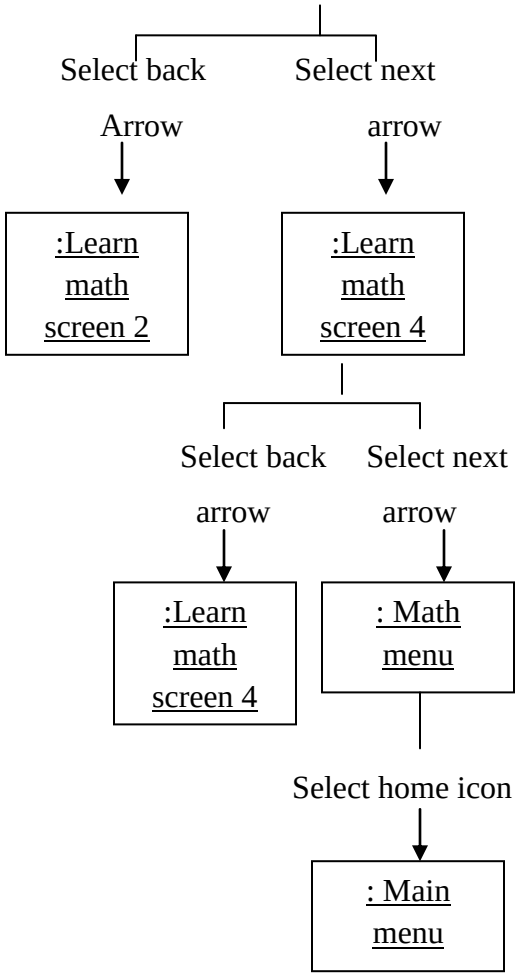



**Figure 3.2 Interface Flow Diagram (Source: The author)**

### 3.5 Storyboard Design

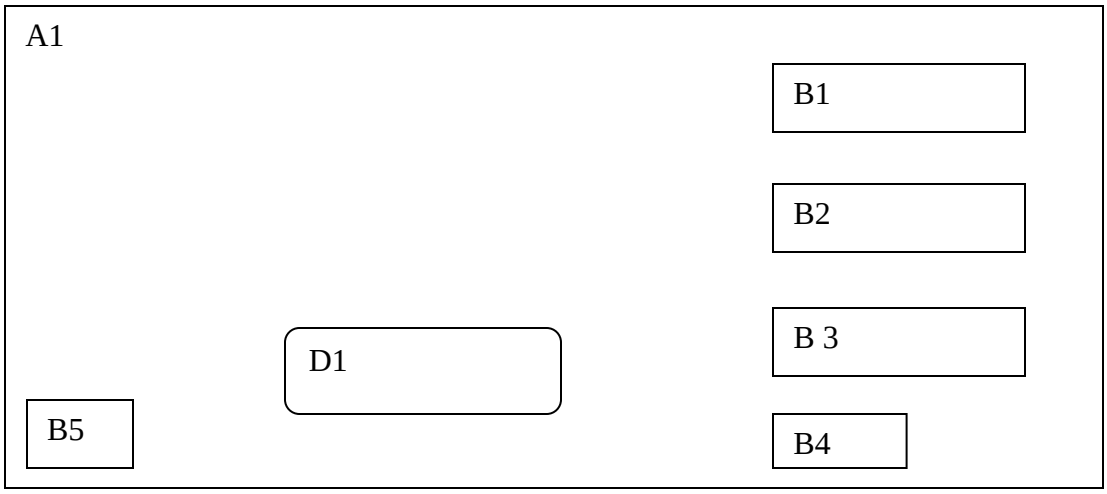



**Figure 3.3 Main Menu (Source: The author)**

| Label | Description |
|---|---|
| **A1** | Background picture of the courseware |
| **B1** | "Math" button will link to the math menu and it is a animation when mouse over |
| **B2** | "Animal" button will link to the animal menu and it is a animation when mouse over |
| **B3** | "Fun Game" button will link to a car parking game to let the kids play and it is a animation when mouse over |
| **B4** | "About" button to link to a page which describe the author and the courseware. |
| **B5** | "Sound" button will play and mute the sound. |
| **D1** | Title of the courseware. |

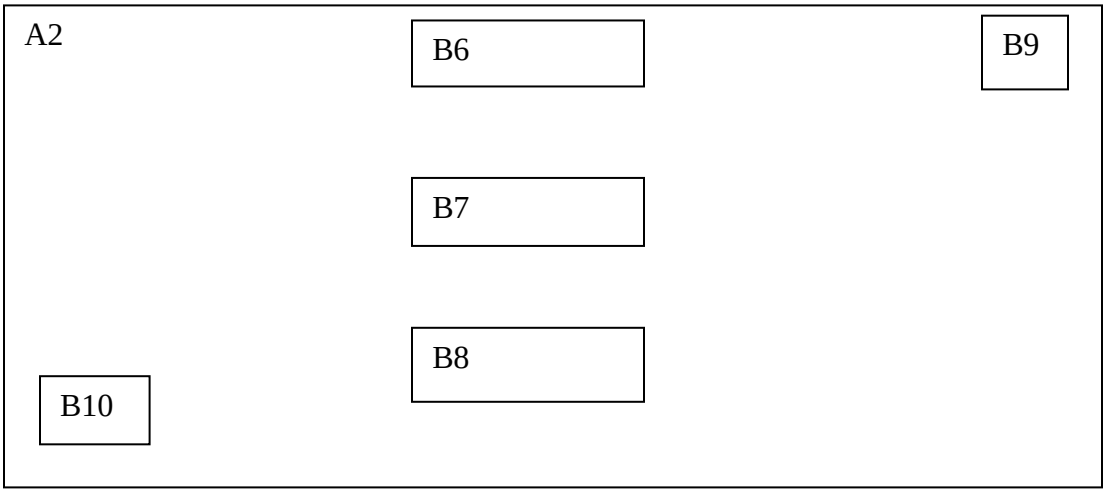



**Figure 3.4 Math Menu Page (Source: The author)**

| Label | Description |
|---|---|
| **A2** | Background picture of the courseware |
| **B6** | "Learn" button will go to the math learning lesson. |
| **B7** | "Game" button will go to the Math Flash Game regarding addition and subtraction. |
| **B8** | "Video" button will go to a Math Video which relates to math to let the kids watch. |
| **B9** | "Home" button will link to the Main Menu and it is a animation when mouse over |
| **B10** | "Sound" button will play and mute the sound. |

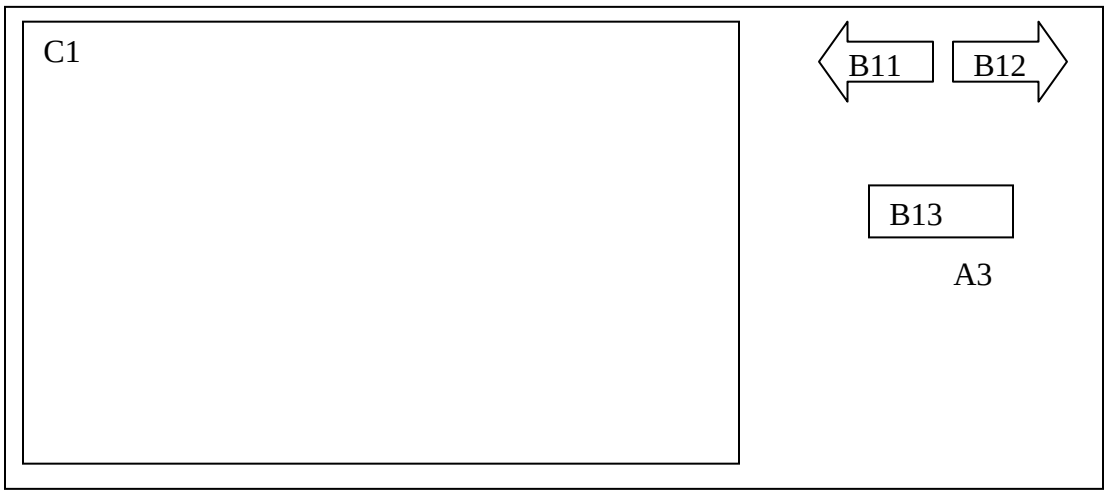



**Figure 3.5 Math Learn Lesson 1 (Source: The author)**

| Label | Description |
|---|---|
| **A3** | Background picture of the Math Learn Lesson 1. |
| **B11** | "Back" button will go to the Math Menu and it is design as an animation. |
| **B12** | "Next" button will link to the Math Learn Lesson 2 and it is design as an animation.. |
| **B13** | "Start" button will start the learning math lesson. |
| **C1** | Math learn lesson 1. |

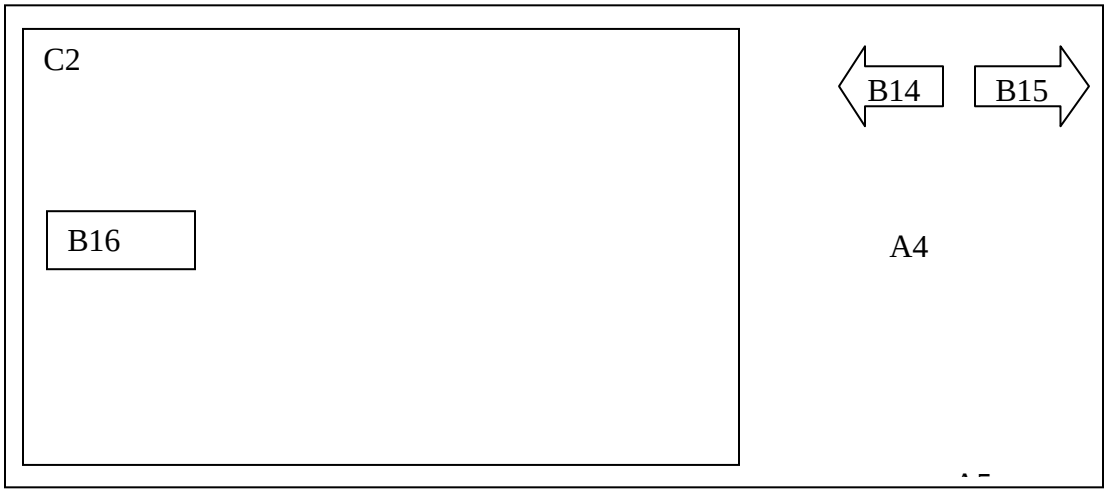



**Figure 3.6 Math Learn Lesson 2 (Source: The author)**

| Label | Description |
|---|---|
| **A4** | Background animation Math Learn Lesson2. |
| **B14** | "Back" button will go to the Math Learn Lesson 2 and it is design as an animation. |
| **B15** | "Next" button will link to the Math Learn Lesson3 and it is design as an animation.. |
| **B16** | "Start" button will start the learning math lesson. |
| **C2** | Math learn lesson 2. |

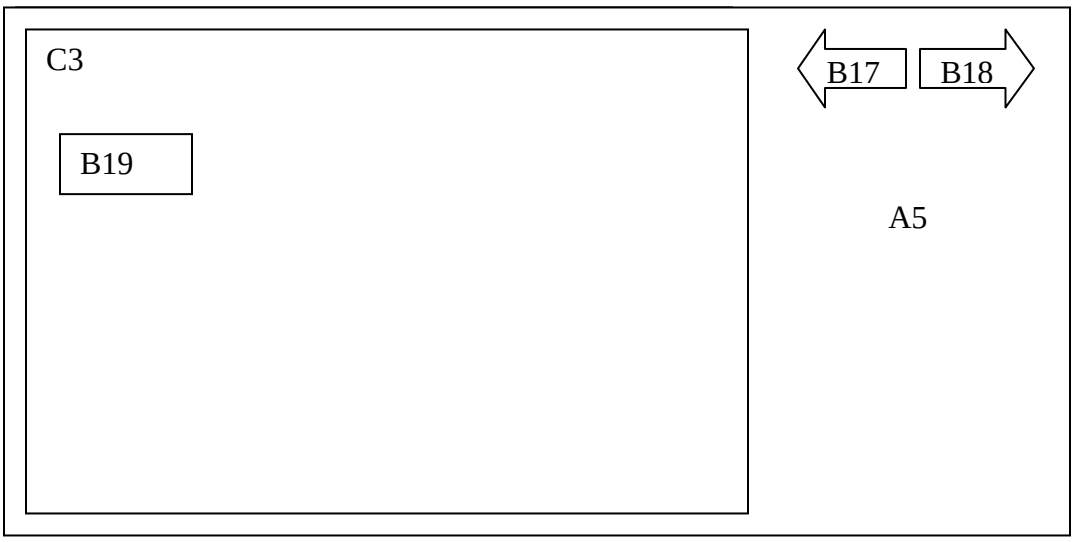



**Figure 3.7 Math Learn Lesson 3 (Source: The author)**

| Label | Description |
|---|---|
| **A5** | Background of the Math Learn Lesson3. |
| **B17** | "Back" button will go to the Math Learn Lesson 2 and it is design as an animation. |
| **B18** | "Next" button will link to the Math Learn Lesson 4 and it is design as an animation. |
| **B19** | "Start" button will start the learning math lesson. |
| **C4** | Math learn lesson 3. |

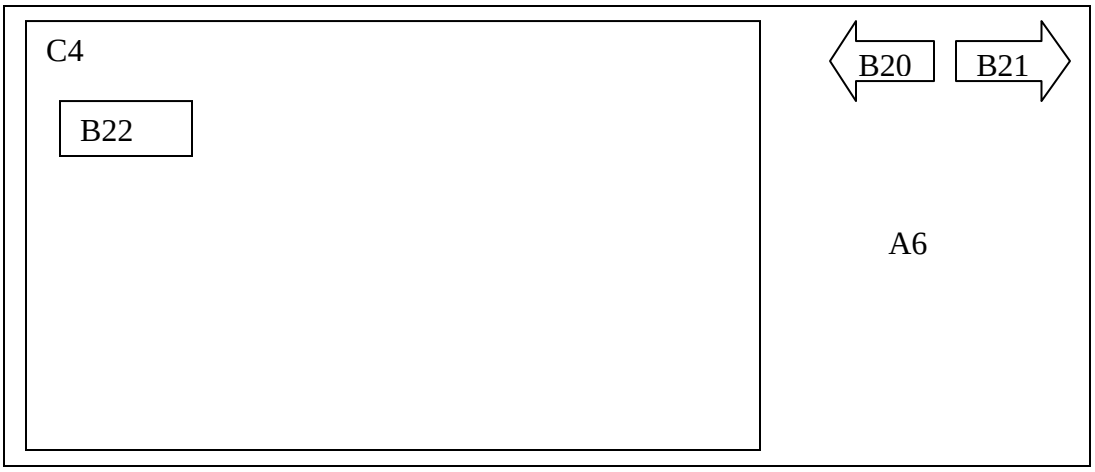



**Figure 3.8 Math Learn Lesson 4 (Source: The author)**

| Label | Description |
|---|---|
| **A6** | Background animation of the Math Learn Lesson 4. |
| **B20** | "Back" button will go to the Math Learn Lesson 4 and it is design as an animation. |
| **B21** | "Next" button will link to the Math Menu and it is design as an animation. |
| **B22** | "Start" button will start the learning math lesson. |
| **C4** | Math learn lesson 4. |

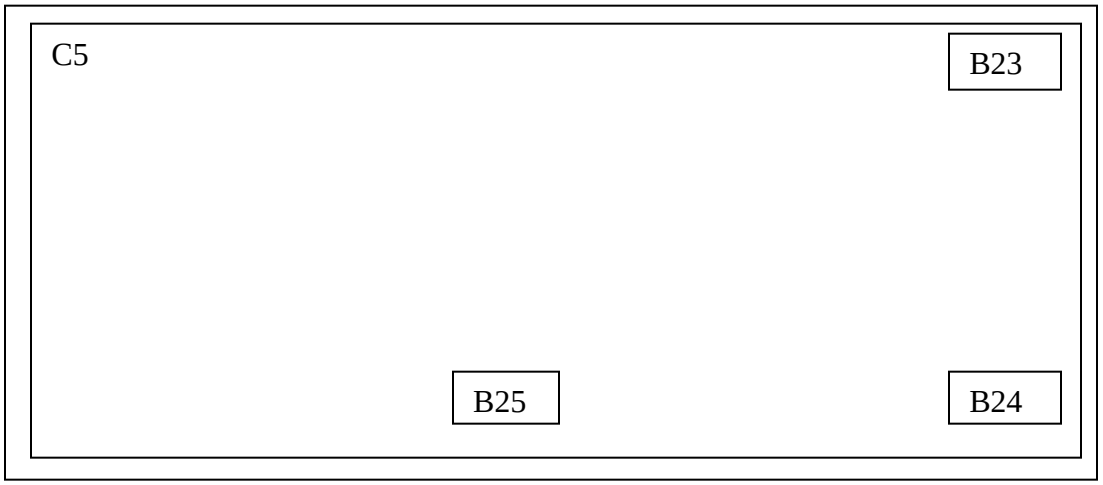



**Figure 3.9 Math Flash Game (Source: The author)**

| Label | Description |
|---|---|
| **B23** | "Sound" button will turn on or mute the background music. |
| **B24** | "Next" button will go to the next questions and it is design as an animation. |
| **B25** | "Retry" button will restart the math game. |
| **C5** | Math flash game of addition and subtraction. |

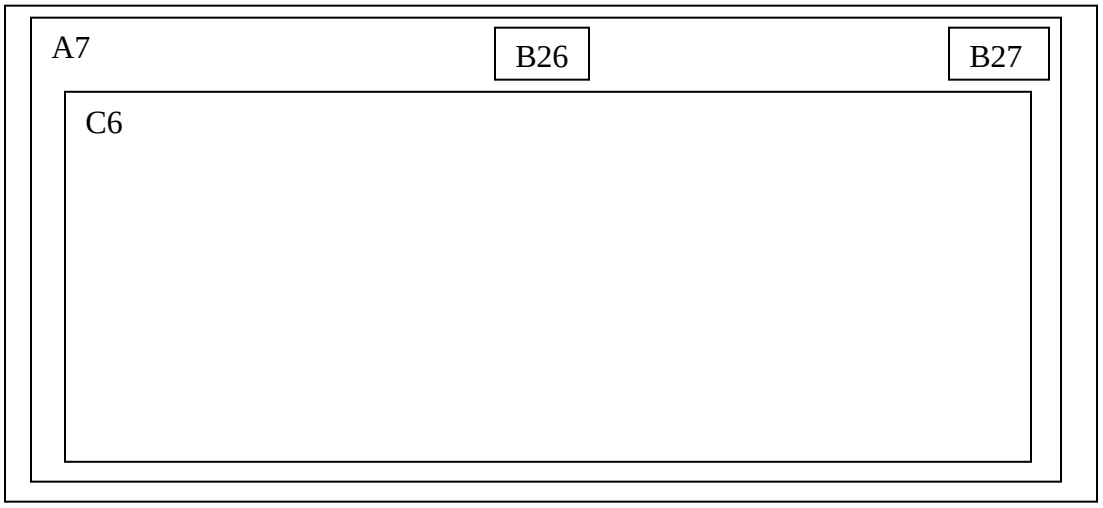



**Figure 3.10 Math Video Page (Source: The author)**

| Label | Description |
|---|---|
| **A7** | Background animation of the Math Video. |
| **B26** | "Play" button will play the math video. |
| **B27** | "Home" button will go to the Main Menu. |
| **C6** | Math video regarding addition and subtraction. |

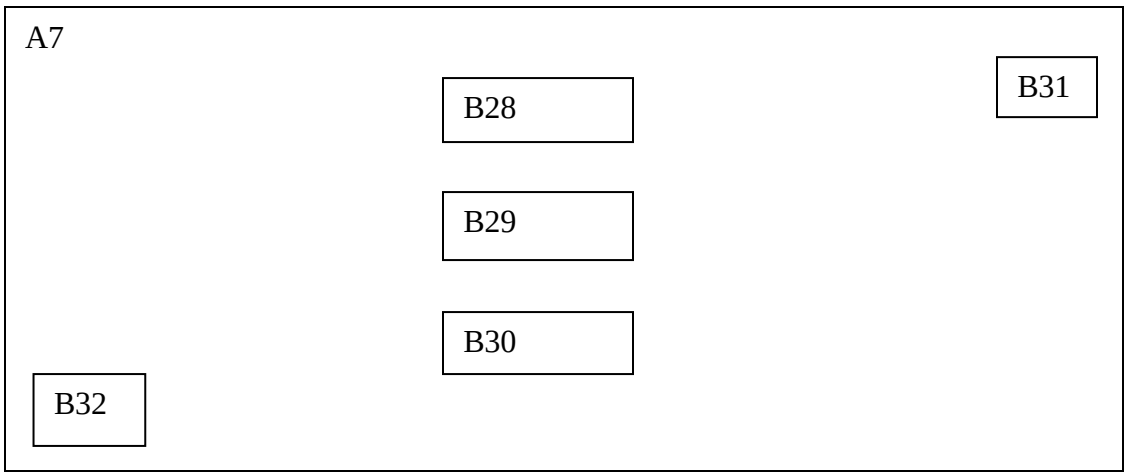



**Figure 3.11 Animal Menu Page (Source: The author)**

| Label | Description |
|---|---|
| **A7** | Background animation of the Animal Menu. |
| **B28** | "Learn" button will go to Learn Animal Lesson. |
| **B29** | "Game" button will go to the Animal Flash Game. |
| **B30** | "Video" button will go to Animal Video which relates to math to let the kids watch. |
| **B31** | "Home" button will go to Main Menu. |
| **B32** | "Sound" button will play and mute the sound. |

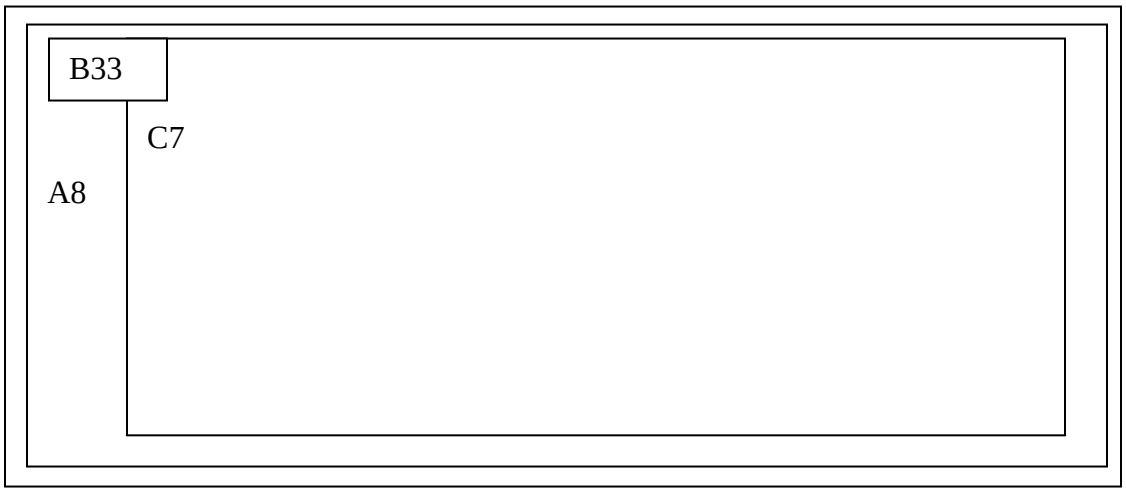



**Figure 3.12 Animal Lesson (Source: The author)**

| Label | Description |
|---|---|
| **A8** | Background animation of the Animal Lesson. |
| **B33** | "Back" button will go to Animal Menu. |
| **C7** | Animal Lesson regarding how to pronoun animals' name and sound of animal. |

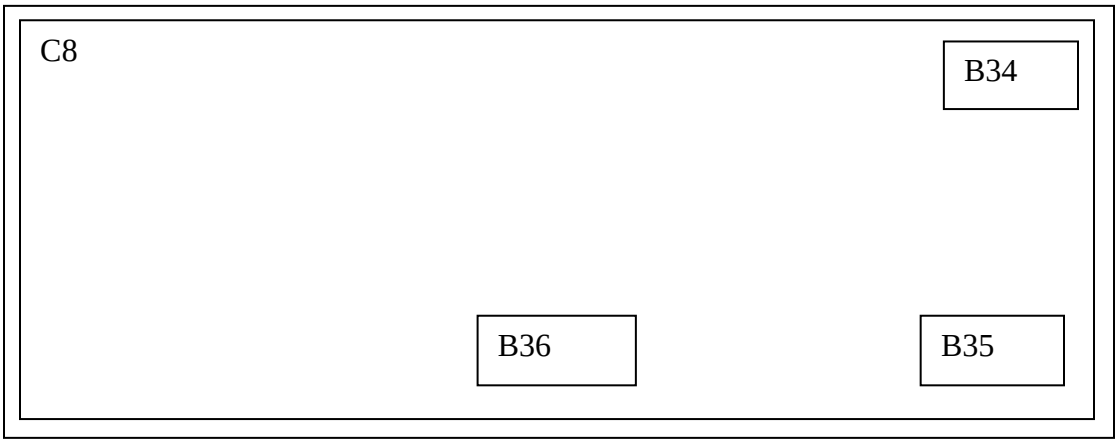



**Figure 3.13 Animal Flash Game (Source: The author)**

| Label | Description |
|---|---|
| **B34** | "Sound" button will turn on or mute the background music. |
| **B35** | "Next" button will go to the next questions and it is design as an animation. |
| **B36** | "Retry" button will restart the math game. |
| **C8** | Animal flash game regarding name of animal, the sound belong to what animal and choose the right animal after hear the pronounce of animal. |

