Multimedia Tool For Children Learning: Web Based Pop Up Book

by

Noorfadzillah bt. Muhamad Baharun

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information System Programme
Universiti Teknologi PETRONAS
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Approved by,

_____

(Dr. Wan Fatimah Wan Ahmad)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
July 2005

CERTIFICATION OF ORIGINALITY

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

NOORFADZILLAH BT. MUHAMAD BAHARUN

ABSTRACT

Web-based multimedia pop-up book for children learning is intend to convert traditional learning process into a web using multimedia format which are integrate with multiple media elements such as audio, video, graphics, text and animations. Currently the children have to pull tabs and open pages for the book to 'come to life'. So the purpose of this project is to produce web-based multimedia pop-up book for children learning. The objectives of this project are to create and design interactive multimedia learning book, to come out with user-friendly interface and interactive application and to develop multimedia book that be able to view, use and interact with the online application that providing true multimedia application. The scope of this project is to create and design multimedia web-based education book for children between 5 to 6 years old in order to help children in learning activities, reading skills and improves children computer literacy. The project will adopt methodology of 'code-and-fix' methodology. Three essential stages of development have been performed, which involved Design stage (design the page layout and design the action and animation), Implementation stage (implement by insert and modify required images and implement actions and animations), and finally Test stage (run the actions and compare with intended design). The result in designing successful multimedia web-based for children learning the relevant area are focused on content presentation and user-friendly interface design. In order to achieve the objective of this web-based multimedia tool for children learning, this project should be able facilitate the process of integrating activity into education through online application.

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CHAPTER 1
INTRODUCTION

1. OVERVIEW

In recently years, research activities on uses of computers have increased greatly. The notion that children learn by constructing their own knowledge is highly popular among educational theorist. Children ought to be active and not passive in learning process and can be the one who become as primary users of software and technology. The focus attentions are interactive multimedia learning tool application on how to design and the ways to engagement and motivation for younger user. Therefore multimedia technologies offer children the opportunities of learning 'actively' by allowing them to construct knowledge as interactive multimedia documents.

Beside of that with the advent of the new millennium, we are now entering into a knowledge-based society. In a knowledge-based society, the competitiveness of any society is determined by knowledge. In a knowledge-based society, lifelong learning as well as distance learning should be provided to everyone at anytime, at any place and through various media and methods of learning. In this sense, Internet has been an important tool to provide high-quality learning environments. Among various tools supporting Internet, the advances in the Web technology have affected the traditional teaching- learning method. In the same time it has rapidly become an important method for effective teaching learning.

1.1 Background of Study

Multimedia has been defined in a number of ways. It is not our purpose to go into the details of these definitions. But, in order to clarify the use of the term in the context of the book by S. Mishra, R. Sharma they prefer to quote a few of them:

"*Multimedia* is the combination of a variety of communication channels into a co-ordinate communicative experience for which an integrated cross-channel language of interpretation does not exist" (Elsom-Cook, 2001).

This definition gives way for two approaches – first approach is term of the "multiple-media" utilization and a combination of different channels acquires unification as a medium. The second approach leads us to the next definition:

"... multimedia can be defined as an integration of multiple media elements (audio, video, graphics, text, animation, etc.) into one synergetic and symbiotic whole that results in more benefits for the end user than any one of the media elements can provide individually" (Reddi, 2003).

Second definition essentially tries to emphasize the second approach of first definition with more clarity and spells out the components of multimedia. Taking a systems theory perspective, it also tells us that the overall effectiveness of multimedia is better than any one component of it. But, neither of the definitions explicitly includes the "interactive" power of multimedia, as in third definition:

"The term 'interactive multimedia' is a catch-all phrase to describe the new wave of computer software that primarily deals with the provision of information. The 'multimedia' component is characterized by the presence of text, pictures, sound, animation and video; some or all of which are organized into some coherent program. The 'interactive' component refers to the process of empowering the user to control the environment usually by a computer" (Phillips, 1997).

"*Multimedia* is the presentation of a usually interactive computer application, incorporating media elements such as text, graphics, video, animation and sound on a computer. It is the melding of the sensory power of television with the data manipulation an interactive power of the computer. (McGloughlin, 2001).

With the rapid advance in web and electronic learning (e-learning), learning variety of knowledge on the Web has been very popular for many years. Beside of that, in the world of variety multimedia technology, the multimedia-based education is

always been distributed via WWW or on a CD-ROM by including some form of interaction between the user and the system. Through multimedia the barriers between education and entertainment are steadily show off. So that Internet has been an important tool to provide high-quality education environments. It because the Internet is a worldwide network of millions of computers situated in all parts of the world. The WWW is a distributed information service that allows these computers to send and receive information between each other regardless of location. Otherwise the multimedia-based education often includes content usually considered entertainment whether in the form of short movies, games, texts or simulations, all of that is usually viewed through a browser.

Web-based multimedia is multimedia application where have high bandwidth and data transfer requirements, require synchronization of large amounts of processor-intensive data, contain varied, highly specific and non-standardized file formats and it typically use high level authoring languages unique to the development tool. For all these reasons networked multimedia applications have lagged behind disk-based applications in sophistication. Development of robust, yet stable, multimedia software is difficult enough when we specify the delivery platform. At the same time, multimedia applications benefit greatly by being networked. Multiplayer games, shared whiteboards and dynamic graphics updated in real time are all example of the Internet's strengths.