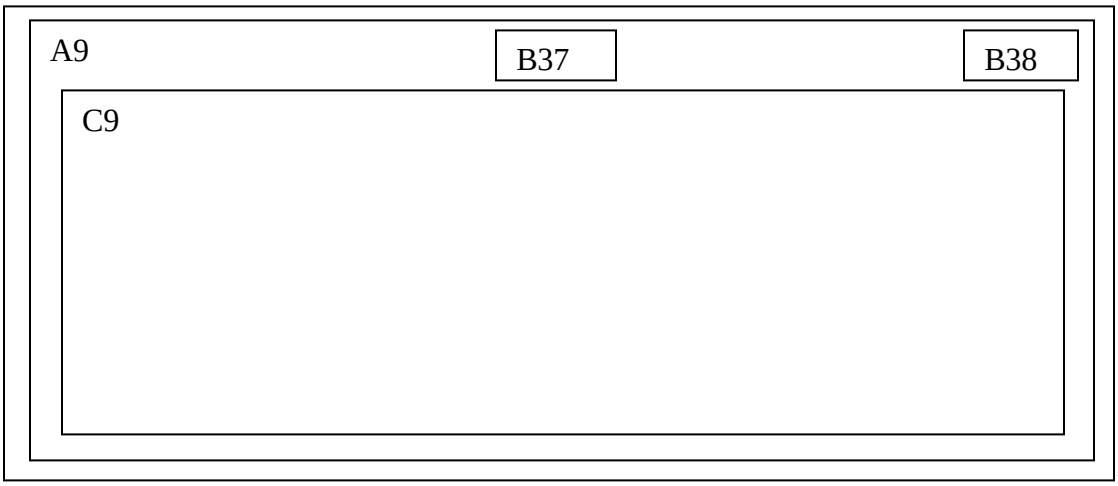


**Figure 3.14 Animal Video (Source: The author)**

| Label | Description |
|---|---|
| **A9** | Background animation of the Animal Video. |
| **B37** | "Play" button will play the animal video. |
| **B38** | "Home" button will go to the Main Menu. |
| **C9** | Animal video regarding how to pronoun animals' name and the sound of animal. |

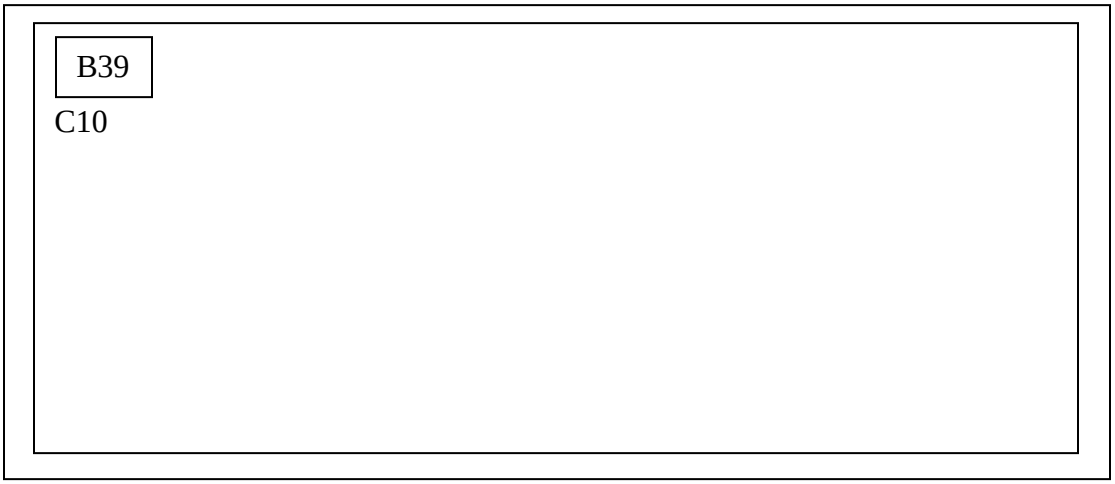



**Figure 3.15 Fun Game (Source: The author)**

| Label | Description |
|---|---|
| **B39** | "Sound" button to turn on or turn off the sound. |
| **C10** | Fun Game regarding to a car parking game to entertain the kids. |

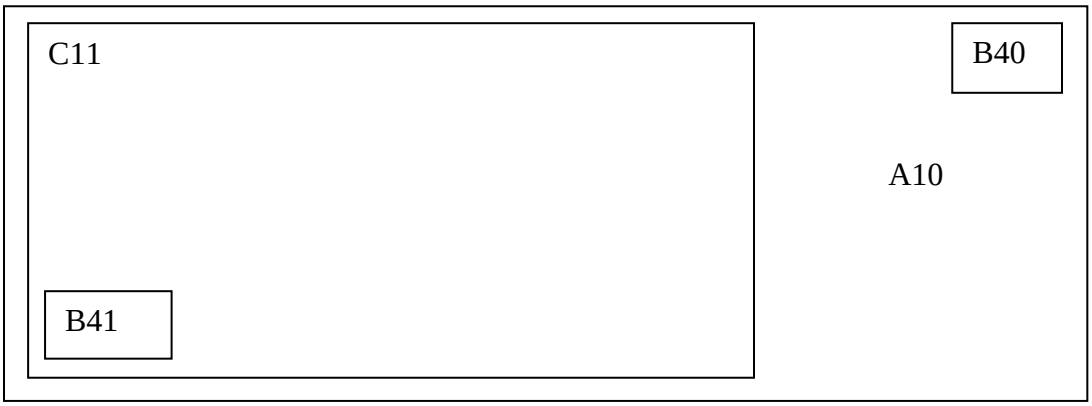



**Figure 3.16 About Page (Source: The author)**

| Label | Description |
|---|---|
| **A10** | Background animation of About page. |
| **B40** | "Home" button will go to the Main Menu. |
| **B41** | "Sound" button will turn on or mute the background music. |
| **C11** | Description of author and courseware. |

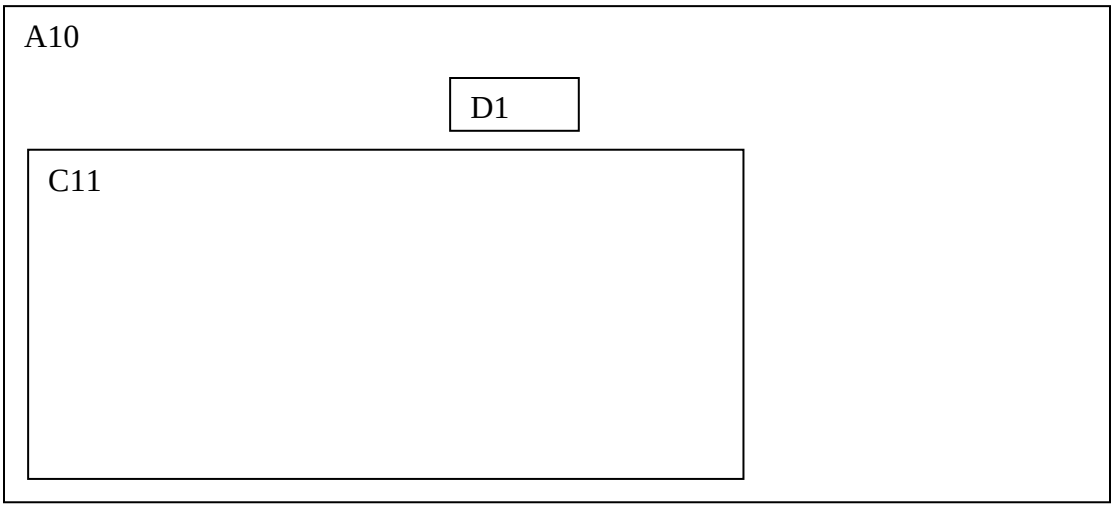



**Figure 3.17 Courseware in Website (Source: The author)**

| Label | Description |
|---|---|
| **A11** | Background animation of website. |
| **C12** | Courseware of math and animal. |
| **D1** | Label text in the website. |

## Chapter 4.0 Development

### 4.1.Pre- Authoring Process

The author creates contents and multimedia elements such as video, text, graphic or image, animation, and audio in pre-authoring process. Generally the author uses software on desktop computer to perform development in this process. Software and application details will be stated below.

### 4.1.1 Process of Editing Picture

Since it is a multimedia courseware for kids, all the pictures using must be attractive and pretty. The author online search and download many picture which will suitable to use in the courseware.

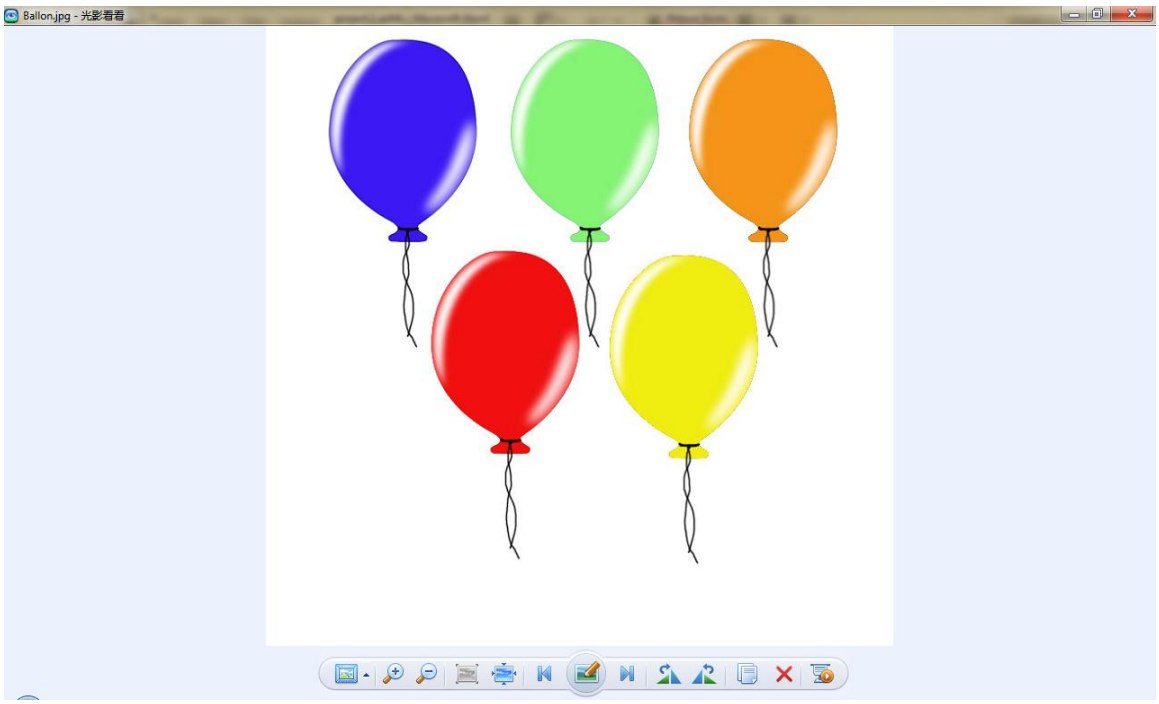



**Figure 4.1 Picture of Balloon (Source: The author)**

After that, the author will edit the picture of balloon using Adobe Photoshop CS4 to cut and edit the background becomes transparent. All the picture will save as PNG format so that the picture will in transparent background.

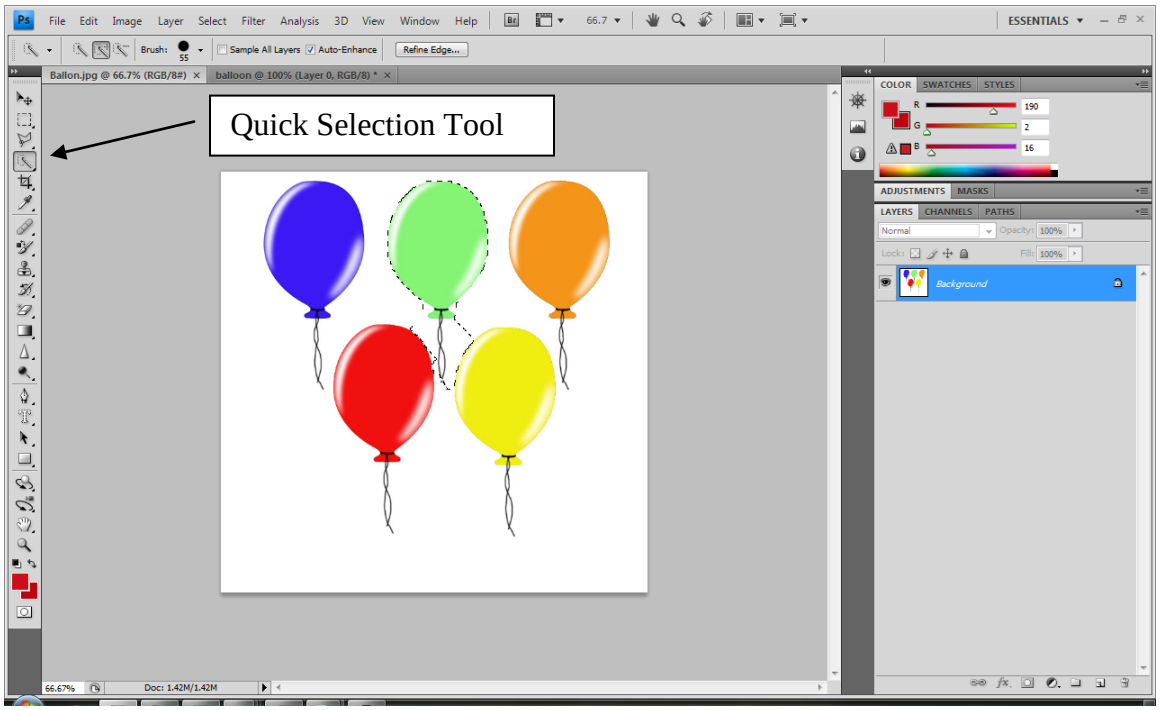



**Figure 4.2 Balloon Cutting (Source: The author)**

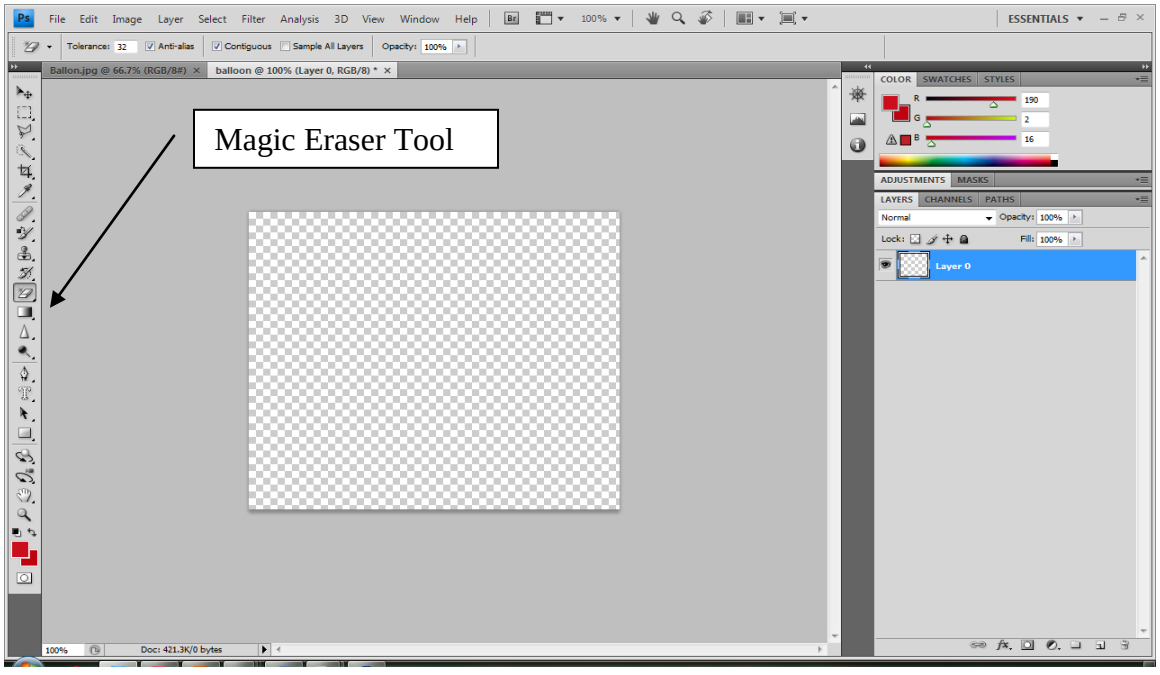



**Figure 4.3 New File Opened and Background Transparent (Source: The author)**

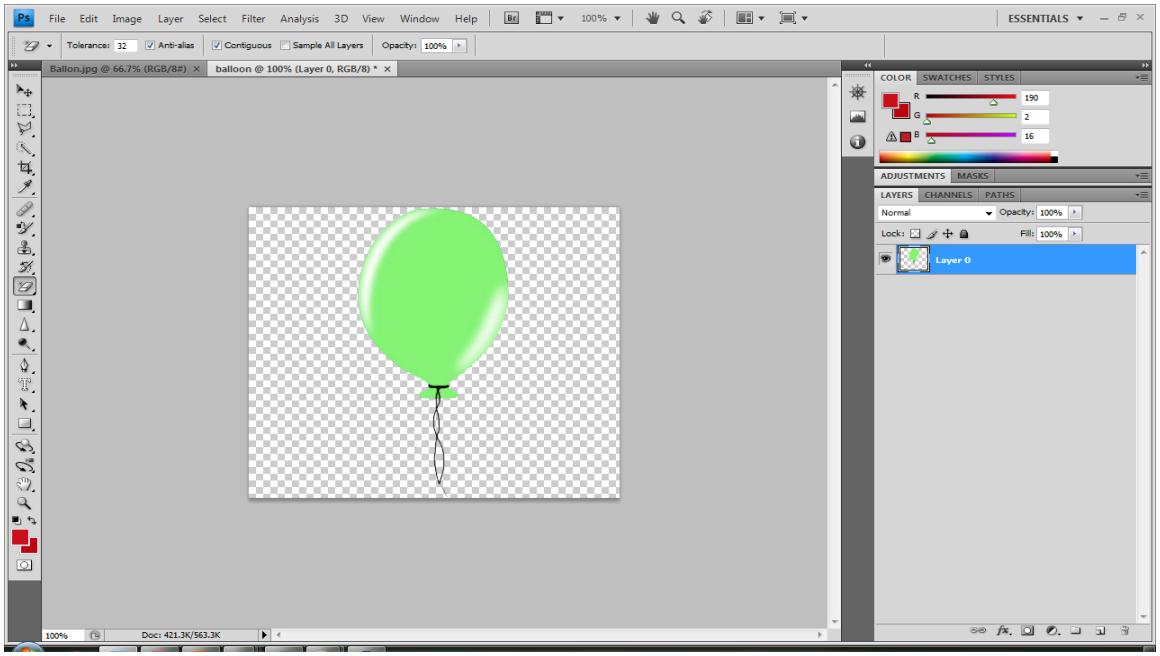



**Figure 4.4 Balloon Pasted (Source: The author)**

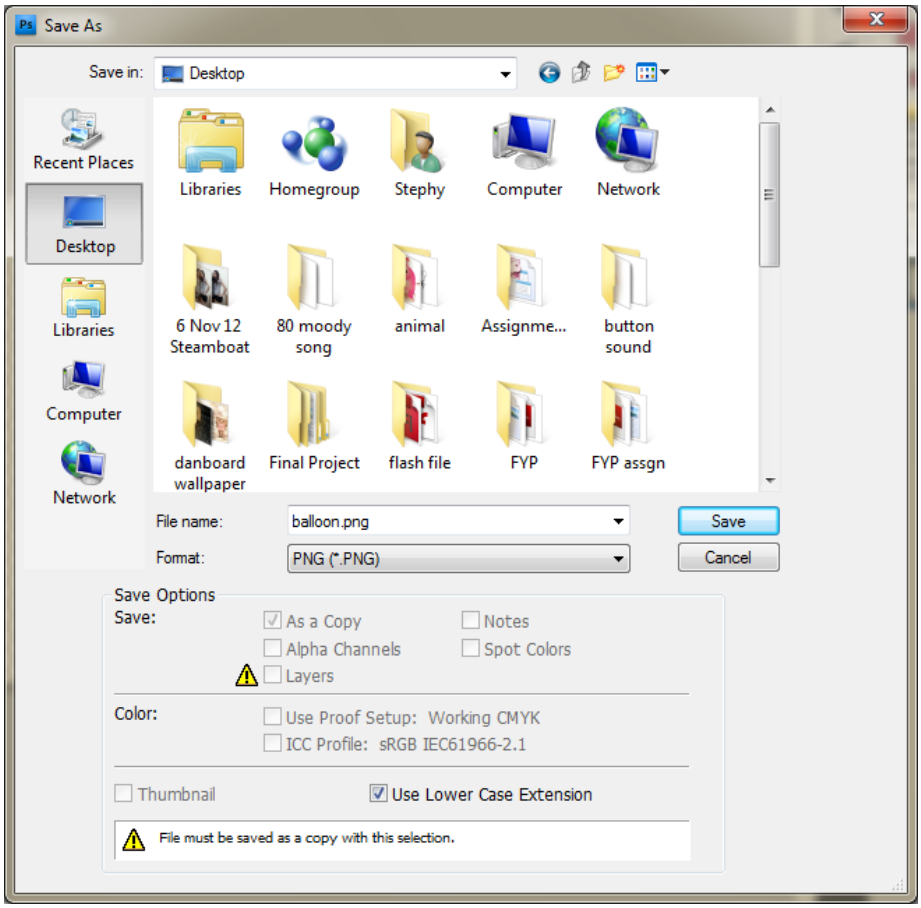



**Figure 4.5 File Saved in PNG Format (Source: The author)**

The author will use Quick Selection tool to cut the balloon and then open a new file to paste the balloon at the new file. Before paste the balloon, the author will make the background of picture become transparent by using Magic Eraser Tool. The picture will be saved as JPG format.

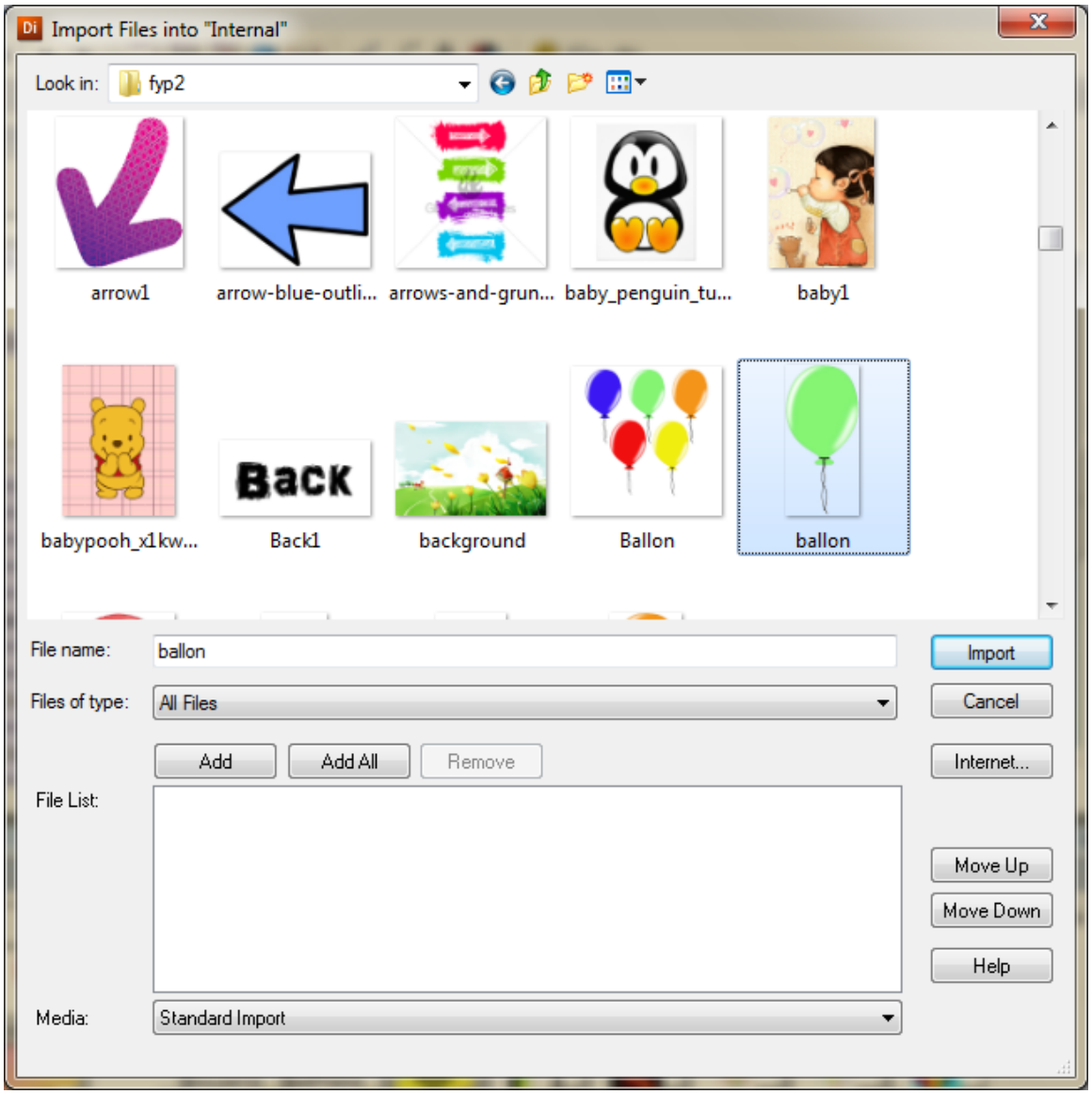



**Figure 4.6 Import Balloon into the Director (Source: The author)**

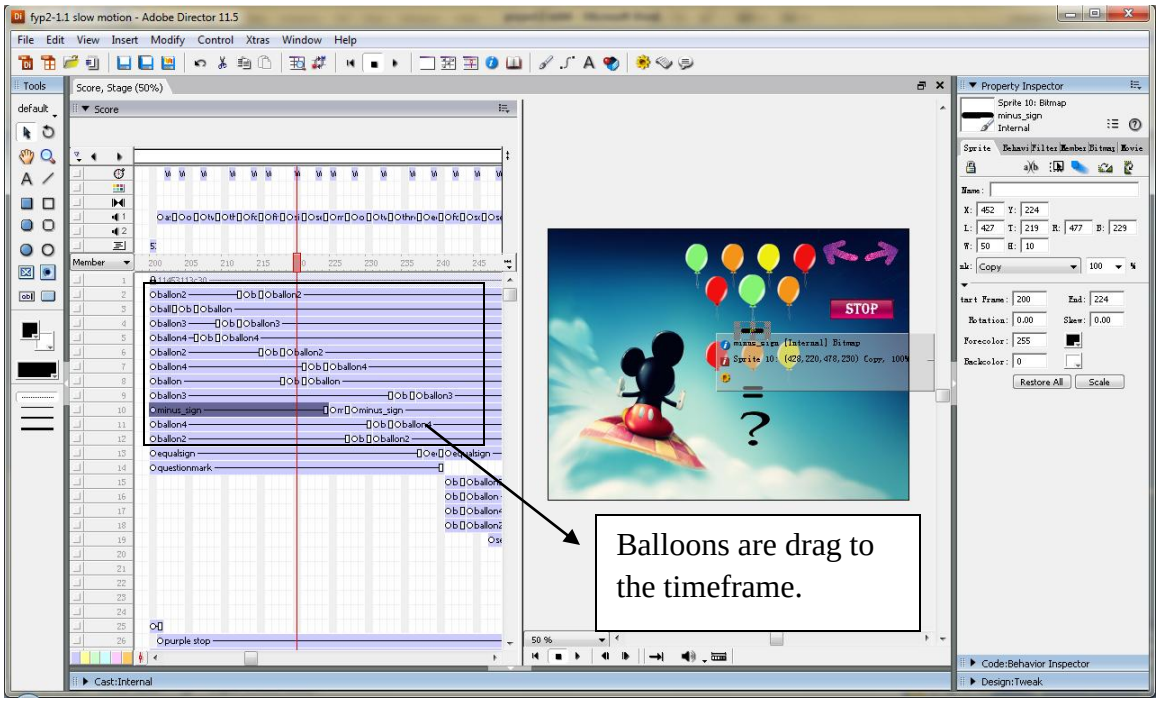



**Figure 4.7 Drag Balloon to the Timeframe (Source: The author)**

After the picture finished edited, the picture will be import to the Adobe Director and will drag to the timeframe. The result can be view as right side.

### 4.1.2 Process of Editing Sound

First of all, sound is require and vital to a courseware. The author needs sound to teach the kids math and animal courses and also need the sound as background music. The author use sound recorder which build in at the computer to record the sound from internal computer. Before record, there is required to adjust the setting of sound.

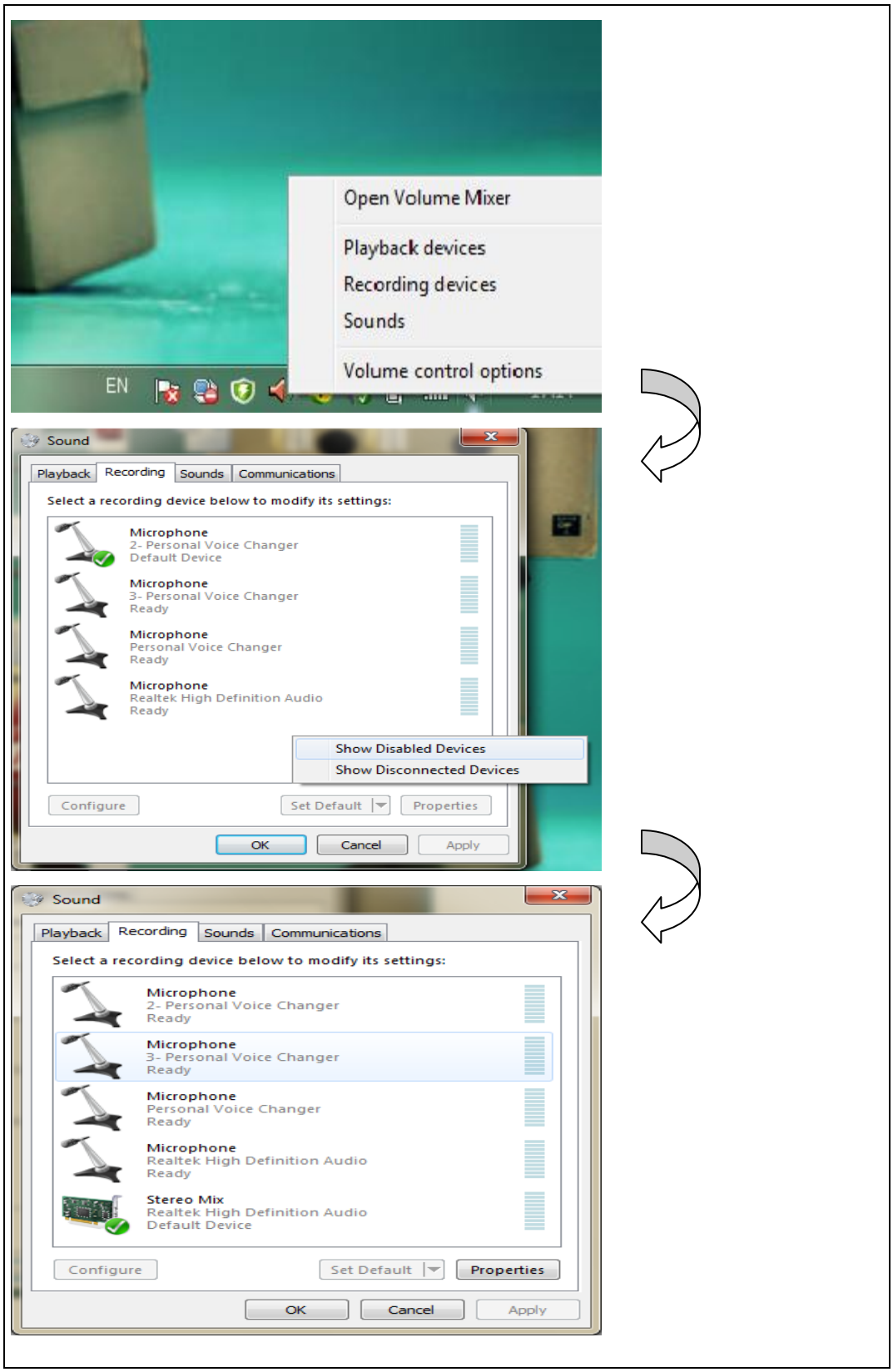
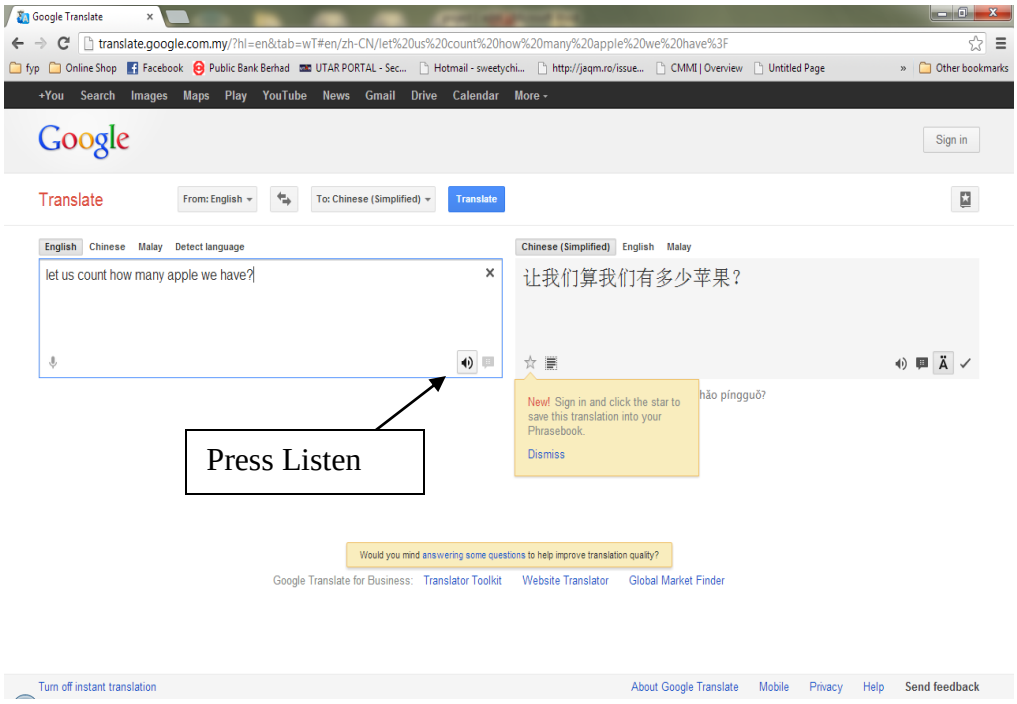
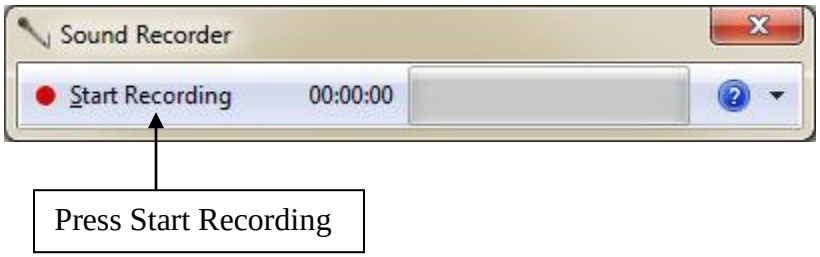



**Figure 4.8 Setting of Sound Recorder (Source: The author)**

The author need go to right click the speaker and choose Recording Devices. After that, right click and choose Show Disable Devices and then choose Stereo Mix and set it as default. The author can start the sound record after done the setting. The author was recorded Google Translate's voice using sound recorded.



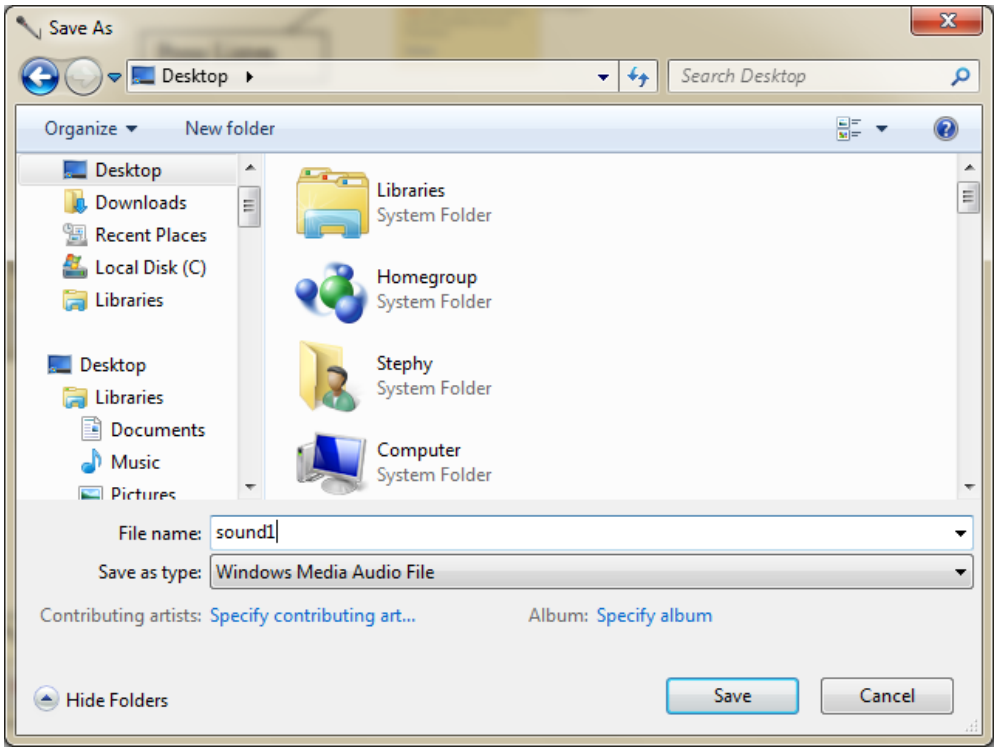
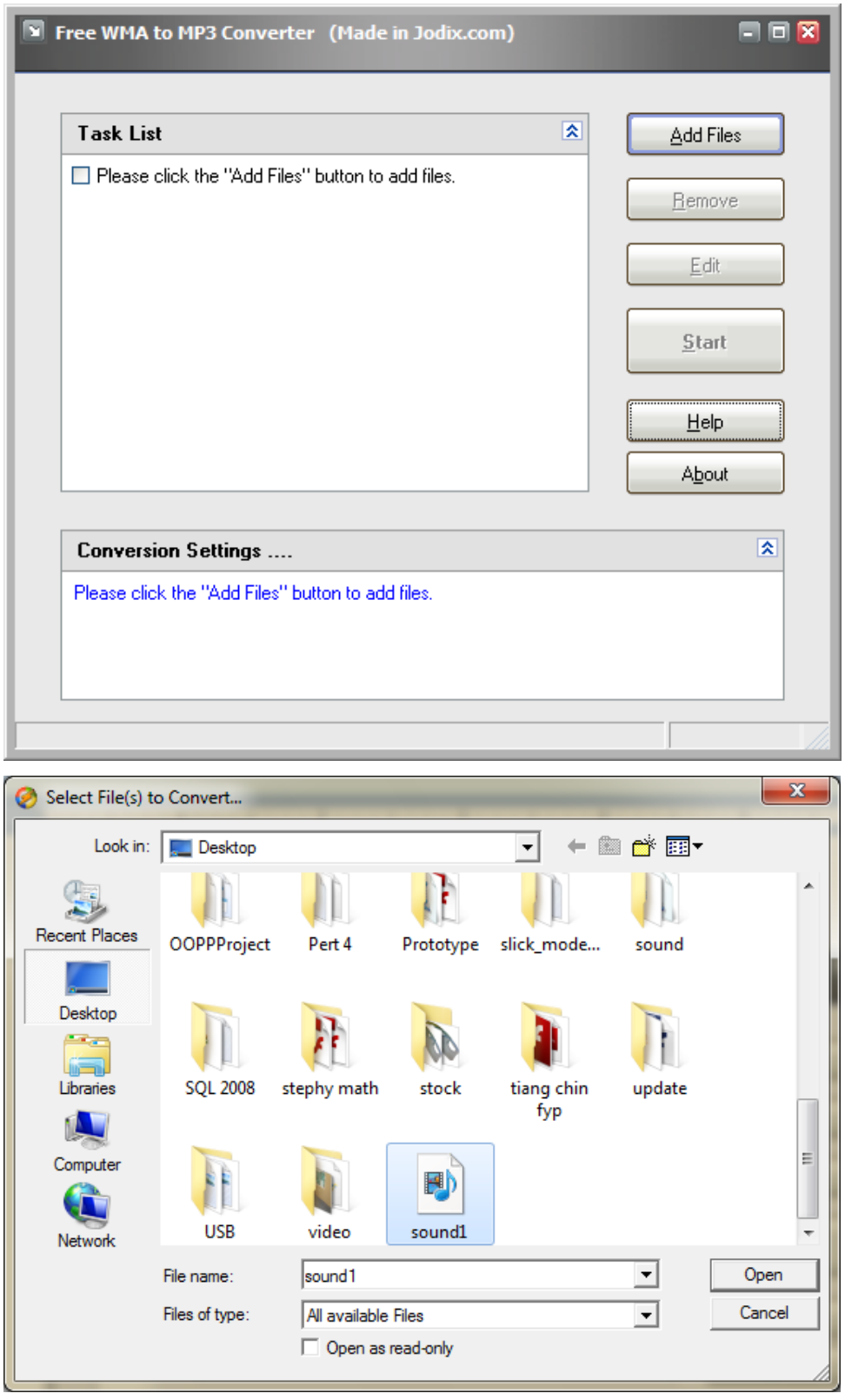



**Figure 4.9 Process of Sound Record (Source: The author)**

After record the sound, the default sound format is WMA format. Due to the Director cannot support WMA file, the author has to convert all the sound audio file to MP3 format using Jodix WMA to MP3 Converter.


Free WMA to MP3 Converter (Made in Jodix.com)
Task List
Please click the "Add Files" button to add files.
Add Files
Remove
Edit
Start
Help
About
Conversion Settings ....
Please click the "Add Files" button to add files.
Select File(s) to Convert...
Look in:
Desktop
Recent Places
Desktop
Libraries
Computer
Network
OOPPProject
Pert 4
Prototype
slick_mode...
sound
SQL 2008
stephy math
stock
tiang chin fyp
update
USB
video
sound1
File name:
sound1
Files of type:
All available Files
Open as read-only
Open
Cancel

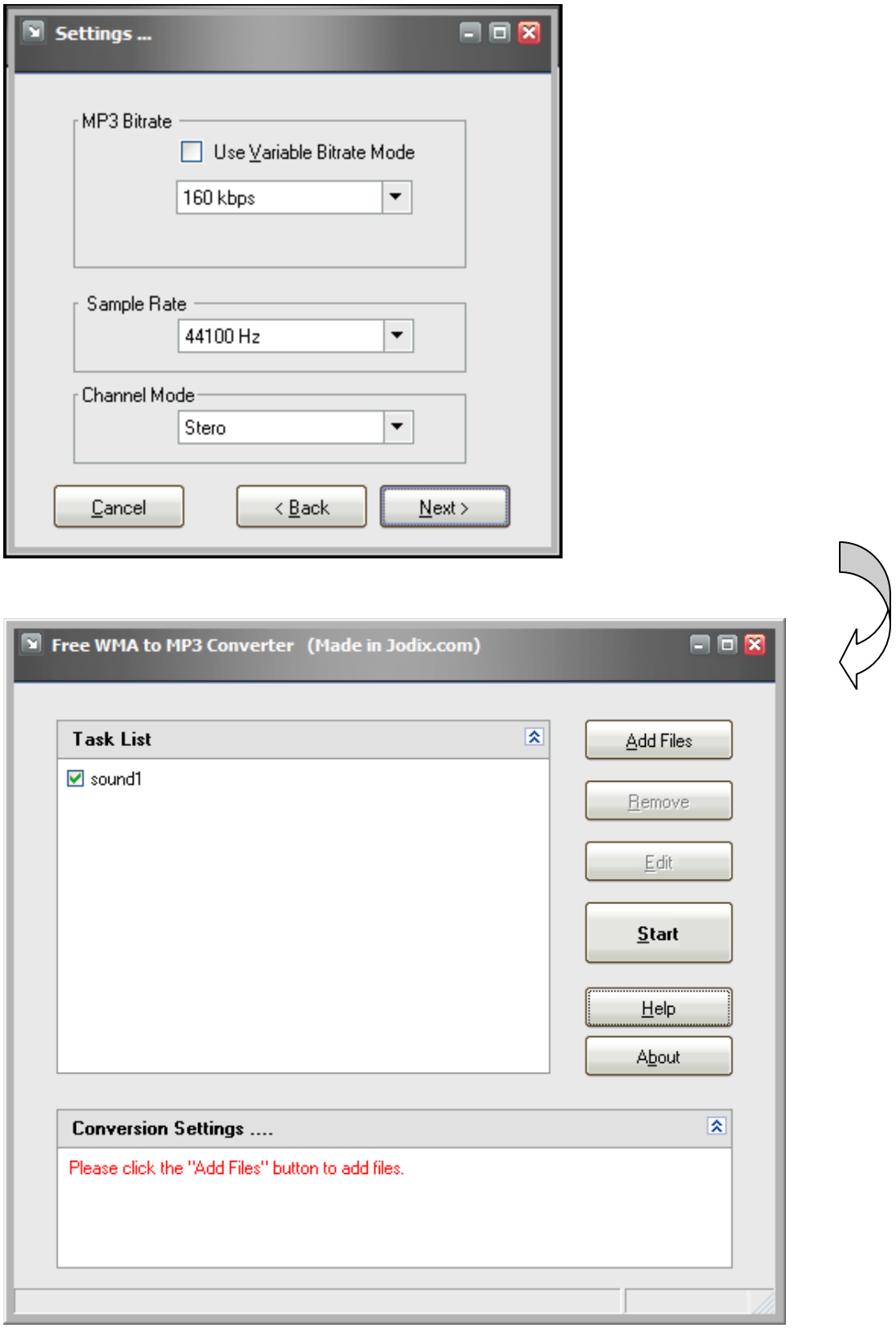
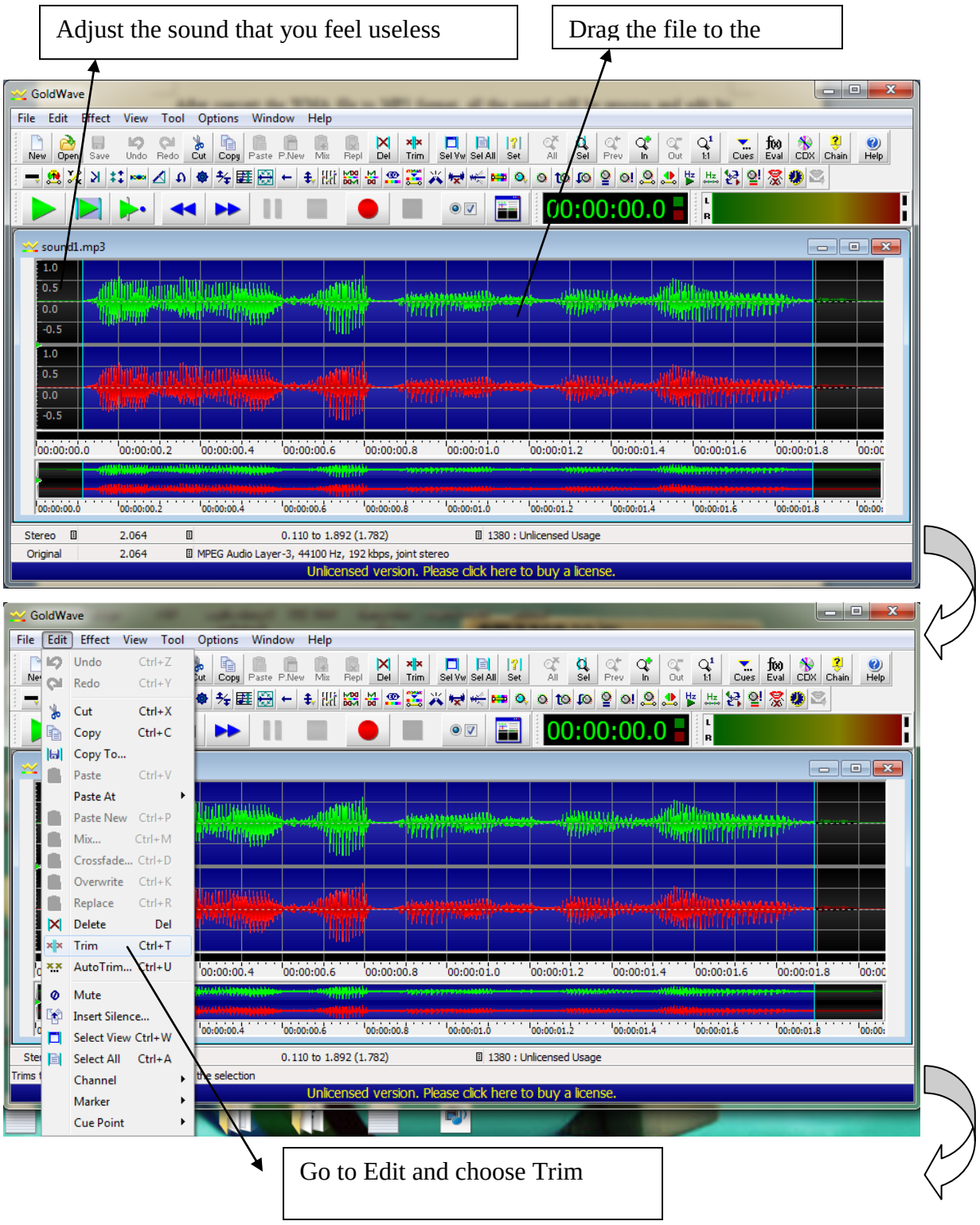



**Figure 4.10 Process of Convert Audio File (Source: The author)**

After convert the WMA file to MP3 format, all the sound will be process and edit by Gold Wave Editor. It is to trim the useless sound and adjust the volume of the sound to reduce the memory space of the file.



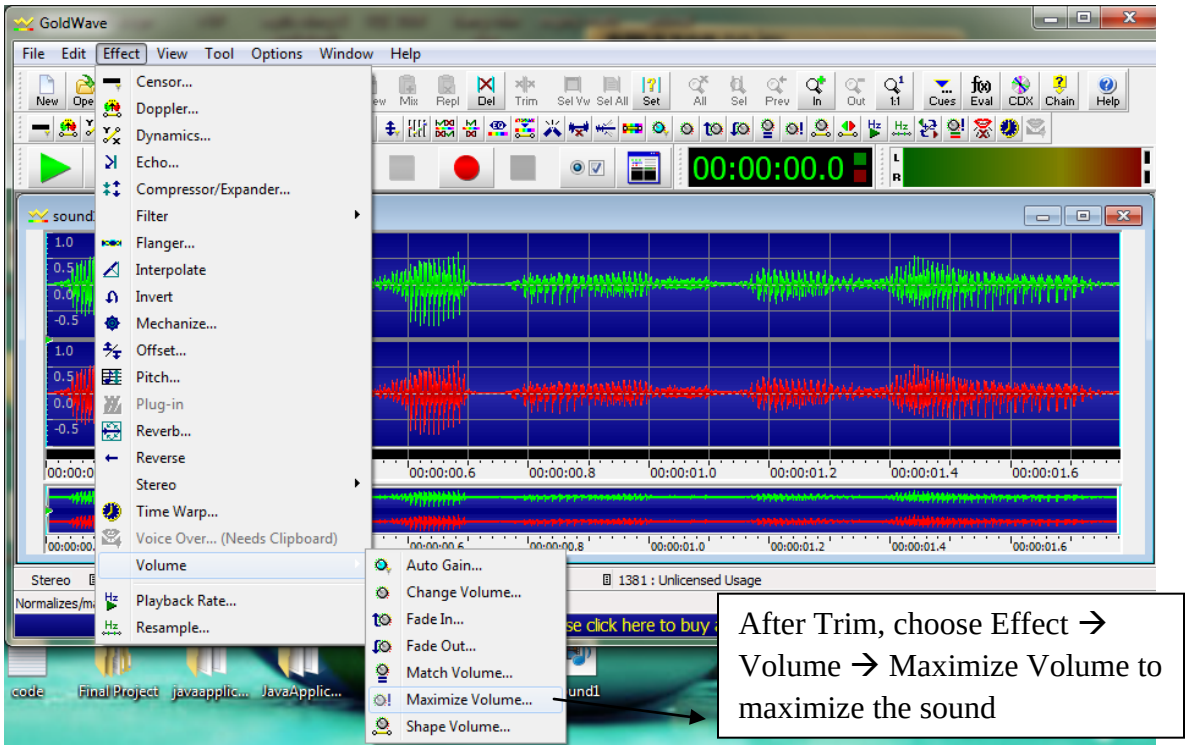



**Figure 4.11 Process of Sound Edit (Source: The author)**

Next is import the sound file to the Director.

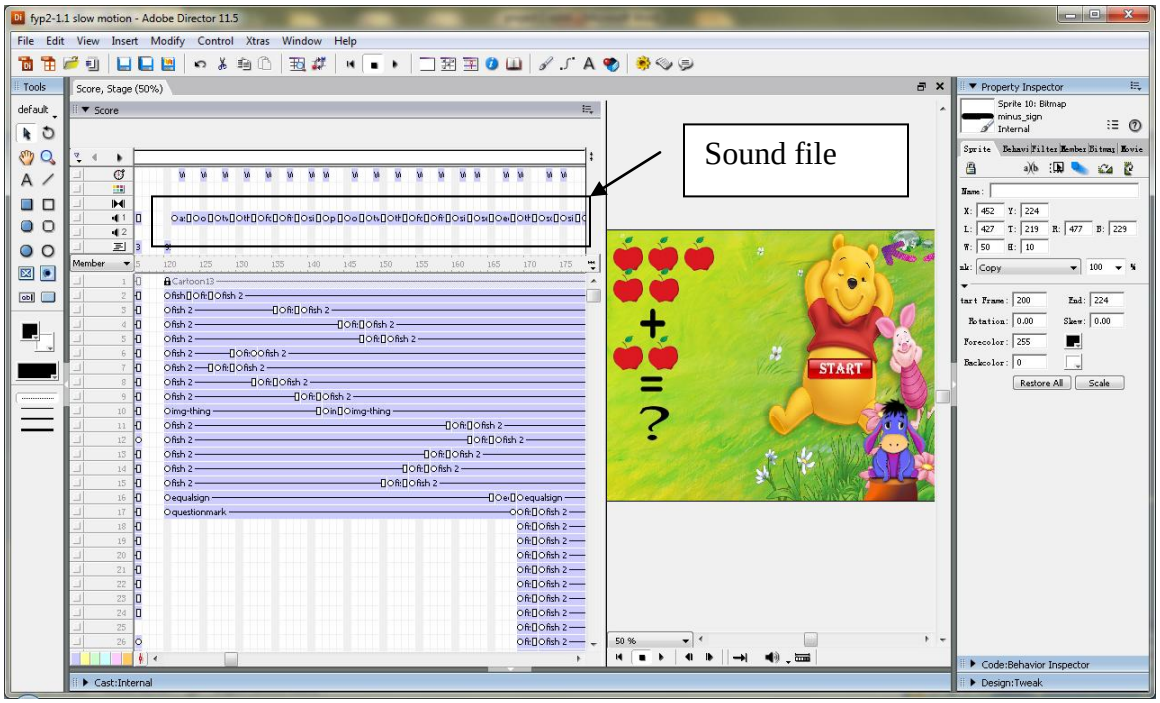
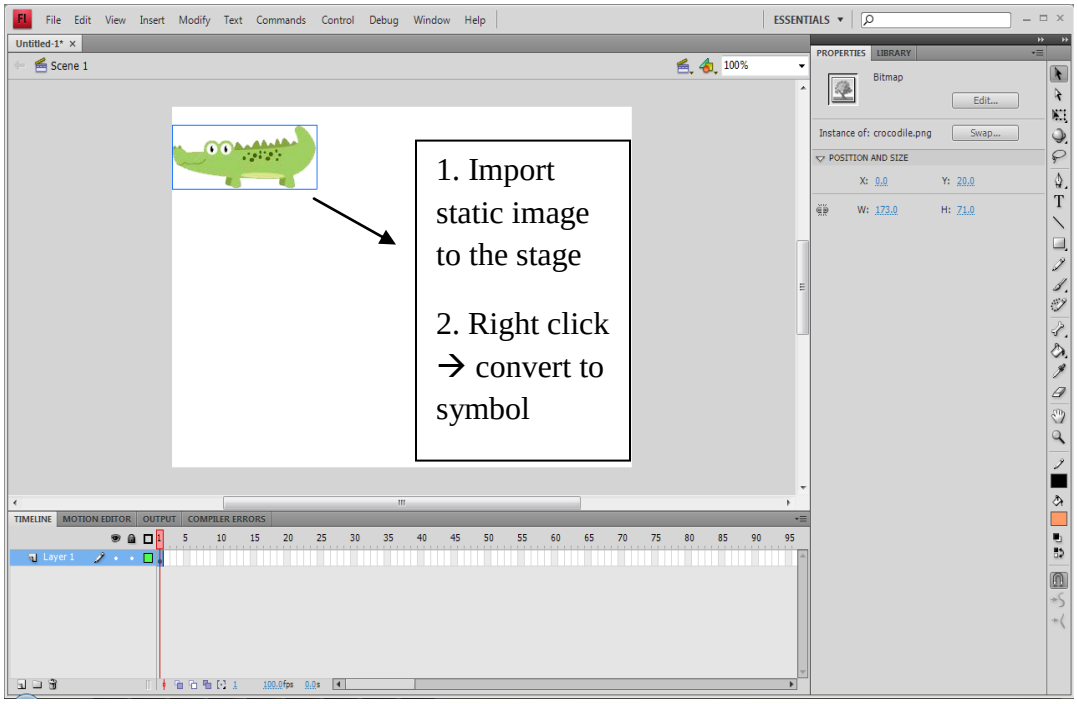
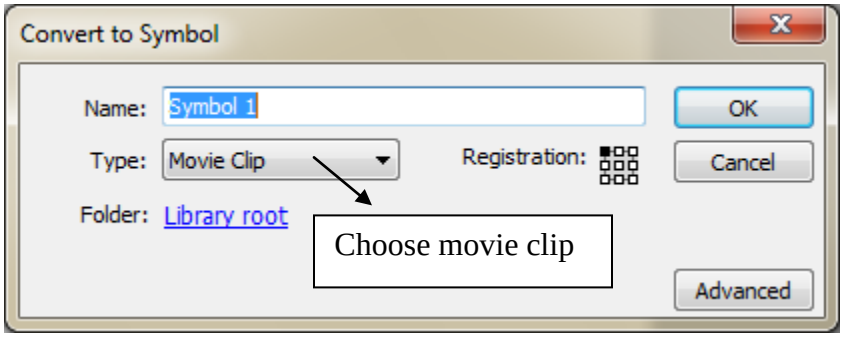



**Figure 4.12 Sound Imported to Director (Source: The author)**

### 4.1.3 Process of Creating and Editing Animation

Animation is different from image and graphic. Image and graphic are static but animation is dynamic. It shows a flow of graphics frame by frame, so human eyes will see a moving graphic on the computer screen. Animation will attract the kids and make the courseware more interesting. The author had included many animations into the proposed courseware. The author use Adobe Flash CS4 to develop the animation and flash game.



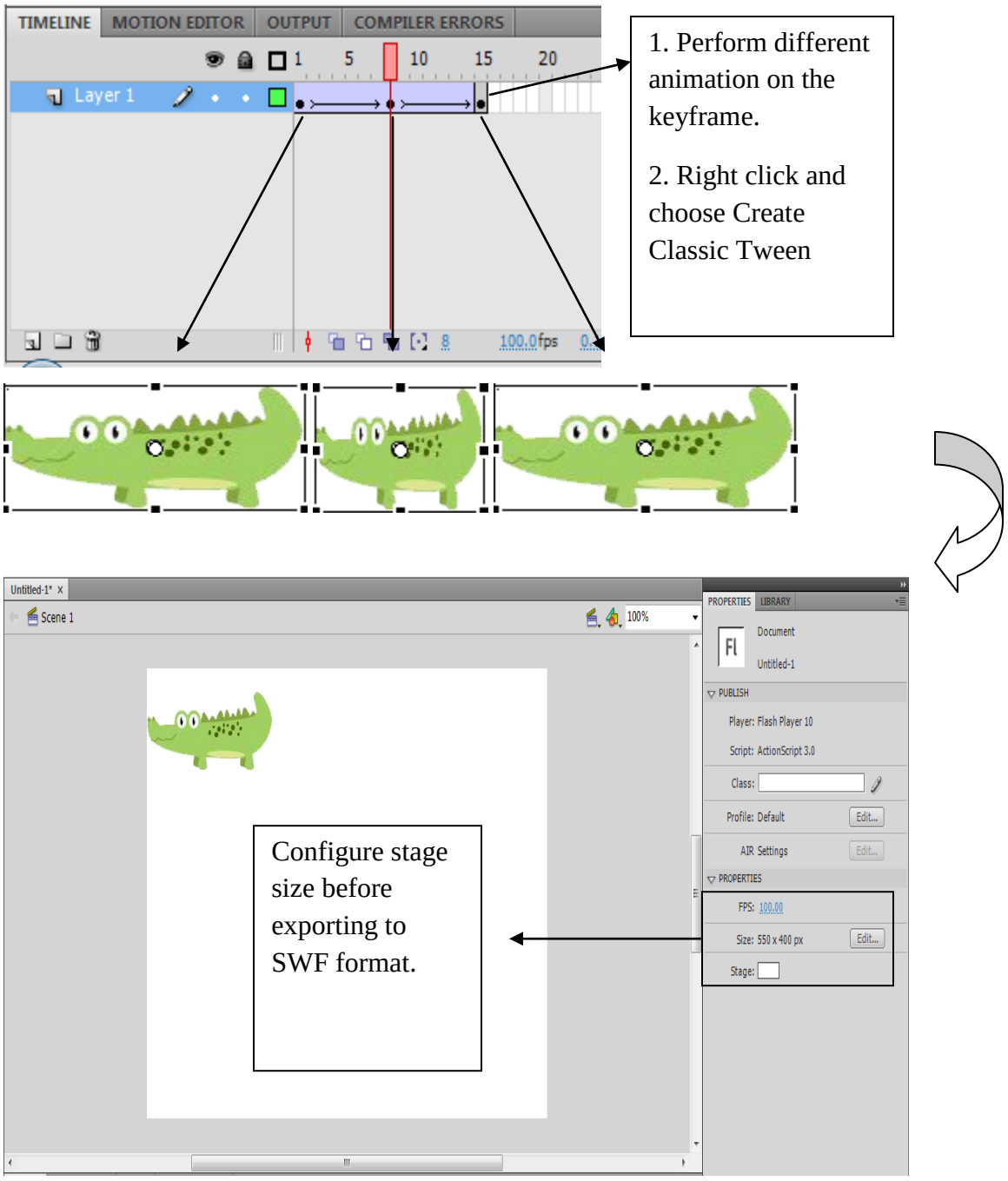
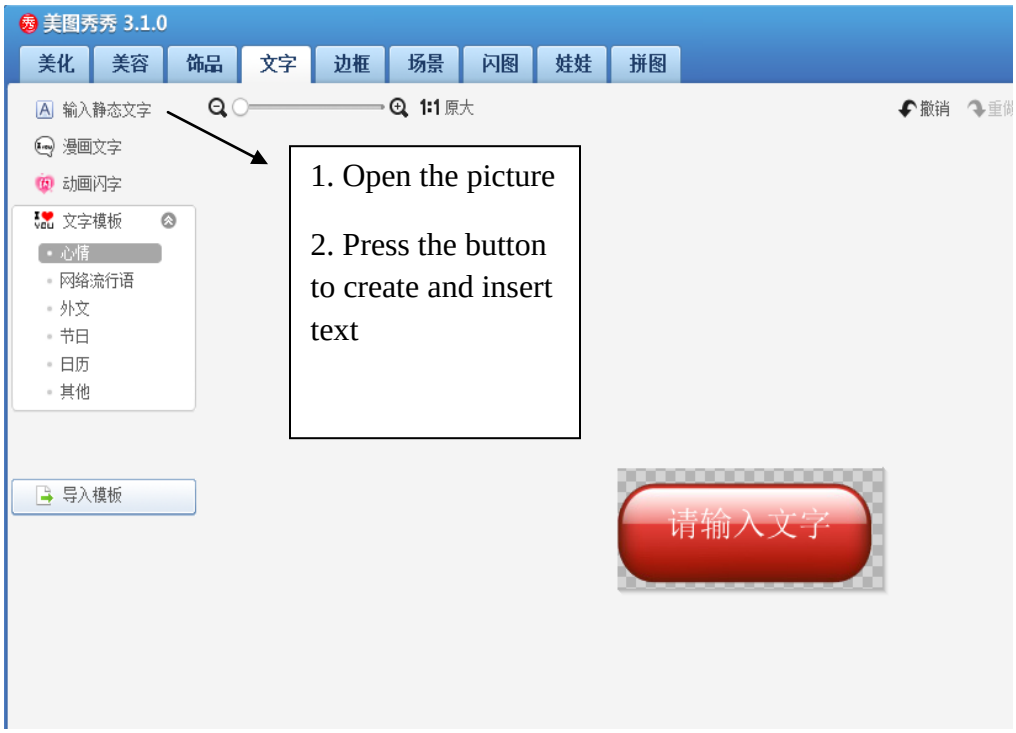



**Figure 4.13 Process of Animation Created (Source: The author)**

### 4.1.4 Process of Creating and Editing Text

Text is also an important content to represent and deliver information and knowledge of the system to users. The author creates text using Meitu Xiu Xiu.





Setting will be appear and the author can adjust the font family, font size, font color, bold, italic, underline the font, the transparency of the font, and the angle of the font

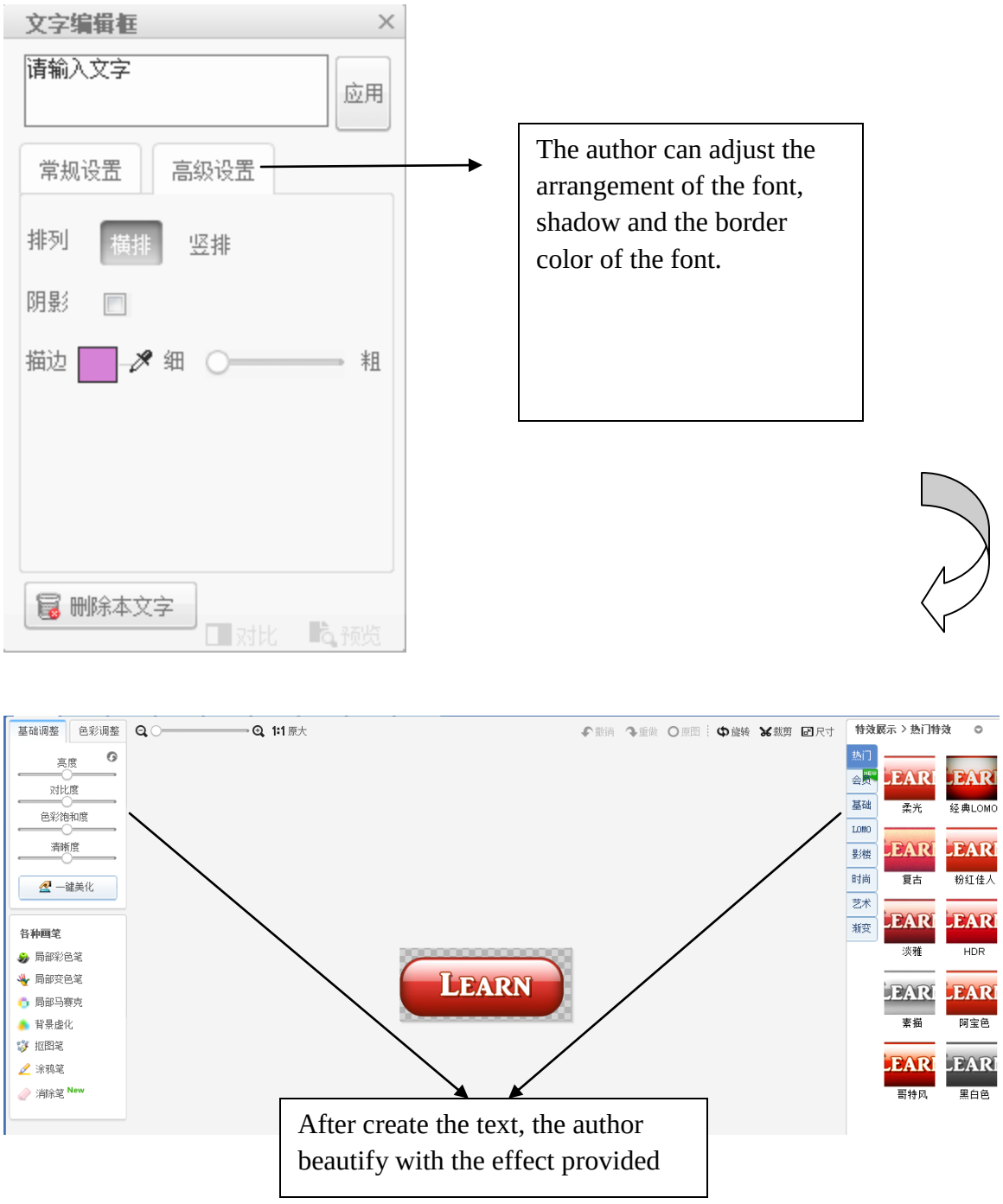



**Figure 4.14 Process of Creating and Editing Text (Source: The author)**

### 4.1.5 Process of Editing Video

Video can let the kids gain additional knowledge and they will not so boring keeps learning. The author has added the video to the courseware too. The author use ClipConverter.cc which convert the YouTube video via online.

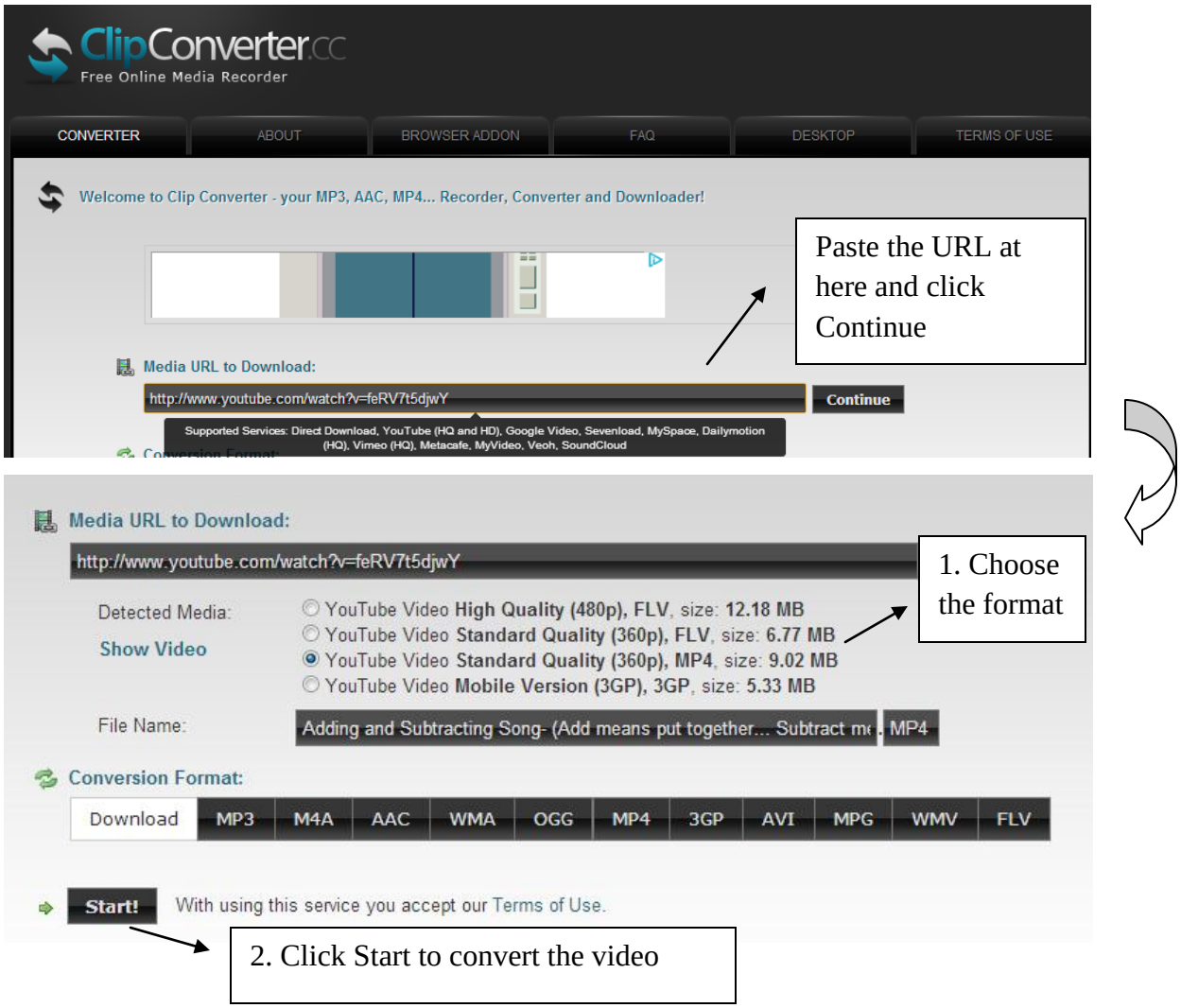



**Figure 4.15 Process of Convert YouTube Video to MP4 (Source: The author)**

## 4.2 Authoring Process

Authoring process can be described as controlling, navigating, tweening, and building up connections between the cast members (contents) in the software. Basically, the author develops and builds the multimedia courseware using Adobe Director 11.5 and Adobe Flash CS4. Adobe Director provides a stage for the author to arrange, control and navigate the contents and multimedia elements within the frames. Default behaviors can be found in the software that enables drag and drop action by the author so that it saves a lot of time. In order to enhance the level of interactive between user and system, Lingo scripts can be written to presents the system in more advance vision. Besides that, the author use Adobe Flash to create animation and use Action Script to control the action of the button and game. Every system modules will be discussed at the section below.

### 4.2.1 Main Menu Page

**Figure 4.16 Main Menu Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Select courses from the main menu. Behavior used: Soft Edge Wipe, Slide, Rollover Cursor Change, mouseUp and Go To Frame X. Custom Lingo Script: mute the background music of current page and play background music of the page going when click. Perform tweening when mouseOver and sound is play when mouseDown was created at Flash. |
| **2** | Title of the courseware. Behavior used: Barn Door and Fade in Out. |
| **3** | Sound button. Behavior used: Rollover Cursor Change. Custom Lingo Script: member change when click and play or mute the background music. |
| **4** | About button. Behavior used: Fade in Out, Rollover Cursor Change, Custom Lingo Script: go to frame X and turn off the music of current page and turn on about page's background music at the same time. Flash: Perform tweening when mouseover and sound is added when click. |

### 4.2.2 Math Menu Page


**Figure 4.17 Math Menu Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Button of Math Menu. Behavior used: Rollover Cursor Change. Custom Lingo Script: mouse over the button a balloon will appear beside the button and go to frame X. Flash: add in sound when mouse click. |
| **2** | Home button. Behavior used: Rollover Cursor Change, mouseUp and Go To Frame X. Custom Lingo Script: mute the background music of current page and play the background music of the page going when click. Flash: mouse over and tweening the image and sound will play when click the button. |
| **3** | Sound button. Behavior used: Rollover Cursor Change. Custom Lingo Script: |

| | |
|---|---|
| | member change when click and play or mute the background music. |
| **4** | Image. Behavior used: Random Movement and Rotation. |

### 4.2.3 Math Learning Lesson Page

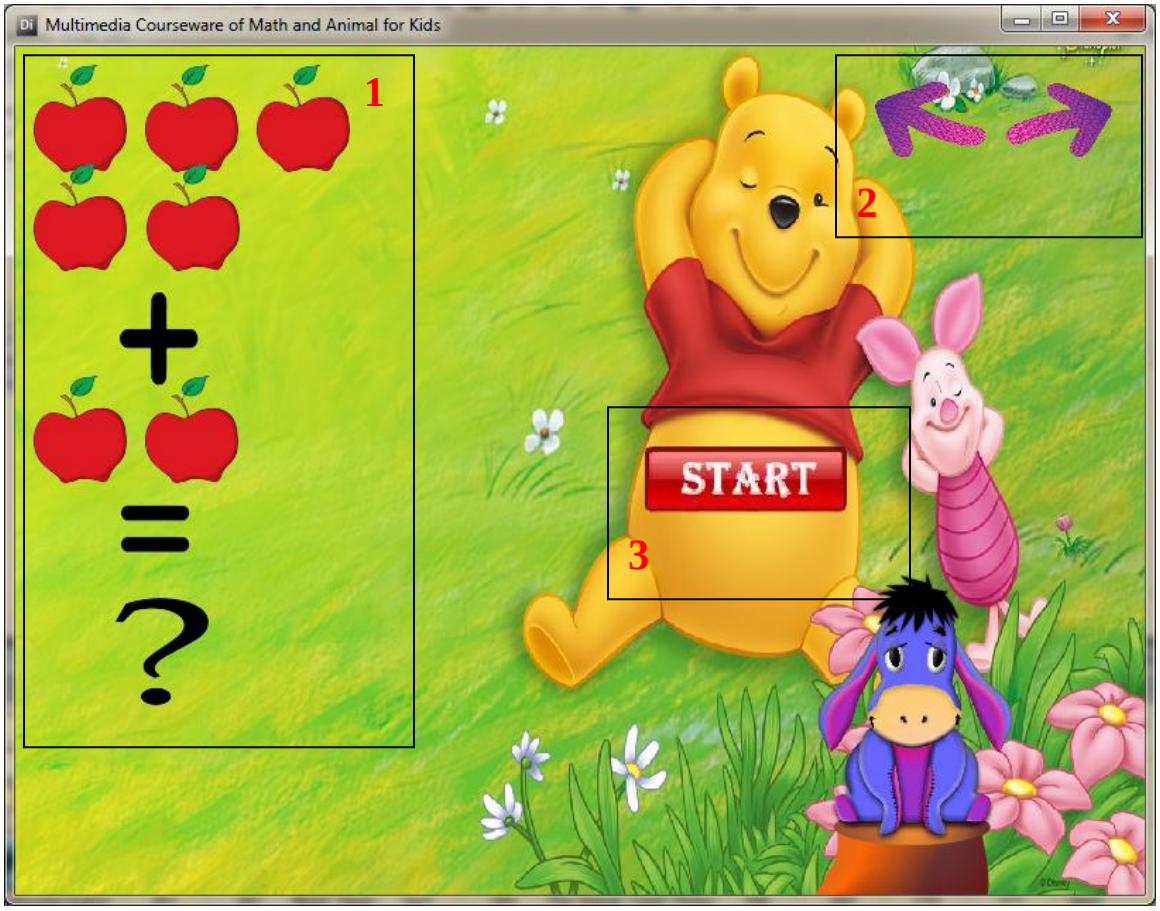



**Figure 4.18 Math Learning Lesson Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Teach Mathematics. Behavior used: Fade in Out. When the computer generated sound count the first apple, the first apple will become bigger to let the kids know which apple is counting. |
| **2** | Start and Stop Button. Behavior used: Rollover Cursor Change. Custom Lingo Script: sprite member change and go to frame X when click to start the teaching and stop the teaching. Flash: mouse over the button will become lighter and add in sound when click. |

| | |
|---|---|
| **3** | Back to previous page and go to the next page. Behavior used: Rollover Cursor Change, mouseUp and Go To Frame X. Custom Lingo Script: play the background music of the page going when clicked. Flash: perform tweening when mouse over and add in sound when the button is clicked. |

### 4.2.4 Math Game Page

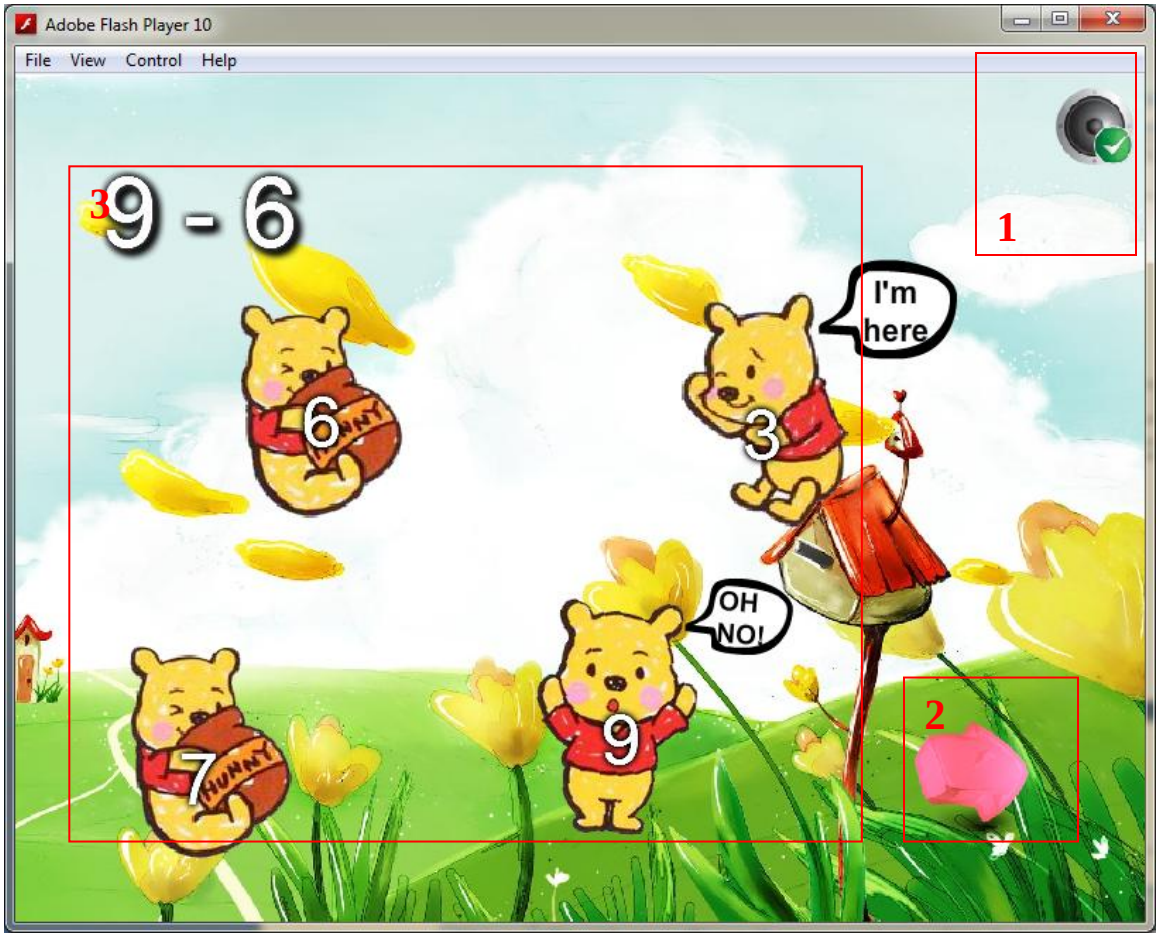



**Figure 4.19 Math Game Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Sound button. Flash: the speaker become bigger when mouse over and the speaker is change to play sound or mute sound when clicked. Action Script: mute and play the sound. |
| **2** | Proceed to next question. Flash: perform tweening when mouse over. Action |

| | |
|---|---|
| | Script: use URLLoader to load the XML file which store the questions and answer. The author also use length() method to count how many questions in XML file and store it into loop variable. Provide function of random question provided. |
| **3** | Answer of the question. Flash: perform tweening and sound of the pooh when mouseover. Action Script: when the answer had been chosen, other answer will be disabled to click and there will be show you right answer if u choose wrong answer. After choose the answer only the arrow proceeds to next questions is enabled. Every chosen answer will be recorded and score will show after finish the entire question. |

### 4.2.5 Math and Animal Video Page

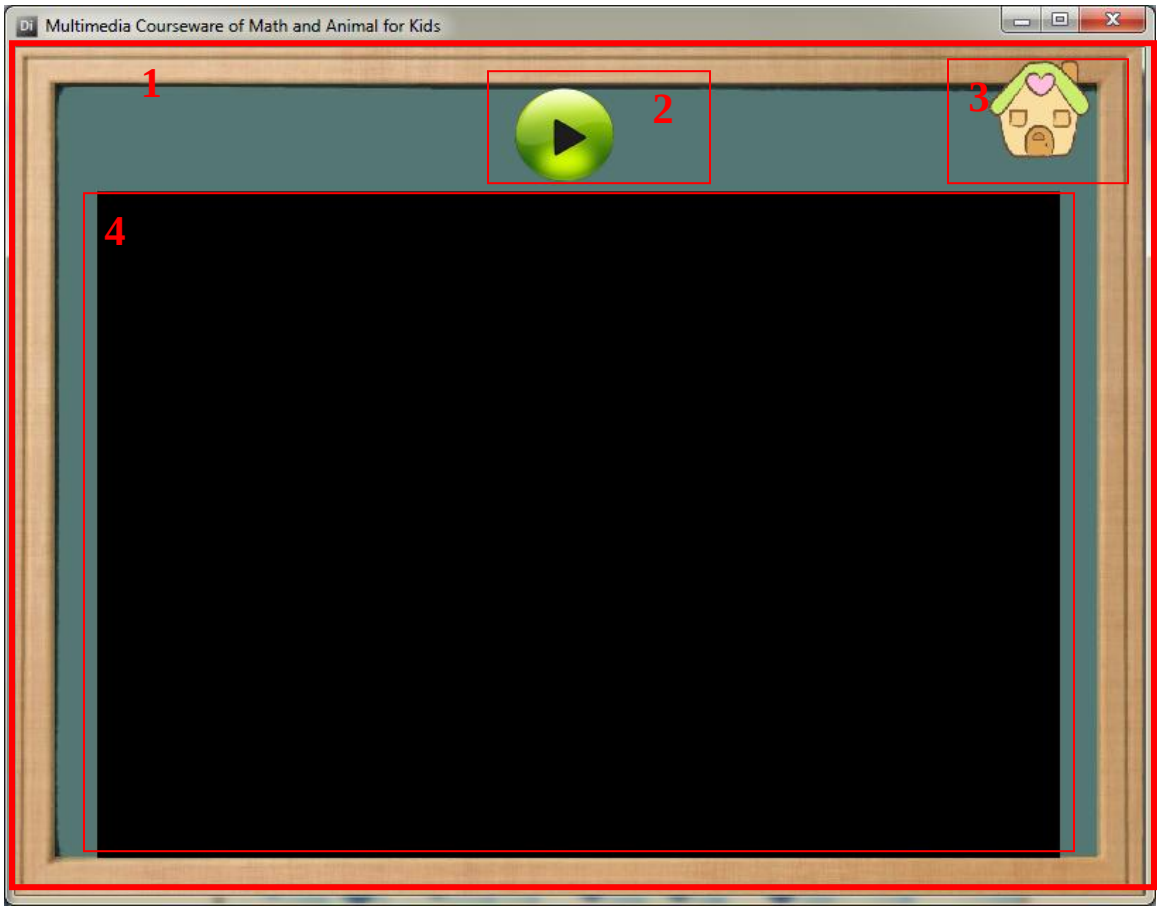



**Figure 4.20 Math and Animal Video Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Moving blackboard. Flash: perform tweening of the blackboard. |
| **2** | Play and stop the video. Behavior used: Rollover Cursor Change, Barn Door, mouseUp and Go To Frame X. Custom Lingo Script: mouseUp the button and change the sprite member. |
| **3** | Home button. Behavior used: Rollover Cursor Change, mouseUp and Go To Frame X. Custom Lingo Script: mute the background music of current page and play the background music of the page going when click. Flash: mouse over and tweening the image and sound will play when click the button. |
| **4** | Video. The video will play when the button is clicked. |

### 4.2.6 Animal Menu Page

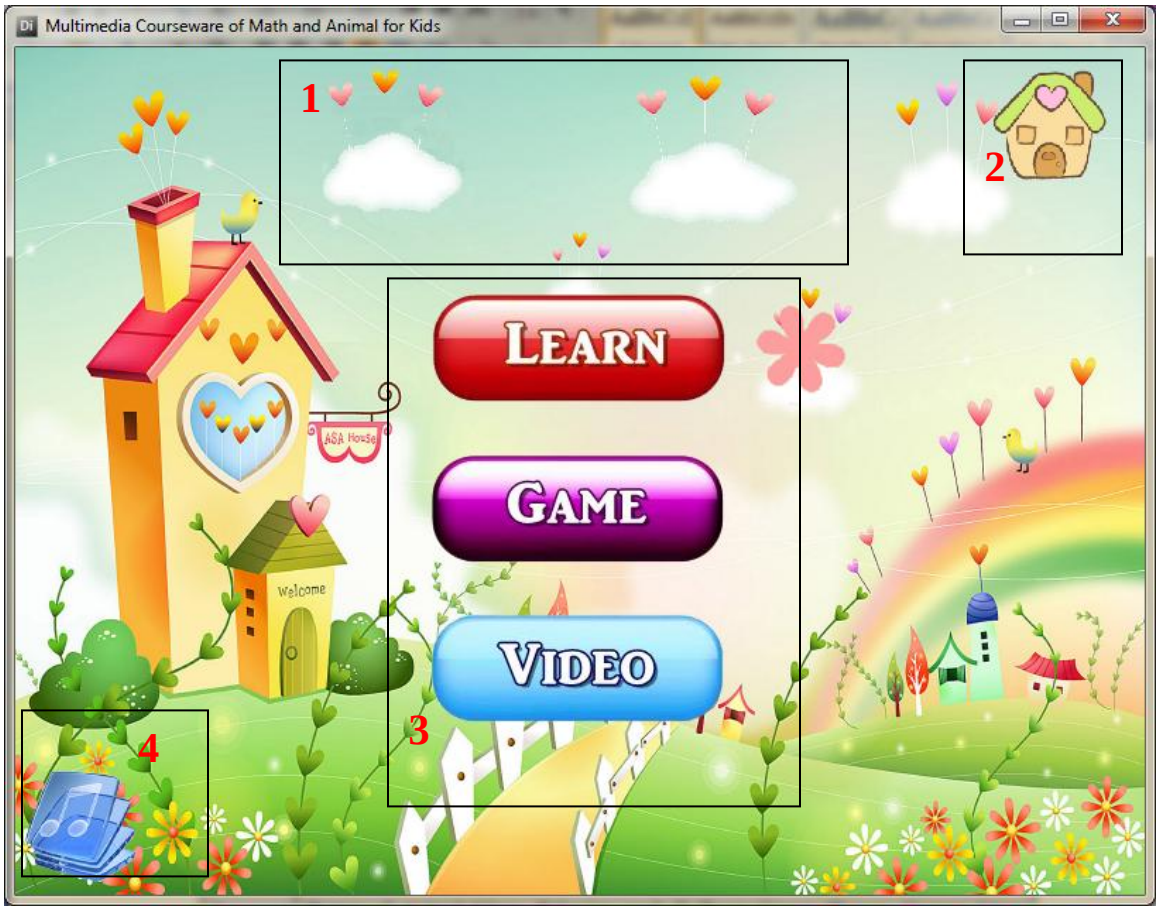



**Figure 4.21 Animal Menu Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Moving cloud. Flash: perform tweening of the cloud.. |
| **2** | Home button. Behavior used: Rollover Cursor Change, mouseUp and Go To Frame X. Custom Lingo Script: mute the background music of current page and play the background music of the page going when click. Flash: mouse over and tweening the image and sound will play when click the button. |
| **3** | Button of Animal Menu. Behavior used: Rollover Cursor Change, mouseUp and Go To Frame X. Custom Lingo Script: mouse over the button a different of picture will appear beside the button. Flash: add in sound when mouse click. |
| **4** | Sound button. Behavior used: Rollover Cursor Change. Custom Lingo Script: member change when click and play or mute the sound. |

### 4.2.7 Animal Learning Page


**Figure 4.22 Animal Learning Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Animal. Behavior used: Rollover Cursor Change, mouseUp and go to frame X. Flash: perform tweening of each of the animal when mouse over. |
| **2** | Bubbles of animals. Flash: create bubble which contain the name and sound of animals, the icons become bigger where contain in the bubble and the icons are changed if been clicked. Action Script: stop the sound when the icons are clicked. |
| **3** | Back to previous page. Behavior used: Rollover Cursor Change, mouseUp and Go To Frame X. Flash: perform tweening when mouse over and sound is added when clicked. |

### 4.2.8 Animal Game Page

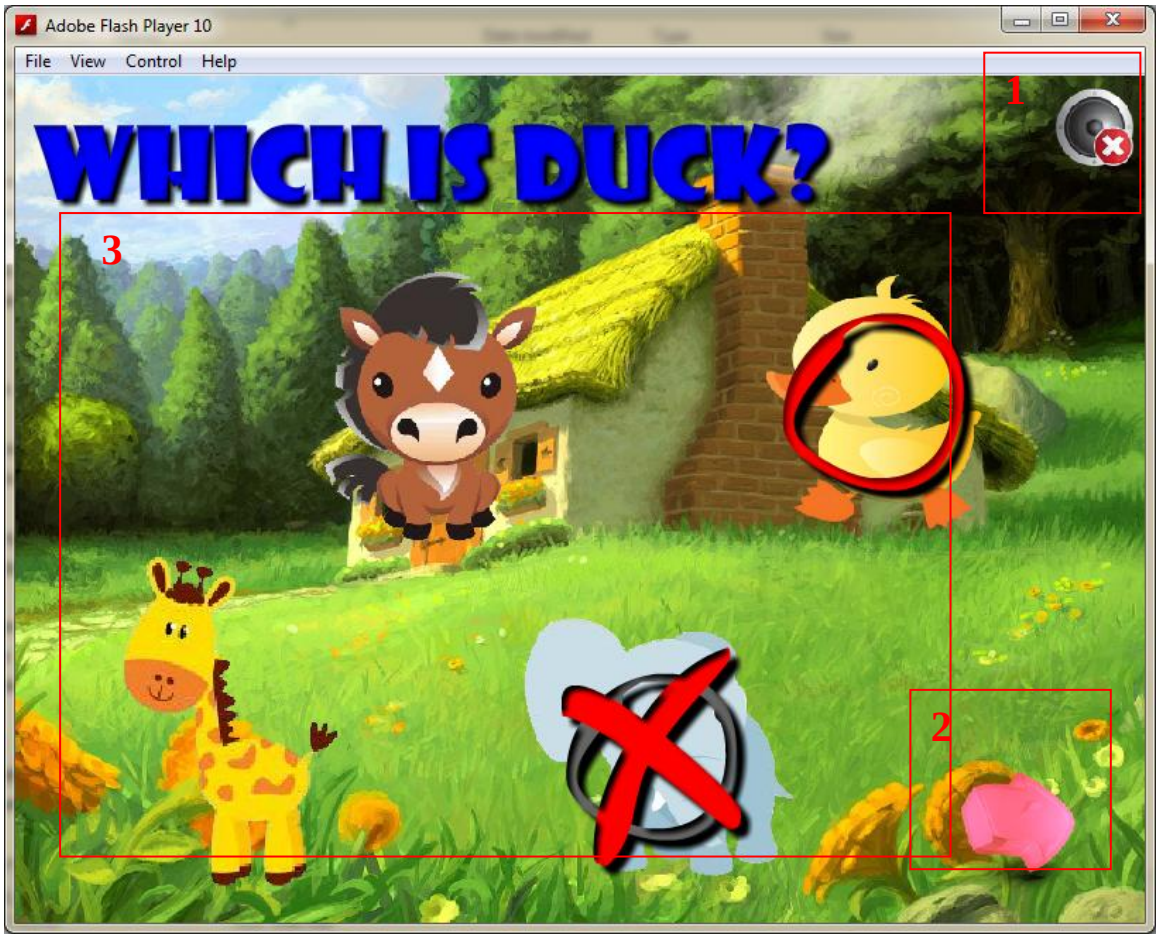



**Figure 4.23 Animal Game Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Sound button. Flash: the speaker become bigger when mouse over and the speaker is change to play sound or mute sound when clicked. Action Script: mute and play the sound. |
| **2** | Proceed to next question. Flash: perform tweening when mouse over. Action Script: set several type of question and answer in the game. |
| **3** | Answer of the question. Flash: perform tweening and sound of the animal when mouseover. Action Script: when the answer had been chosen, other answer will be disabled to click and there will be circle the right answer if u chooses wrong answer. After choose the answer only the arrow proceeds to |

| | |
|---|---|
| | next questions is enabled. Every chosen answer will be recorded and score will show after finish the entire question. |

### 4.2.9 Fun Game Page


**Figure 4.24 Fun Game Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Sound button. Flash: the speaker become bigger when mouse over and the speaker is change to play sound or mute sound when clicked. Action Script: mute and play the sound. |
| **2** | Timer, life of the car and score. Flash: create the car. Action Script: set timer to the game, create 5 life of car to the game and save the score of the game. |
| **4** | Car parking. Flash: design entire image in the game. Action Script: control the car movement, control the speed of the car move, and import the sound to the game. |

### 4.2.10 About Page

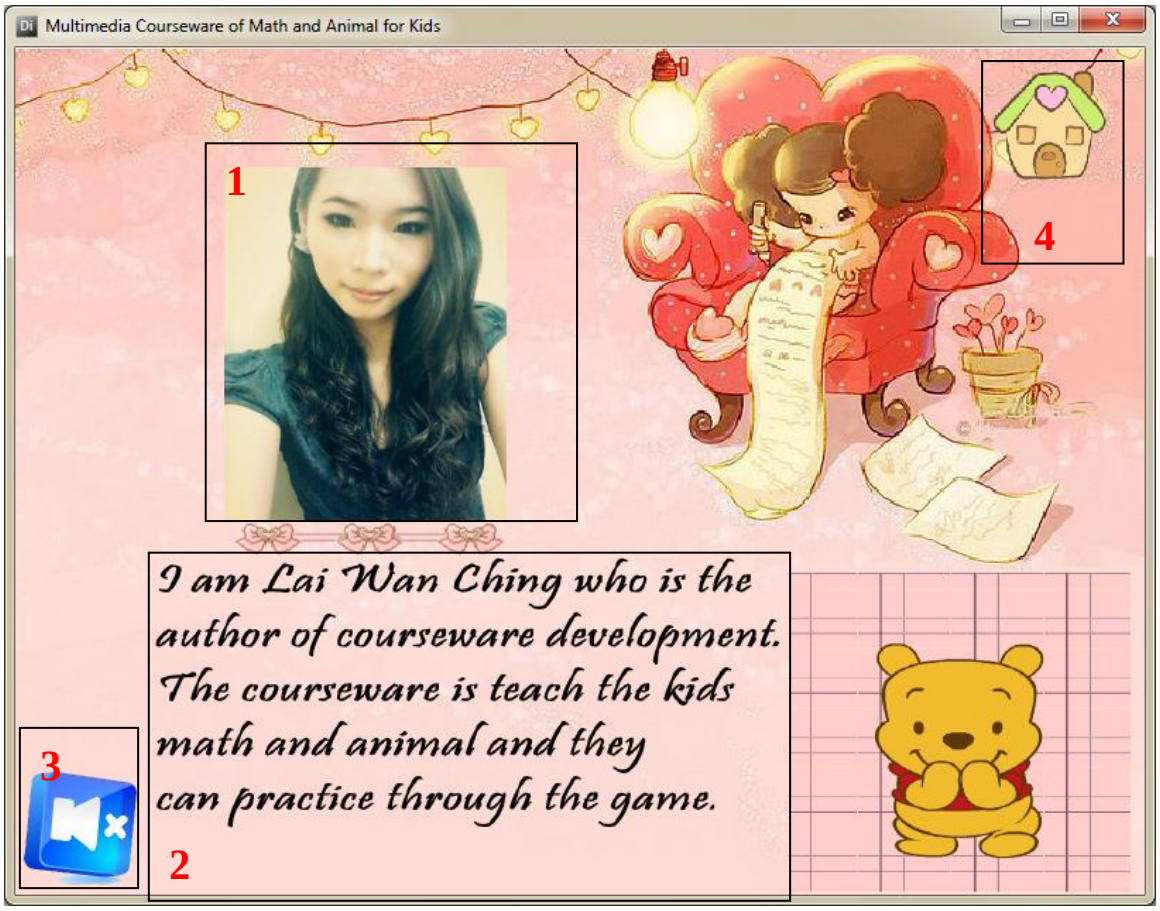



**Figure 4.25 About Page (Source: The author)**

| Label | Description |
|---|---|
| **1** | Picture of the author. Behavior used: Soft Edge Wipe |
| **2** | Description of author and courseware. Behavior used: Slide in out |
| **3** | Sound button. Behavior used: Rollover Cursor Change. Custom Lingo Script: member change when click and play or mute the sound. |
| **4** | Home button. Behavior used: Rollover Cursor Change, mouseUp and Go To Frame X. Custom Lingo Script: mute the background music of current page and play the background music of the page going when click. Flash: mouse over and tweening the image and sound will play when click the button. |

### 4.2.11 Courseware Embedded to Website

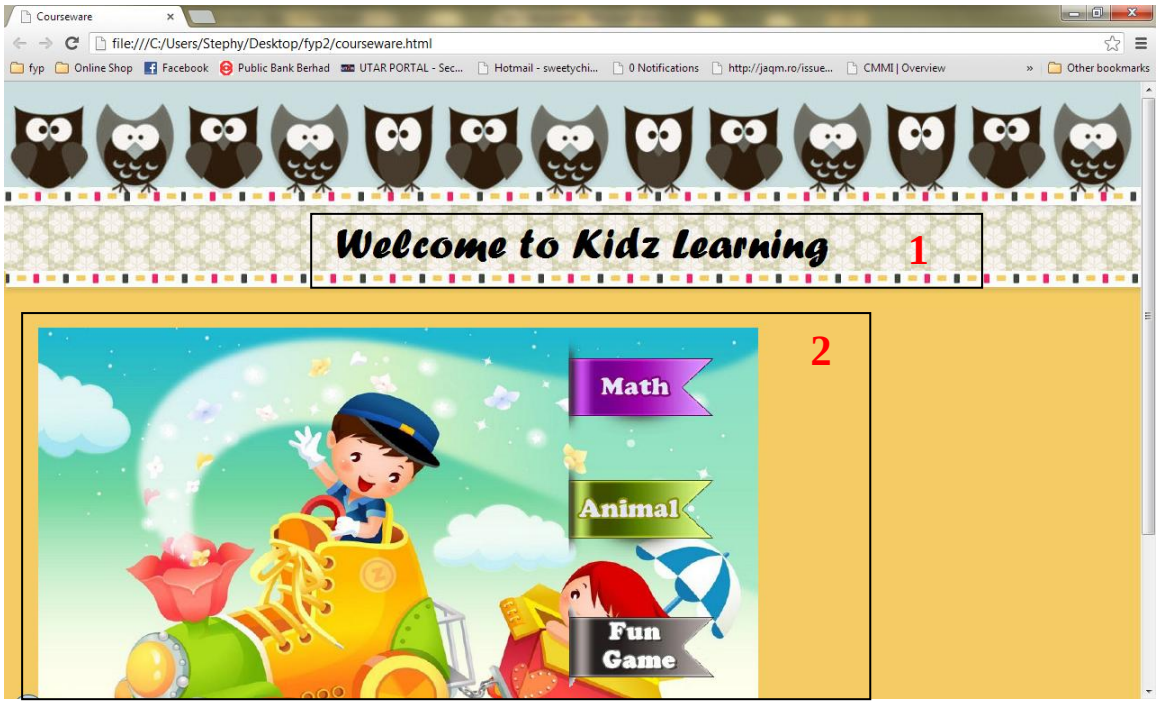



**Figure 4.26 Courseware Embedded to Website (Source: The author)**

| Label | Description |
|---|---|
| **1** | Text. HTML: use marquee to let the text move. |
| **2** | Courseware embedded to website. HTML: use embed src embed the courseware and set the player Version to 11. |

### 4.3 Post-Authoring Process

Lastly the delivering methods of final system to the users by the author is called post-authoring process. The author will publish the final system into DCR Shockwave file format which can be executed under Windows Operating System using Adobe Director 11.5 and embed to the website. Since it is an online courseware, the author will embed the courseware to the website. The author also will publish as EXE file format and burn into the DVD as offline courseware.

Next, the Final Multimedia Courseware will be distributed to target audience via offline method. The author will propose to the kids and give them use the courseware.

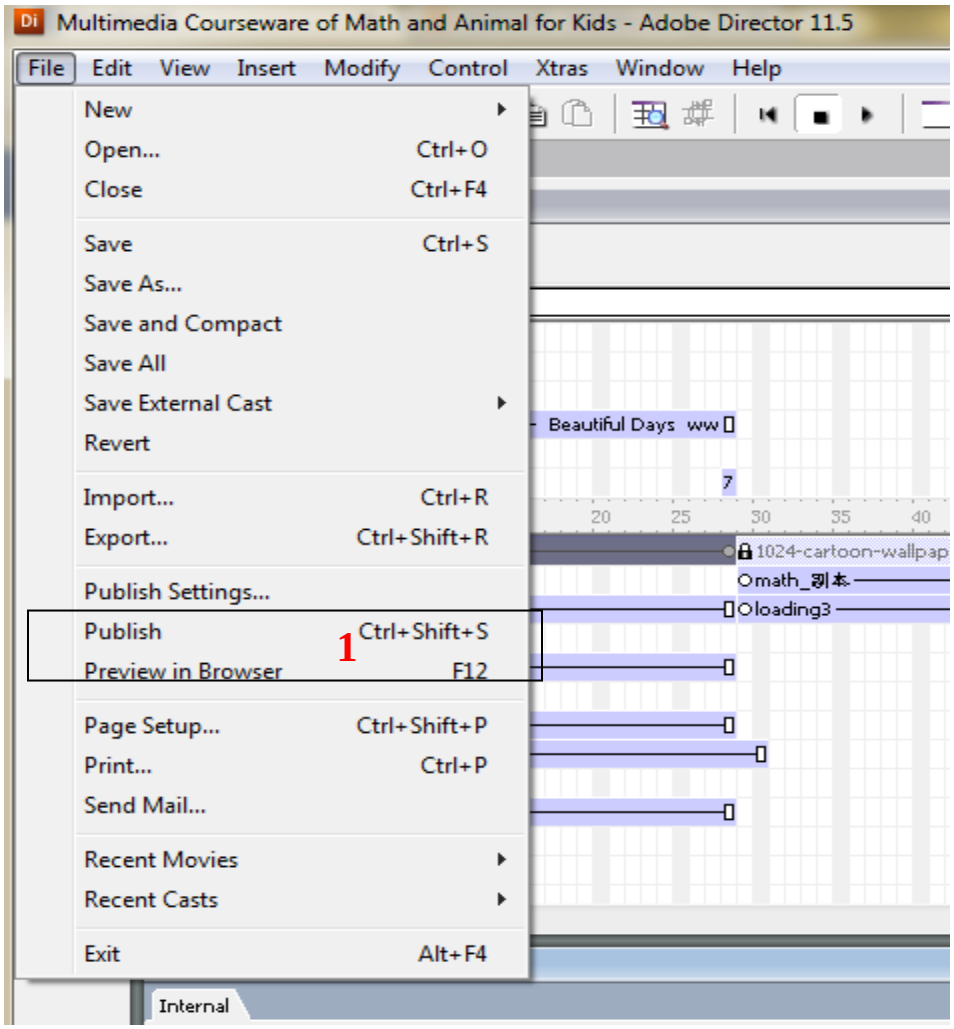



**Figure 4.27 Publish Setting in Adobe Director 11.5 (Source: The author)**

| Label | Description |
|---|---|
| 1 | Click on Publish Settings to configure settings before publishing final system. |

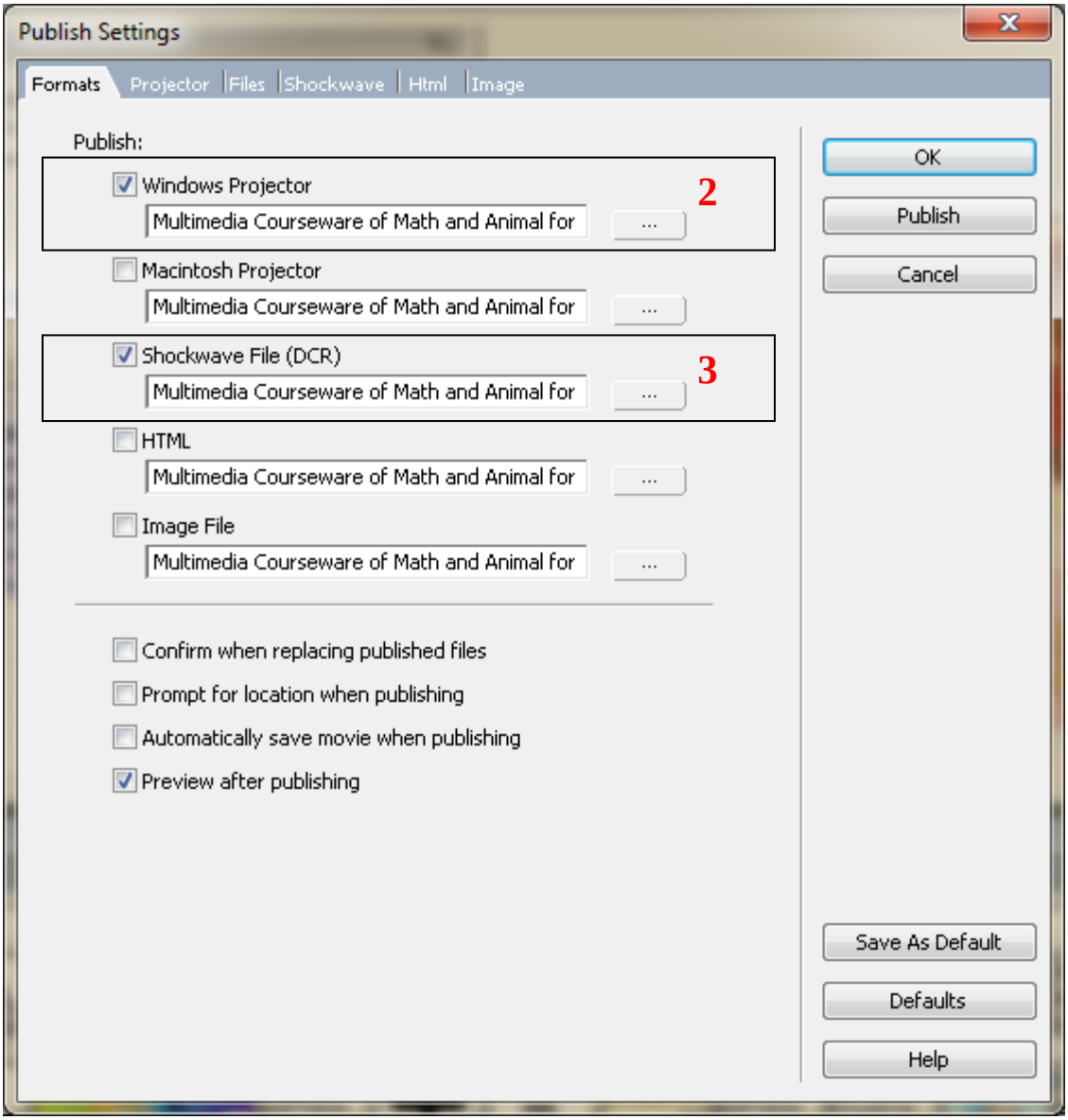



**Figure 4.28 Format Tabs Under Publish Setting (Source: The author)**

| Label | Description |
|---|---|
| 2 | Choose the Windows Projector which will publish as EXE file format. |

| | |
|---|---|
| **3** | Choose Shockwave File which will publish as DCR file format in order to embed to website. |

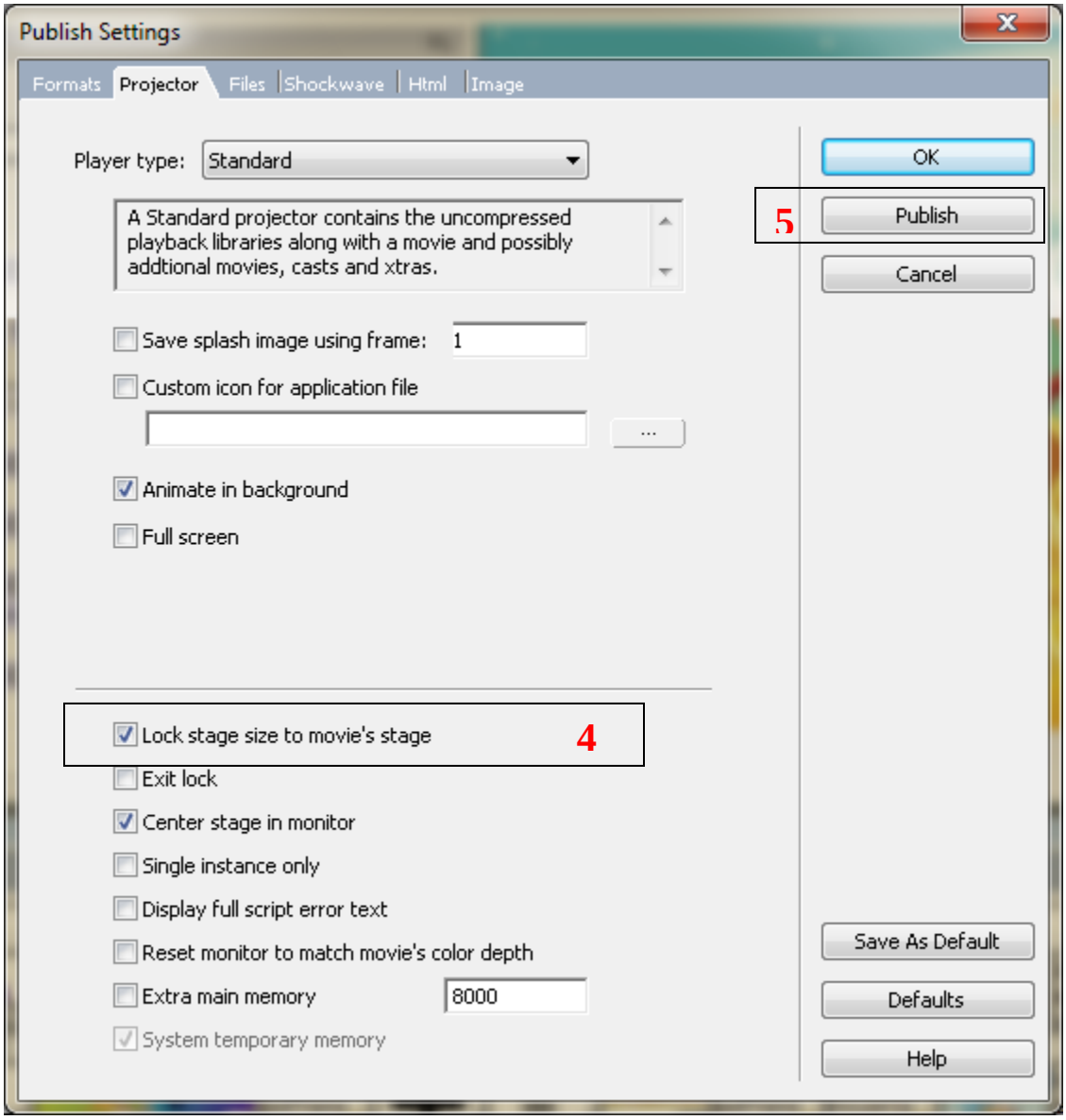



**Figure 4.29 Projector Tabs Under Publish Setting (Source: The author)**

| Label | Description |
|---|---|
| **4** | Check “Lock stage size to movie’s stage”. |
| **5** | Click on “Publish” to start publishing final system. |


**Figure 4.30 Final System Type (EXE format) (Source: The author)**


**Figure 4.31 Final System Type (DCR format) (Source: The author)**

This is the front design of CD cover for the courseware.


**Figure 4.32 Front Design CD Cove**

This is the back CD cover design for courseware

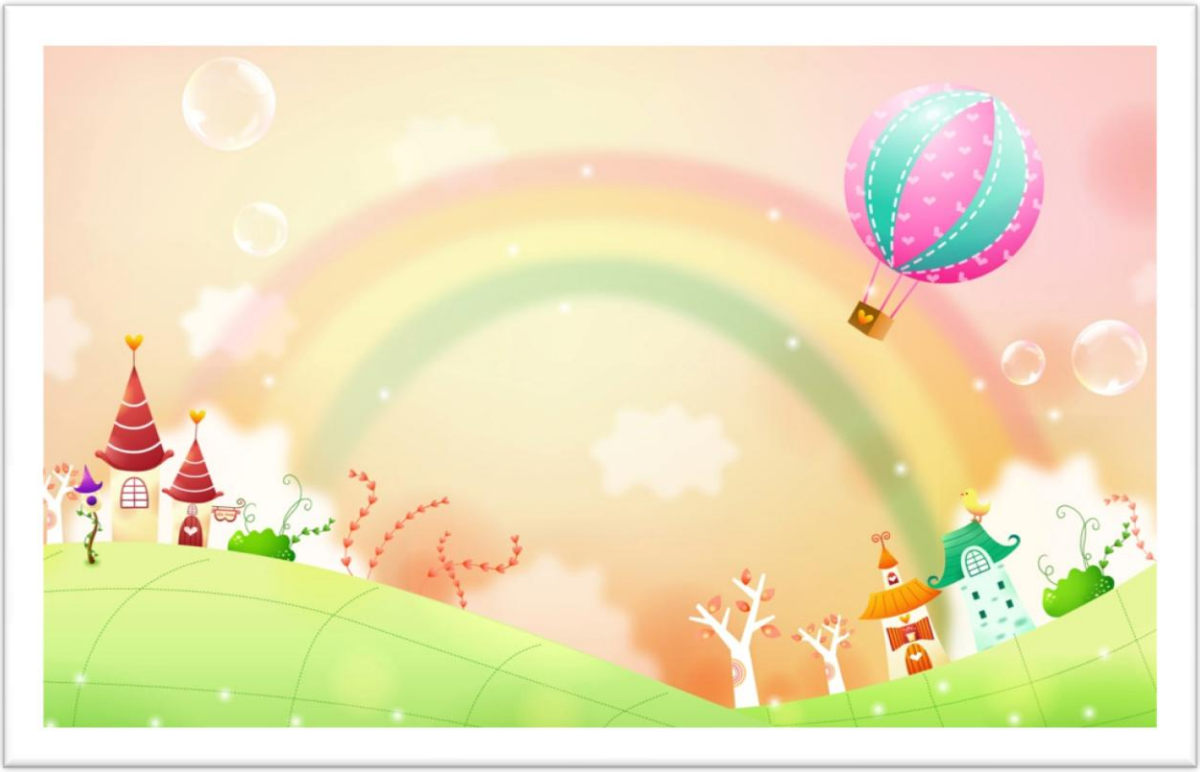


**Figure 4.33 Back Design CD Cover**

# Chapter 5.0 Testing

## 5.1 Alpha Testing

The author has conducted the alpha testing for the Math and Animal Courseware. Alpha testing is to test among the developer and this test will not involve the users or the clients. Alpha testing is the first phase or process to test the software development (nau.edu, 2010). The purpose of conduct the alpha testing is because it can test whether the system is having errors or bugs. Alpha testing is help the author to reduce the amount of error occur when implementing the user evaluation of the Math and Animal Courseware. The first phase of the alpha testing is included the unit testing, integration testing, and system testing.

### 5.1.1 Unit Testing

#### *5.1.1.1 Main Menu Page*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Math" button | Link to Math Menu Page | Same as expected | Success |
| **2.** | Click on "Animal" button | Link to Animal Menu Page | Same as expected | Success |
| **3** | Click on "Fun Game" button | Link to mini flash game- Car Parking. | Same as expected | Success |
| **4** | Click on "About" button | Link to About Page | Same as expected | Success |
| **5** | Click on "Sound On" button | Background music is play. | Same as expected | Success |
| **6** | Click on "Sound Off" button | Background music is mute. | Same as expected | Success |

**Table 5.1 Testing of Main Menu Page (Source: The author)**

### *5.1.1.2 Math Menu Page*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Learn" button | Link to Math Learning Page | Same as expected | Success |
| **2.** | Click on "Game" button | Start the mini flash game regarding addition and subtraction. | Same as expected | Success |
| **3** | Click on "Video" button | Link to Math Video Page. | Same as expected | Success |
| **4** | Click on "Sound On" button | Background music is play. | Same as expected | Success |
| **5** | Click on "Sound Off" button | Background music is mute. | Same as expected | Success |
| **6** | Click on "Home" button | Link to the Main Menu | Same as expected | Success |

**Table 5.2 Testing of Math Menu Page (Source: The author)**

### *5.1.1.3 Math Learning Lesson Page*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Start" button | Start the math teaching | Same as expected | Success |
| **2.** | Click on "Stop" button | Stop the math teaching | Same as expected | Success |
| **3** | Click on "Back" button | Link to Math Menu Page. | Same as expected | Success |
| **4** | Click on "Next" button | Link to next page of math teaching. | Same as expected | Success |
| **5** | Material of teaching | The material able to become larger when the | Same as expected | Success |

| | | | | |
|---|---|---|---|---|
| | | voice teaching point to the specific material. | | |

**Table 5.3 Testing of Math Learning Lesson Page (Source: The author)**

#### *5.1.1.4 Math Game*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Next" button | Proceed to next question. | Same as expected | Success |
| **2.** | Click on "Answer" button | Able to click on the answer button for each question. | Same as expected | Success |
| **3** | Question and answers are randomly generated | The question and answer are able to randomly generate. | Same as expected | Success |
| **4** | Right Answer | Able to show right answer (yummy) beside the pooh. | Same as expected | Success |
| **5** | Wrong Answer | Able to show wrong answer (oh no) and right answer (I'm here) will be show directly beside the pooh | Same as expected | Success |
| **6** | Sound effect of right and wrong answer | Able to play the sound effect to the each answer. | Same as expected | Success |
| **7** | Score | The total score will be calculate automatically and displayed at the end | Same as expected | Success |

| | | | | |
|---|---|---|---|---|
| | | of the game | | |
| **8** | Click on "Sound" button | Able to turn on and mute the background music | Same as expected | Success |
| **9** | Click on "Retry" button | The game will be replay | Same as expected | Success |

**Table 5.4 Testing of Math Game (Source: The author)**

#### *5.1.1.5 Math and Animal Video Page*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Play" button | Play the video | Same as expected | Success |
| **2.** | Click on "Stop" button | Stop the video | Same as expected | Success |
| **3** | Click on "Home" button | Link to the Main Menu | Same as expected | Success |

**Table 5.5 Testing of Math and Animal Video Page (Source: The author)**

#### *5.1.1.6 Animal Learning Lesson Page*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Animal" button | A bubble speech which contains sound of animal and pronunciation of animal's name will appear. | Same as expected | Success |
| **2.** | Click on "Start Sound of Animal" button | Start play the sound of animal | Same as expected | Success |

| | | | | |
|---|---|---|---|---|
| **3** | Click on "Stop Sound of Animal" button | Stop play the sound of animal | Same as expected | Success |
| **4** | Click on "Start Pronoun Name of Animal " button | Start pronounces the name of animal. | Same as expected | Success |
| **5** | Click on "Stop Pronoun Name of Animal " button | Stop pronounces the name of animal. | Same as expected | Success |

**Table 5.6 Testing of Animal Learning Lesson Page (Source: The author)**

#### *5.1.1.8 Animal Game Page*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Next" button | Proceed to next question. | Same as expected | Success |
| **2.** | Click on "Answer" button | Able to click on the answer button for each question. | Same as expected | Success |
| **3** | Tick | It will show tick symbol on the animal if the answer is correct. | Same as expected | Success |
| **4** | Cross | Able to display cross symbol on the animal if the answer is wrong. | Same as expected | Success |
| **5** | Cricle | A circle symbol will circle the right answer if the answer is wrong chosen. | Same as expected | Success |
| **7** | Score | The total score will be | Same as expected | Success |

| | | | | |
|---|---|---|---|---|
| | | calculate automatically and displayed at the end of the game | | |
| **8** | Click on "Sound" button | Able to turn on and mute the background music | Same as expected | Success |
| **9** | Click on "Retry" button | The game will be replay | Same as expected | Success |

**Table 5.7 Testing of Animal Game Page (Source: The author)**

### *5.1.1.7 Fun Game Page*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Click on "Play" button | Start the car parking | Same as expected | Success |
| **2.** | Click on "Help" button | Display the instruction of how to play the game. | Same as expected | Success |
| **3** | Click on "Exit" button | Close the game | Same as expected | Success |
| **4** | Timer | Timer is able to counting down 60 seconds | Same as expected | Success |
| **5** | Car | Able to control by keyboard. | Same as expected | Success |
| **6** | Collision | If the car collide the obstacles, "Crush" word will be appear. | Same as expected | Success |
| **7** | Life of car | Able to display 5 life of car. Once the car is | Same as expected | Success |

| | | | | |
|---|---|---|---|---|
| | | crush, life of car will decrease one among all. | | |
| **8** | Score | The total score will be calculated automatically and displayed at the end of the game. | Same as expected | Success |
| **9** | Click on "Sound" button | Able to turn on and mute the background music | Same as expected | Success |

**Table 5.8 Testing of Fun Game Page (Source: The author)**

### 5.1.2 Integration Testing

Integration testing is an integrated of two or more units from the system into larger units. The different between unit testing and integration testing is the testing is no longer tested independently but is tested in the groups (MalathiVanaraj, 2009). Integration testing is important to the author is because it can avoid confusing when the author combining the whole module into one system.

#### *5.1.2.1 Images and Sound*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Import image | Import images that edited by Adobe Photoshop. | Same as expected | Success |
| **2.** | Import sound | Import sound to Flash and Director. | Same as expected | Success |
| **3** | Integrate sound into button | Integrate sound into the buttons so that sound will play when | Same as expected | Success |

| | | | | |
|---|---|---|---|---|
| | | mouseOver and mouseUp. | | |
| **4** | Integrate sound into frame | Integrate the sound effect or narrator sound into the keyframe. | Same as expected | Success |

**Table 5.9 Integration Testing on Images and Sound (Source: The author)**

***5.1.2.2 XML File***

| **No** | **Test Field** | **Expected Result** | **Test Result** | **Remarks** |
|---|---|---|---|---|
| **1.** | Integrate with XML file | Integrate external XML file with Flash | Same as expected | Success |
| **2.** | Retrieving XML data | Retrieve the XML data and display in Flash | Same as expected | Success |

**Table 5.10 Integration Testing of XML File (Source: The author)**

### 5.1.3 System Testing

Once the integration testing is done by the author and it produces the satisfy results, the next testing is the system testing. System testing represents the overall test on the assembled system. The important of system testing is this is the only stage that the full complexity of the system is present (MalathiVanaraj, 2009). The system testing is the most structured and most formal stage of testing among the all testing. If the output is not match with the expected result, the author will do the modified and come out with the more satisfy output. The author has done the hardware testing which test in different hardware specification.

### *5.1.3.1 Hardware Specification*

| No | Test Field | Expected Result | Test Result | Remarks |
|---|---|---|---|---|
| **1.** | Run the system in:<br>- Acer Laptop 14”<br>- Windows 7<br>- Intel Core i5 processor<br>- NVIDIA G310M<br>- 4GB RAM | Run the system without any problem. | Same as expected | Success |
| **2.** | Run the system in:<br>- Asus Laptop 15”<br>- Windows 7<br>- Intel Core 2 Duo P7450 processor<br>- NVIDIA G105M<br>- 4GB RAM | Run the system without any problem. | Same as expected | Success |
| **3** | Run the system in:<br>- Desktop 20”<br>- Windows 7<br>- Intel Core 2 Duo E7400 processor<br>- NVIDIA GTX260<br>- 4GB RAM | Run the system without any problem. | Same as expected | Success |
| **4** | Integrate sound into frame | Integrate the sound effect or narrator sound into the keyframe. | Same as expected | Success |

**Table 5.11 System Testing on Hardware Specification (Source: The author)**

## 5.2 Beta Testing

Beta testing is a period of involve large groups of people into the testing. There are two type of beta testing, which are open-beta and close-beta. Open-beta is welcome everyone to join and test the system. While close-beta is specific people or selected people can only join the testing. The participants will test the system and report back on any problems occurs in the system. Besides that, the participants allow to provide the feedbacks or suggestions to the developer so that the developer can make the modification.

The author has conducted the beta testing for the multimedia courseware. Beta testing is the second phase of the proposed system testing which involving the target audiences (kids under 4-7 years old) to try out the system.

### 5.2.1 User Evaluation

The purpose of user evaluation is to collect the feedback from the kids. The author uses questionnaire to collect the feedback. Since the kids are too young and not able to understand the meaning of questions, the questionnaire will me answer by their parents.

### *5.2.1.1 Result of Questionnaire*

**Question 1:**

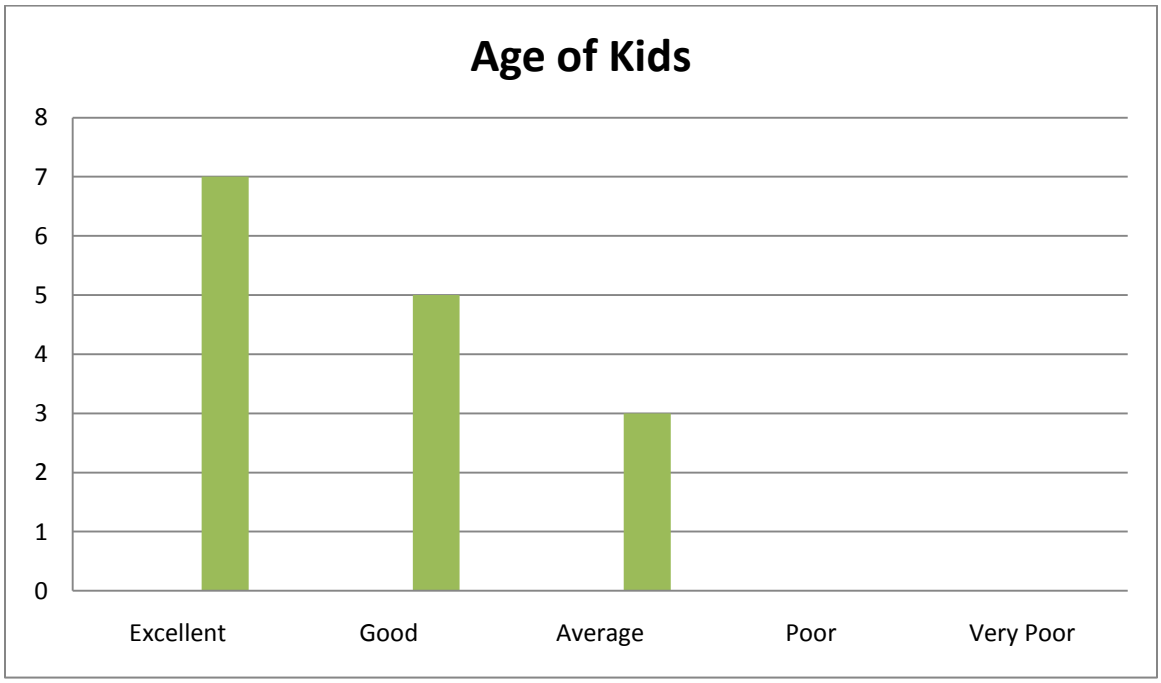



**Figure 5.1 Age of Kids**

From the Figure 5.1, there are 2 kids are 4 years old, 4 kids are 5 years old, 5 kids are 6 years old and 3 kids are 7 years old among 15 kids.

**Question 2:**

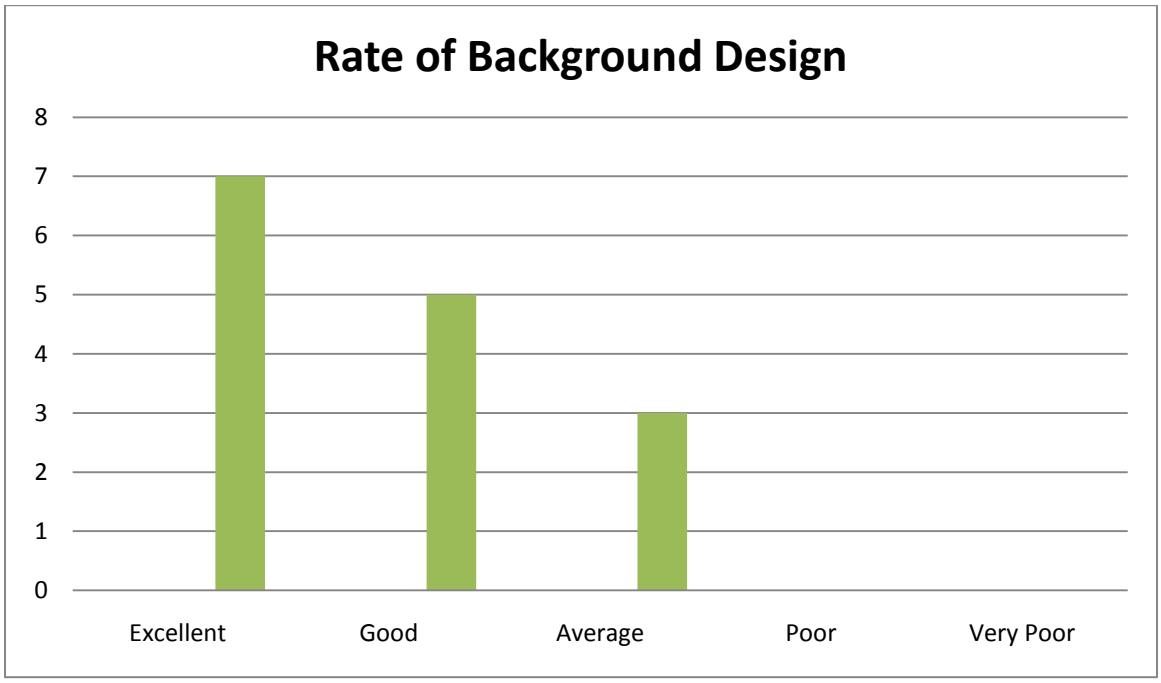



**Figure 5.2 Rate of Background Design**

From the figure 5.2, out of 15 respondents, there are 7 respondents rate the background design are excellent, 5 respondents rate the background design are good while 3 respondents rate the background design is average. The author need to know the design of background whether can attract the kids.

**Question 3:**

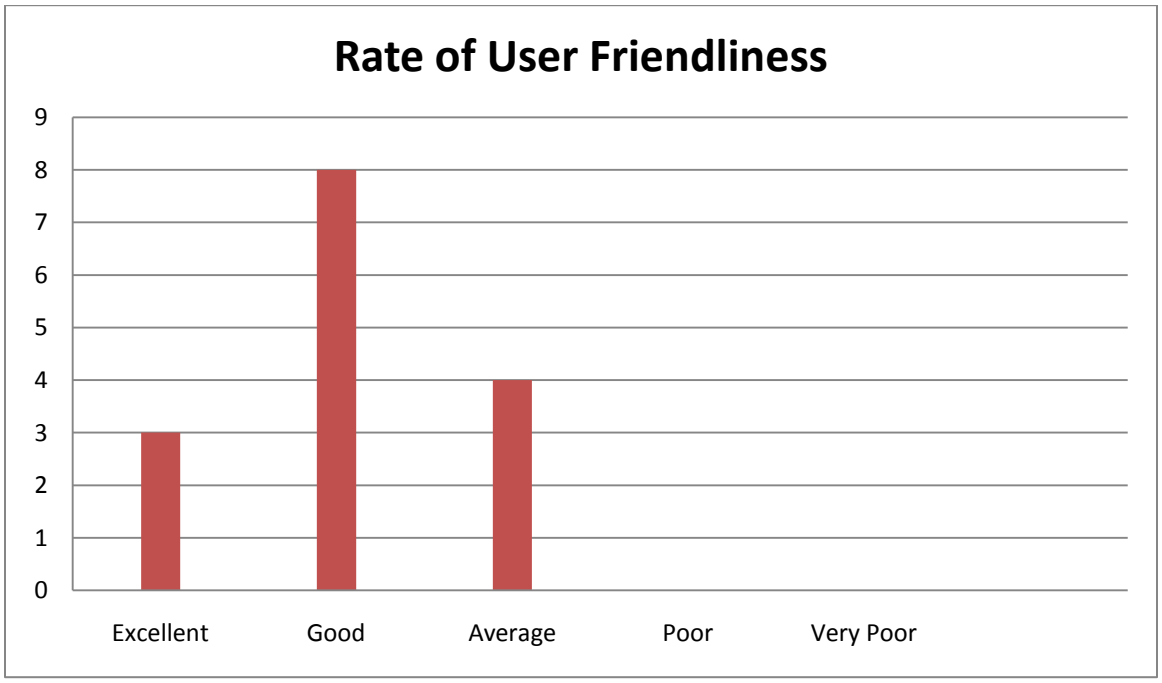



**Figure 5.3 Rate of User Friendliness**

Figure 5.3 shows the rating of the user friendliness of the courseware. There are 3 respondents rate excellent, 8 respondents are rate good and 4 respondents are rate average. There are no respondents are rates poor and very poor of user friendliness of the courseware. User friendliness of the courseware is very important. If the courseware is not user friendly, the kids are not able to play and learning the courseware.

**Question 4:**

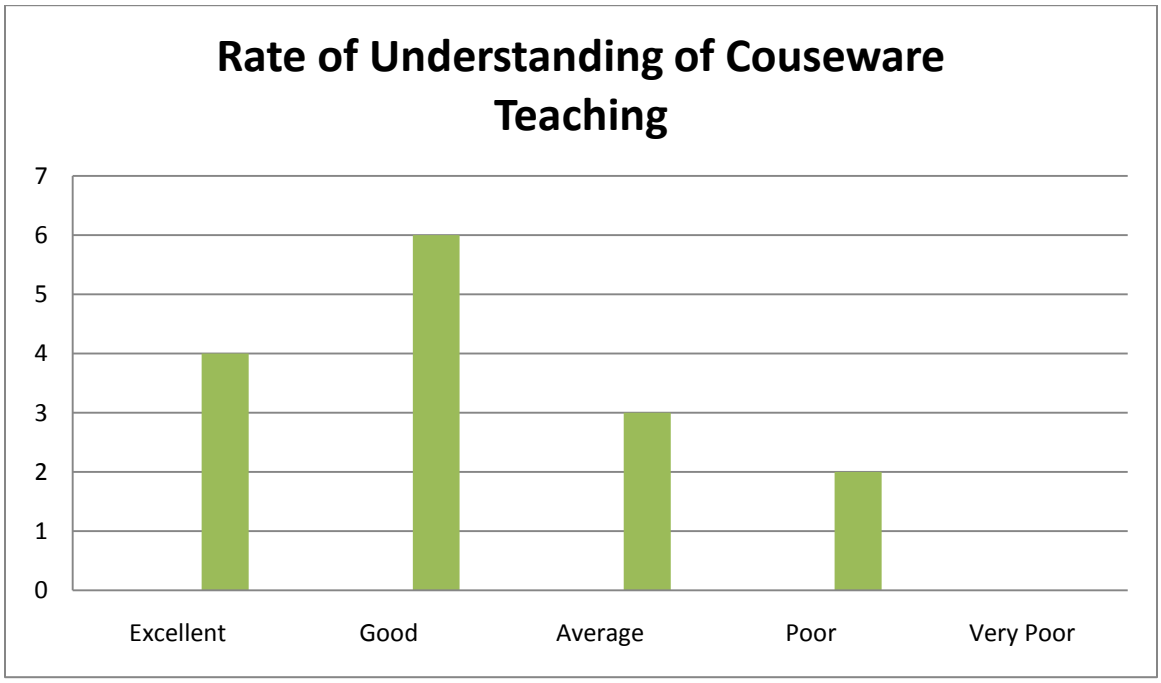



**Figure 5.4 Rate of Understanding of Courseware Teaching**

Base on the Figure 5.4, there are 4 respondents rate excellent of the understanding of the courseware teaching, 6 respondents are rate good, 3 respondents are average and 2 respondents are rate poor among 15 respondents. The purpose of author designing this question is to know whether the kids can understand the way of teaching that the author used in courseware. If the kids are not understand which mean there is meaningless of the courseware.

**Question 5:**

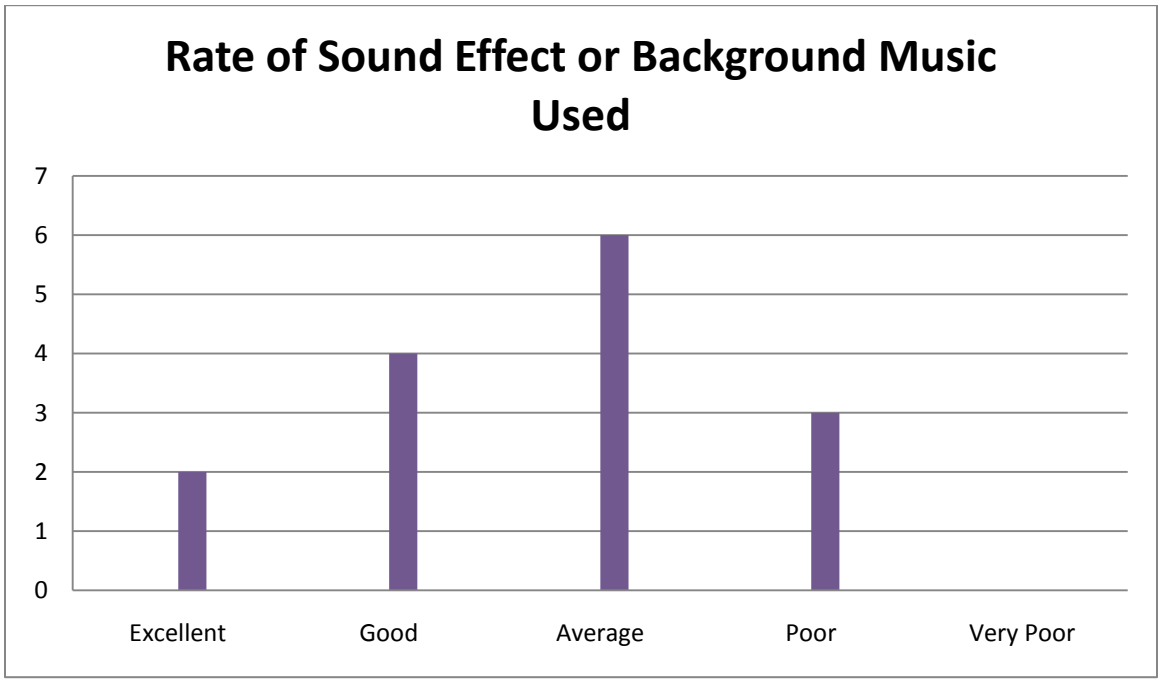



**Figure 5.5 Rate of Sound Effect or Background Music Used**

Base on the Figure 5.5, out of 15 respondents found that 2 respondents rate the sound effect or background music used excellent, 4 respondents rate good, 6 respondents rate average while 3 respondents are rate poor to the sound effect or background music used. The author wants to know that the kids like or dislike the sound effect used in the courseware.

**Question 6:**

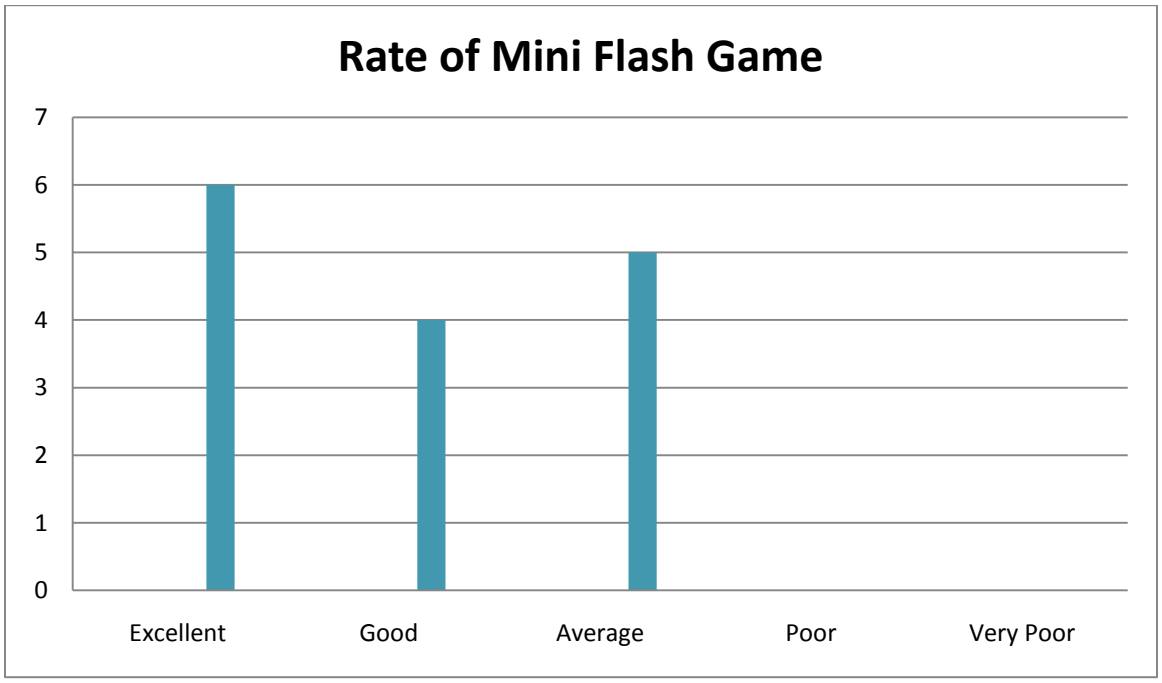



**Figure 5.6 Rate of Mini Flash Game**

Result above shows that there are 6 respondents rate excellent to the mini flash game in the courseware, 4 respondents rate that good for the mini flash game while 5 respondents are rate average to it. The author has to know the effectiveness of the mini flash game for the kids.

**Question 7**

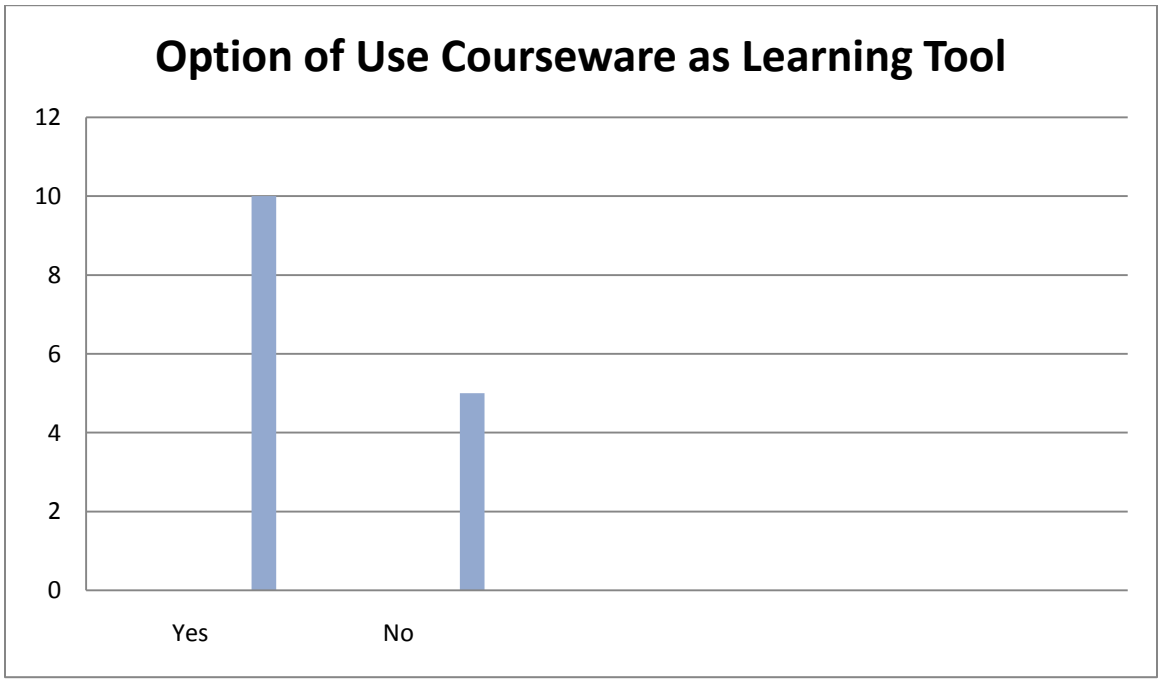



**Figure 5.7 Option of Use Courseware as Learning Tool**

From the Figure 5.7 shows that there are 10 respondents will use the courseware as their learning tool while 5 respondents are reject to use the courseware as their learning tool. The author needs to know whether the kids will use the courseware as their learning tool after play with courseware because the purpose of develop the courseware is to give them learning and practice.

**Question 8:**

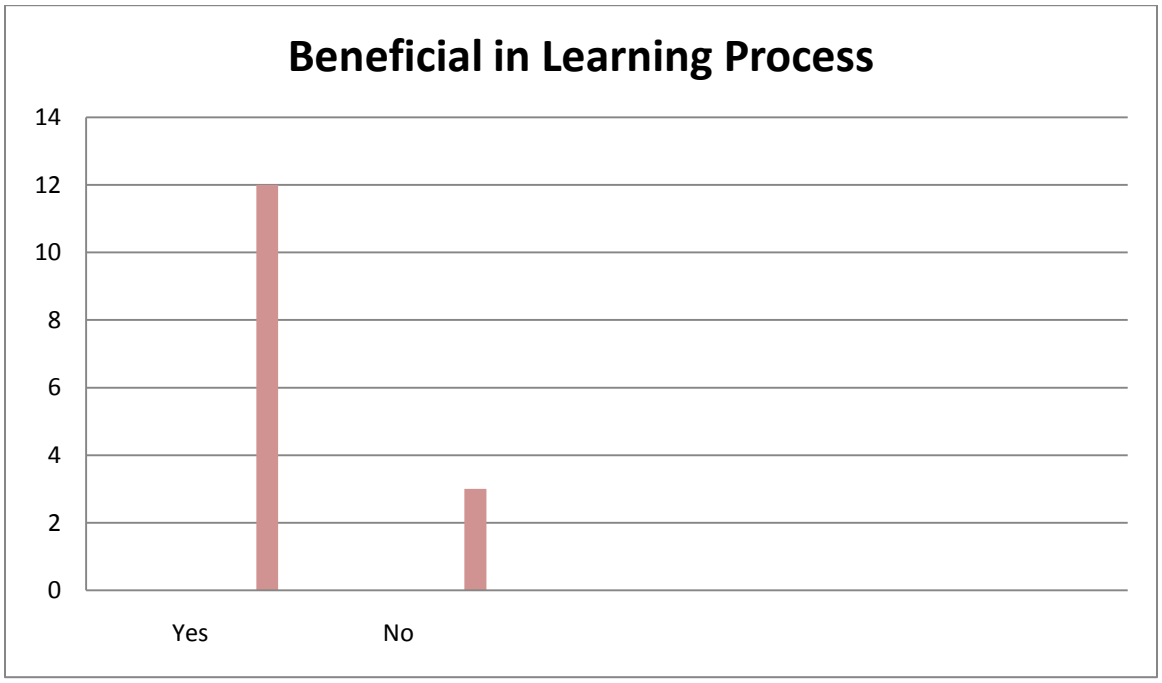



**Figure 5.8 Beneficial in Learning Process**

From the Figure 5.8 shows that there are more respondents which is 12 respondents choose yes which mean the courseware is benefit to the kids' learning process while only 3 respondents choose no which mean the courseware will not give benefit in the kids' learning process. The author wants to know that the courseware developed whether can benefit to the kids in their learning process.

**Question 9:**

What are the other comments you would like to provide for the courseware for further improvement?

- It is good for kids in their learning process.
- Background music is not match.
- Prefer go tuition
- Good

There are only 5 respondents out of 15 respondents are comment on this questions while the rest of the respondents are no comments about this. Since has respondents are comment that the background music is not match with the courseware, the author will make changes to the courseware as well.

# Chapter 6.0 Conclusion

## 6.1 Future Enhancement

Future enhancement is vital to any system because it would add in new feature and improve the system to attract and fulfill more customers' requirement. The author would make future enhancement to the online courseware as well.

### 6.1.1 Math Course

Since there is lack of time, the author only can develop math with addition and subtraction which under category of 4-7 years old child. The author will add one more category which is 8-12 years old and the mathematics fraction will also include addition, subtraction, multiplication, division. At the same time, the level of difficulties of the questions provided also will base on the category chosen.

### 6.1.2 Animal Course

Same as math course, animal course also will add in one category which is 8-12 years old. As the kids will learn pronounce the name of animal and what sound should the animal make in category of 4-7 years old, the new category will learn how to differentiate category of animal. For example, spider is in the insect category.

### 6.1.3 Graphic Design

The author wishes to improve the graphic design of the courseware by add in more complicated action to the image so that it will look more interesting. Thus, the kids also will be attracted to use the courseware.

### 6.1.4 Sound effect or sound narrator

Sound effect also played an important role to make the system exciting. Since it is an online courseware for kids, the author will add in more cartoon sound effect to match

with the kids. For the sound narrator used is too mature, the author plan change the sound narrator to be more childish style.

## 6.2 Lesson Learnt

### 6.2.1 Adobe Flash Action Script 3.0

To develop the proposed courseware, the author need go to online research how Action Script work due to the author never learns the Action Script before. With the help of online and friends, the author was gain the knowledge of Action Script and apply in the mini flash game. The author also learnt how to make animation by using Flash. Besides, the author learnt embedded the XML to Flash as well.

### 6.2.2 Adobe Director 11.5

Adobe Director using Lingo Script to control the system but the author has no idea on this area. Through online learning, the author able to use some basic Lingo Script during authoring process. The author had learnt new things throughout the system.

### 6.2.3 Planning

The author had learnt how to planning a project from beginning and develop the system from the idea stage. Hence, project management skills and knowledge are gain by the author.

## 6.3 Challenge Faced

### 6.3.1 Lack of Time Learning

Due to the author never learn about develop a courseware, so the author need learn all the related things from the beginning and do research on related topics too. It is require a lot of time to learn the tool such as Adobe Director and Adobe Flash. The author need learn the tutorial of Adobe Flash with Action Script before start to develop the project. Besides that, project documentation also need spend time to do so.

### 6.3.2 Embedded EXE File to Website.

After the author had publish the courseware format to EXE file, the author face problem on embedded the file to website. The author had tried few methods to embed the file to website.

## 6.4 Conclusion

In conclusion, the proposed courseware had developed and fulfills the proposed objective. Although there are some problem faces in the development process, the author had fixed it and the courseware can run without any serious error. The author hopes that the courseware can benefit the kids in their learning process.

Besides that, the author was appreciated because she gains a lot of additional knowledge throughout the development of the system. The knowledge she gain can apply to her future and the author will keep the positive way to learn new knowledge as well.

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# Appendix A

**Questionnaire1 (Before Development)**

Questionnaire –Online Multimedia Courseware of Math and Animal for Kids

1. Please specify the age of your child.

_____

2. What is the gender of your child?

A.Female

B. Male

3. Did the existing online learning system can grab your attention?

A. Yes

B. No

4. Does the design of user interface of existing online learning system that you use user friendly?

A. Yes

B. No

5. Do you agree that the existing online learning system has all the features required by a general user?

A. Strongly Agree

B. Agree

C. Disagree

D Strongly Disagree

6. Did existing online learning system solve your child's purpose?

A. Yes, it did completely.

B. It did, but to a certain extent

C. No, it did not at all.

7. Did you feel the design of existing online learning system attractive?

A. Yes

B. No

8. Did you feel the content of existing online learning system is easy to understand?

A. Yes

B. No

9. Did you feel the design of the existing online learning system that you use should be improve?

A. Yes

B. No

# Appendix B

**Questionnaire 2 (After Development)**

1. Please specify your child's age.

_____

2. How would you rate the background design of the courseware?

A Excellent

B Good

C Average

C Poor

D Very Poor

3. How would you rate the user friendliness of the courseware?

A Excellent

B Good

C Average

C Poor

D Very Poor

4. How would you rate the understanding of the courseware teaching?

A Excellent

B Good

C Average

C Poor

D Very Poor

5. How would you rate the sound effect or background music used in the courseware?

A Excellent

B Good

C Average

C Poor

D Very Poor

6. How would you rate the mini flash game in the courseware?

A Excellent

B Good

C Average

C Poor

D Very Poor

7. Will your child use the courseware as his/her learning tool?

A Yes

B No

8. Does the courseware benefit to your child in his/her learning process?

A Yes

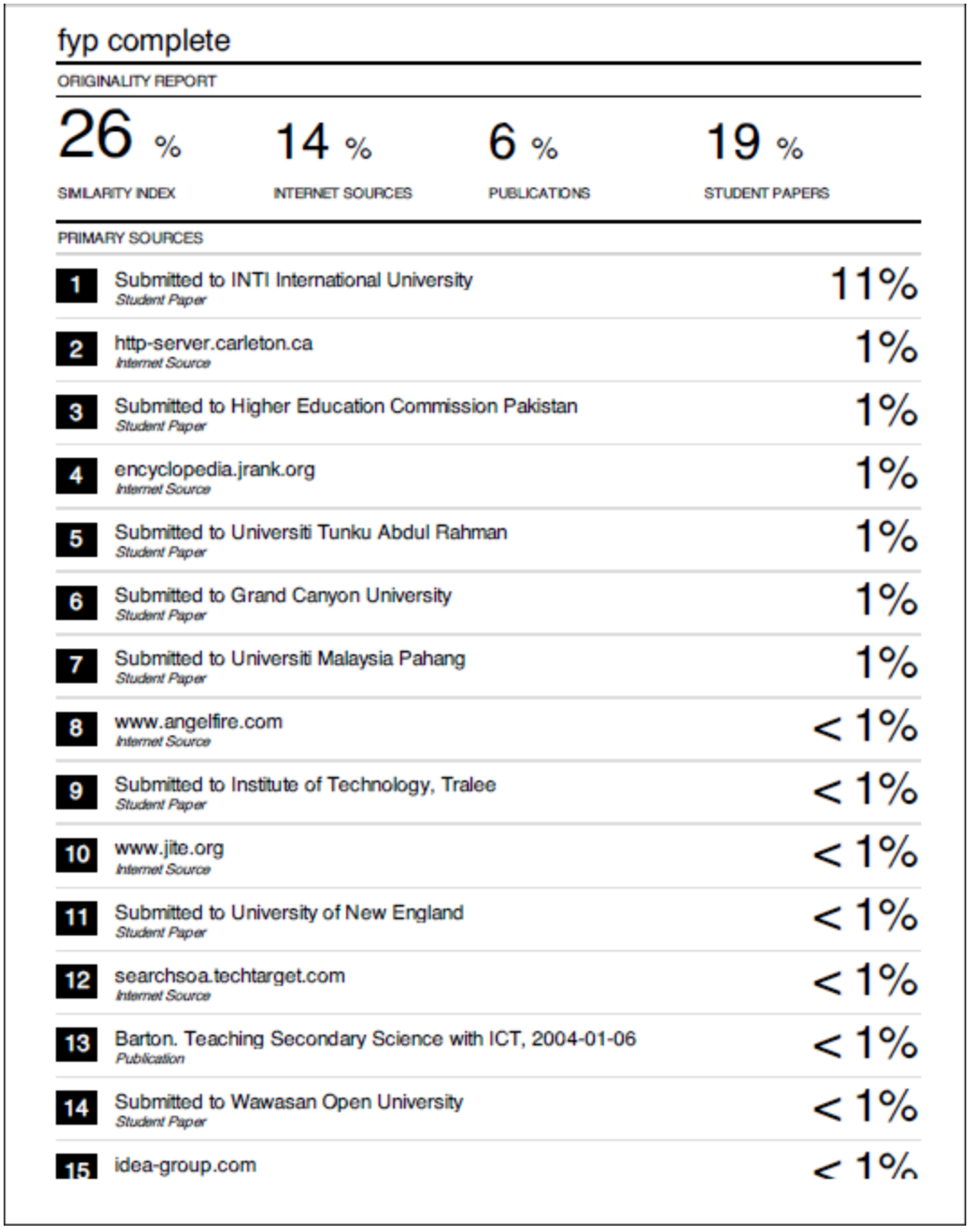
B No

9. What are the other comments you would like to provide for the courseware for further improvement?

_____

# Appendix C

## Plagiarism Report



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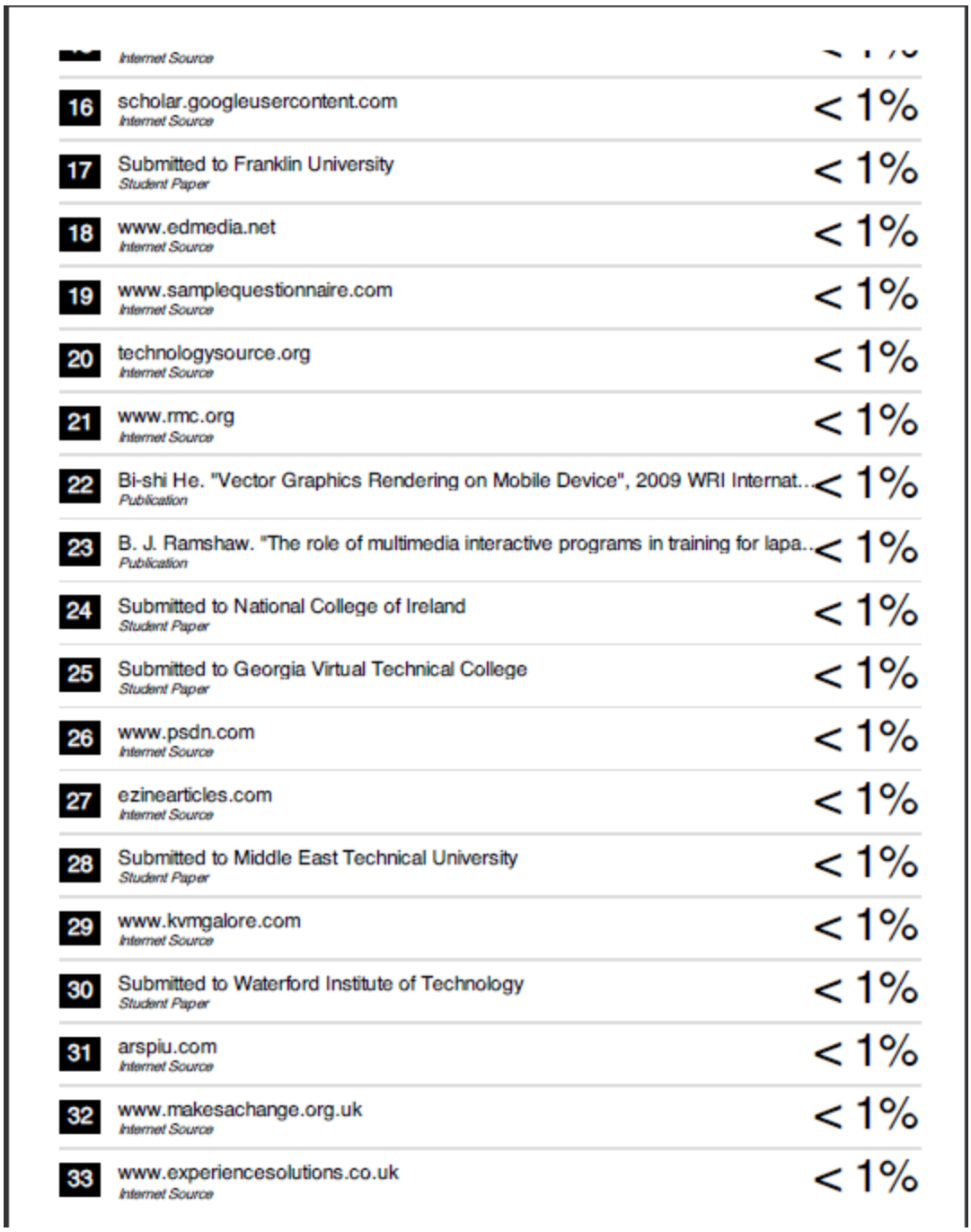

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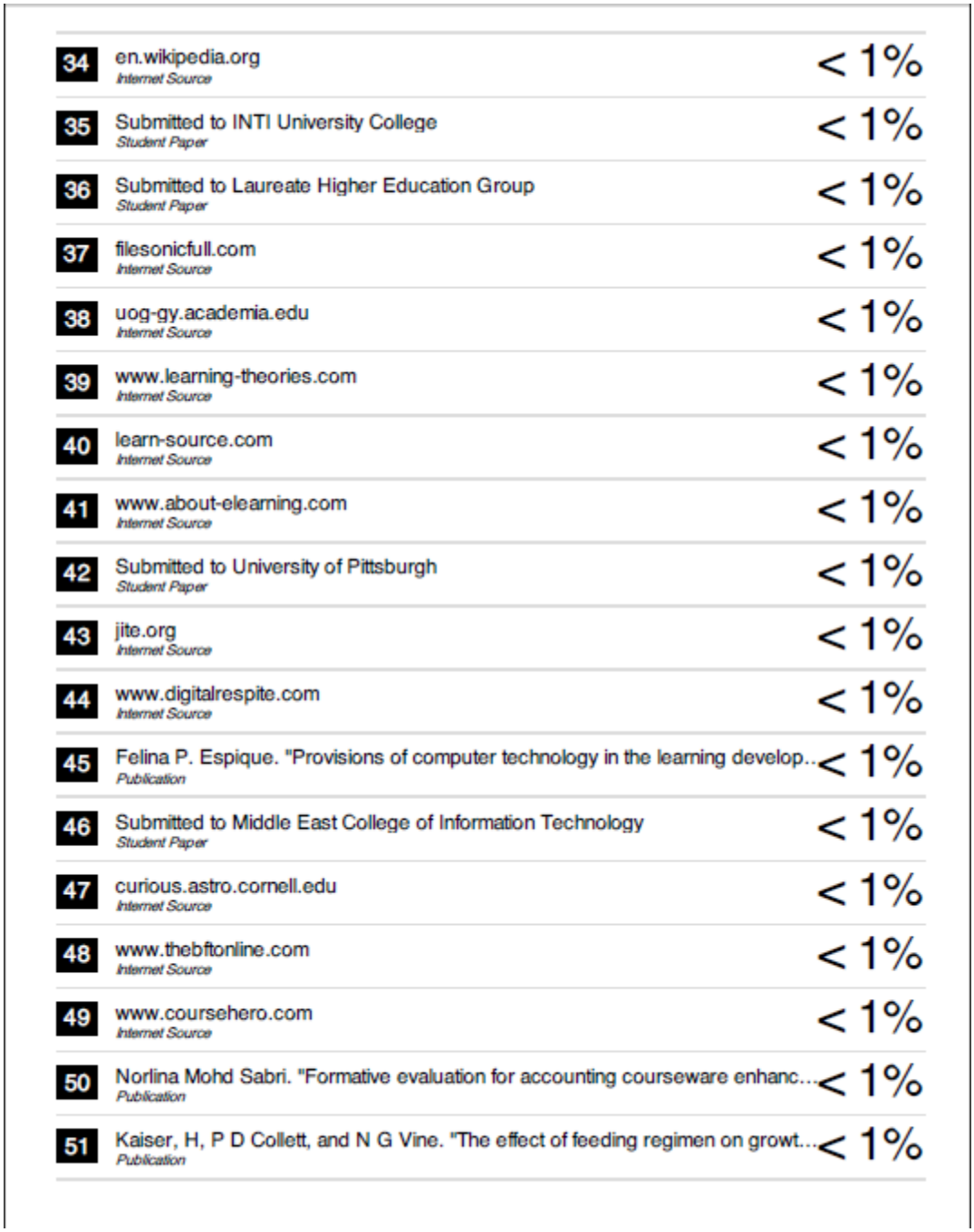

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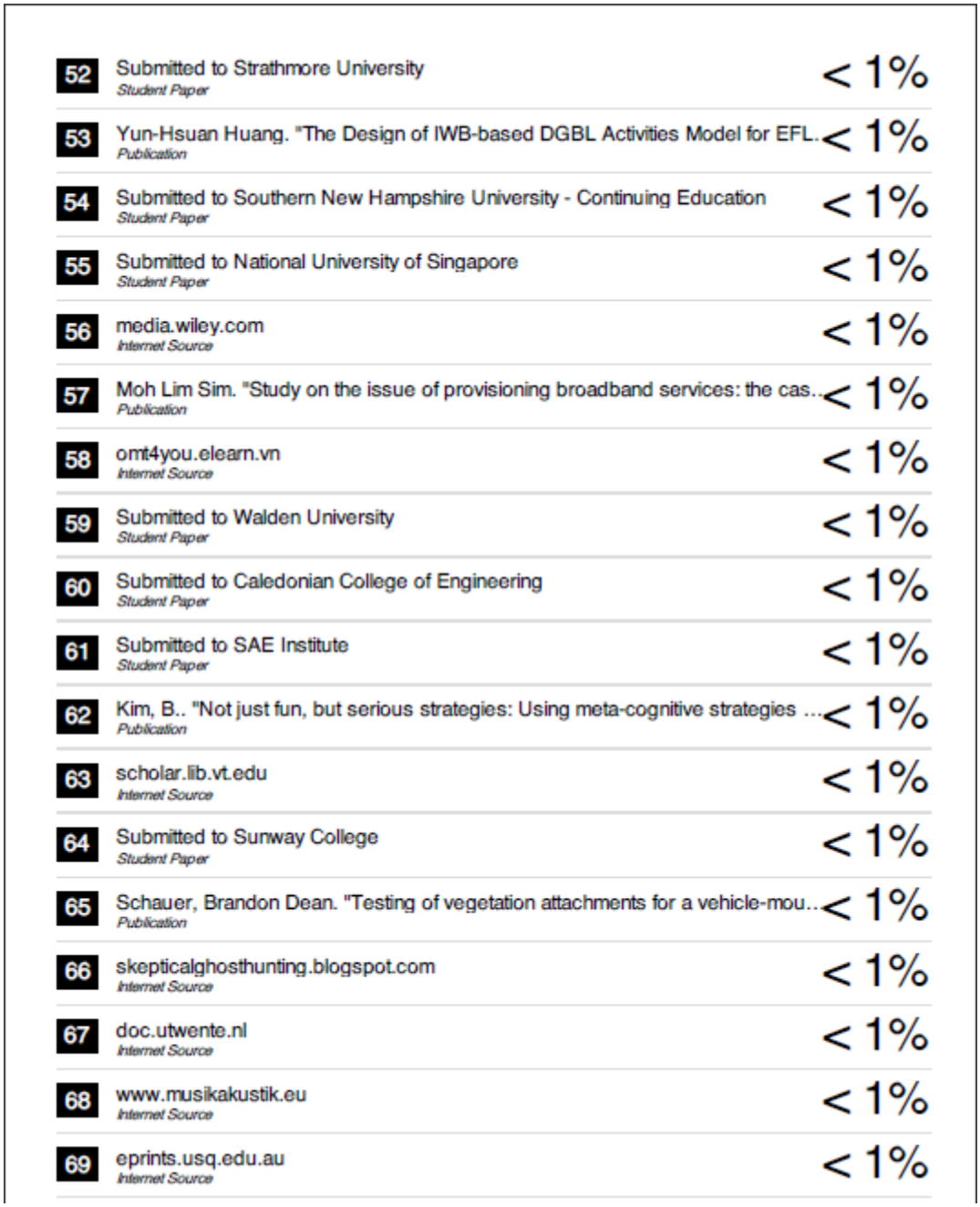

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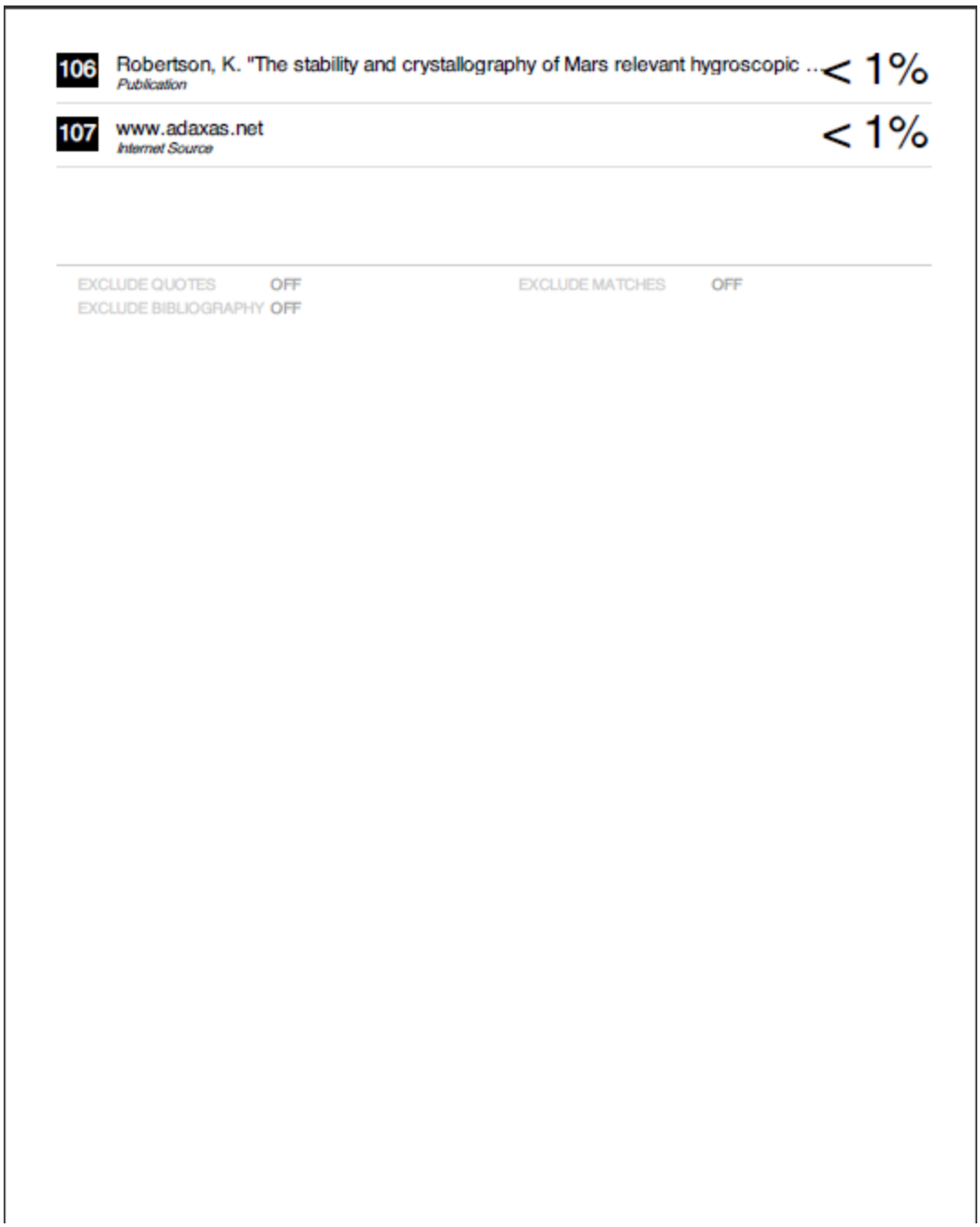
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## Appendix D

# FINAL YEAR PROJECT BIWEEKLY REPORT

| | |
|---|---|
| **Trimester, Year: 3, 3** | **Study week no.: 2** |
| **Student Name & ID: Lai Wan Ching 10ACB04470** | |
| **Supervisor: Mr Soong Hoong Cheng** | |
| **Project Title: Kids Online Multimedia Courseware of Math and Animal** | |

**1. WORK DONE**

- Installation of Adobe Director and Adobe Flash.
- Determine the final design of storyboard.
- Find pictures for the courseware used.
- Edit the pictures by using Adobe Photoshop.
- Had learned to use the software.

**2. WORK TO BE DONE**

- Main menu, math menu and animal menu need to be produced.
- Found pictures that need to used in math learning and edit all of the pictures.
- All background pictures and button need to be put nicely.
- Math learning of addition and subtraction need to be done.
- Sound need to be record and edited.

**3. PROBLEMS ENCOUNTERED**

- Never use the software and many tools are not familiar.

**4. SELF EVALUATION OF THE PROGRESS**

- Spend too much time to learn the new software.

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**Supervisor's signature** **Student's signature**

APPENDIX D

| | |
|---|---|
| **Trimester, Year: 3, 3** | **Study week no.: 4** |
| **Student Name & ID: Lai Wan Ching 10ACB04470** | |
| **Supervisor: Mr Soong Hoong Cheng** | |
| **Project Title: Kids Online Multimedia Courseware of Math and Animal** | |

**1. WORK DONE**

- Main menu, math menu and animal menu are developed.
- Pictures are found and edited.
- Background pictures and button are put nicely.
- Math learning of addition and subtraction are done.
- Sound teaching are put in the math learning

**2. WORK TO BE DONE**

- Mini math flash game needs to be done.
- Found pictures and sound that to be use in the math game

**3. PROBLEMS ENCOUNTERED**

- Lingo Script is not familiar.
- When the voice teaching says the first object, the object needs to be having some effect.

**4. SELF EVALUATION OF THE PROGRESS**

- Need study more Lingo Script.

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**Supervisor's signature** **Student's signature**

APPENDIX D

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|---|---|
| **Trimester, Year: 3, 3** | **Study week no.: 6** |
| **Student Name & ID: Lai Wan Ching 10ACB04470** | |
| **Supervisor: Mr Soong Hoong Cheng** | |
| **Project Title: Kids Online Multimedia Courseware of Math and Animal** | |

**1. WORK DONE**

- Mini math flash game is done and can function well.
- All the pictures and button is included to the game**.**

**2. WORK TO BE DONE**

- Mini animal flash game needs to be done.
- Found pictures and sound that to be use in the animal game

**3. PROBLEMS ENCOUNTERED**

- Action Script 3.0 is not familiar.
- Create random questions for math
- Load XML file to flash
- Press the answer which is right or wrong will has special effect.

**4. SELF EVALUATION OF THE PROGRESS**

- Weak in overall progress.

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**Supervisor's signature** **Student's signature**

APPENDIX D

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|---|---|
| **Trimester, Year: 3, 3** | **Study week no.: 8** |
| **Student Name & ID: Lai Wan Ching 10ACB04470** | |
| **Supervisor: Mr Soong Hoong Cheng** | |
| **Project Title: Kids Online Multimedia Courseware of Math and Animal** | |

**1. WORK DONE**

- Mini animal flash game is done and can function well.
- All the pictures and button is included to the game**.**

**2. WORK TO BE DONE**

- Find the video and put into the courseware.
- Create animation of the pictures.
- Fun Game in the courseware which is car parking game need to be done
- Found pictures and sound that to be use in the animal game

**3. PROBLEMS ENCOUNTERED**

- Action Script 3.0 is not familiar.
- Not much problem because the code is almost same with the math flash game.

**4. SELF EVALUATION OF THE PROGRESS**

- Moderate in overall progress.

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**Supervisor's signature** **Student's signature**

APPENDIX D

| | |
|---|---|
| **Trimester, Year: 3, 3** | **Study week no.: 10** |
| **Student Name & ID: Lai Wan Ching 10ACB04470** | |
| **Supervisor: Mr Soong Hoong Cheng** | |
| **Project Title: Kids Online Multimedia Courseware of Math and Animal** | |

**1. WORK DONE**

- Video is added to the courseware
- Animation content is created.
- Car parking game is developed.
- Background pictures were put nicely.

**2. WORK TO BE DONE**

- Embedded the courseware to the website.
- Documentation need to be done.
-

**3. PROBLEMS ENCOUNTERED**

- Action Script 3.0 is not familiar.
- Hard to set and control the car movement and speed.
- Total life given is 5 and one life will be deducted if crush object.
- Set timer to the car parking.
-

**4. SELF EVALUATION OF THE PROGRESS**

- Weak in overall progress.

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**Supervisor's signature** **Student's signature**

APPENDIX D

| | |
|---|---|
| **Trimester, Year: 3, 3** | **Study week no.: 12** |
| **Student Name & ID: Lai Wan Ching 10ACB04470** | |
| **Supervisor: Mr Soong Hoong Cheng** | |
| **Project Title: Kids Online Multimedia Courseware of Math and Animal** | |

**1. WORK DONE**

- Courseware is embedded to the website successfully.
- Documentation is done.

**2. WORK TO BE DONE**

- Prepare for presentation.

**3. PROBLEMS ENCOUNTERED**

- Courseware which is publish as EXE file format via Adobe Director cannot embed to the website and only DCR file format able to embed to website. The problem is after publishing as DCR file format the flash game cannot work properly.
- Different shockwave player version are effected the courseware run at website.

**4. SELF EVALUATION OF THE PROGRESS**

- Weak in overall progress.

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