1.2 Problem Statement

1.2.1 Problem Identification

From an observation, there are several possibilities of problems raise to traditional paper based books. The first one is the difficulties to create an interactive multimedia application and difficult to update the latest education information. In the meantime, with the increase in technologies, it is becoming old fashioned as computer is becoming more significant in education. Beside of that for the working parents they will face difficulty to help their children in there learning activities because the lack of time spending at home. The other problem is overall content of the book. This will need to be addressed because if the user has a slow Internet connection, they will not want to wait for too long to access the book.

1.3 Significant of the Project and Objectives

1.3.1 Significant of the Project

The purpose of this project being done is to produce multimedia web-based pop-up book for children learning and easier to create interactive education book as a multimedia version in learning tool against the traditional paper based book. Otherwise, the product will be able to view, use and interact with the online application where it is the nearest thing that providing true multimedia application.

1.3.2 Objectives

There are a few objectives to be met in this project and they are as stated below:

- to create and design interactive multimedia learning book,
- to come out with user-friendly interface and interactive application, and
- to develop multimedia book that be able to view, use and interact with the online application that providing true multimedia application.

1.4 Scope of Study

The scope of this project is to create and design multimedia web-based education book for children between 5 to 6 years old in order to help children in learning activities, reading skills and improves children computer literacy.

1.4.1 The Relevance of the Project

This project's targeted user is a child between 5 to 6 years old where ought to be active and not passive in learning process and can be the one who become as primary users of technology. The focus attention is interactive multimedia tool to motive younger user by allowing them to construct knowledge in interactive multimedia application.

1.4.2 Feasibility of the Project within the Scope and Time Frame

The time period given to complete this project is about 14 weeks and it is feasible for this project, as the work will only be focused on interactive multimedia tool for children learning part. As an additionally to use an online application, the web-based application authoring need to be considered in order to improve children computer literacy and basic web skills.

CHAPTER 2
LITERATURE REVIEW

2. OVERVIEW

Literature review is the part where researcher are reading and finding the relevant research papers, journals and related sources in order to get other researchers theory and principal in developing the new product or system. It also can be as a reference to a new researcher to get the latest and important information in term to have clear view and understanding in improving or developing their new product or system.

To understand what the web-based multimedia tool for children learning is, this the part where need to be reading and finding the information based on web technology and multimedia tool and application to get clear understanding about that proposed topic.

2.1 Investigated the use of a computerized interactive book for enhancing the development of literacy in children with severe disabilities.

According to Hetzroni and Schanin (June 2002), investigated the use of a computerized interactive book for enhancing the development of literacy in children with severe disabilities. Children with special needs developed a multimedia interactive story software program for use. A special keyboard equipped with two switches was used to enable independent and active participation in the story activities. A multiple survey design examined the learning process of word identification over time. The study also examined the development of literacy while interacting with written text. The data demonstrated a steady increase in word recognition over time. Results also indicated that controlled exposure to the written word in an interactive multimedia story-telling environment enabled a natural learning experience that enhanced the development of literacy.

2.2 The effective design multimedia content materials based on child-centered design

Norhayati Abd. Mukti and Siew Pei Hwa (2003), mentioned that multimedia technology plays an important role in the education because of its ability to provide a virtual environment for learners to effectively acquire knowledge. Meanwhile, the interest of growing in the integration of ICT especially in learning and teaching and the use of multimedia technology has offered as an alternative way of delivering instruction. Therefore, to ensure the educational multimedia applications realize their potential it is necessary to stand back and re-examine the key features of multimedia and how they can be used to enhance learning. Therefore the aspect was concerning on child-centered educational multimedia materials design and referred to a multimedia-based instructional package called CITRA (**C**ourseware development to project positive **I**mages of **TRA**ditional Malay oral narratives).

As been stated, CITRA is intended as an innovative and interactive multimedia application, which is designed and developed based on a well-researched conceptual model. Meanwhile the principle objective of developing CITRA is to create an application that combine multiple media in an enticing environment that allows the positive images and moral values to be projected via the multimedia capabilities and technologies in order to foster good moral sense in children. So that, interactions and interactivity have become key elements characterizing much of the teaching and learning associated with new technologies. Otherwise the principles components of educational multimedia materials that been applied for the interface are emphasize on content, organization and interactions.

Meanwhile for the design implementation, they used the child-centered approach whereby the particular design strategy is to encourage the correct mental model of the user. Users form mental models in order to help them guide them through attempts to perform tasks and correct errors while using computer software. As a conclusion, they emphasize that the success of the educational multimedia materials seems depend on the nature of the educational content and how the multimedia material compares to traditional classroom education. Otherwise they hope other researchers not only to do further studies on the learning of children in context of

computer-based environments but also to study the issues arising in the design of educational multimedia materials for children.

2.3 Web-based multimedia authoring and presentation framework for children's art cultivation

As been discuss by Hao-Tung Lin, Yi-Chun Lai, Kuo-Yu Liu, and Herng-Yow Chen (2004), they're proposed is about a web-based multimedia authoring and presentation framework to facilitate online pieces creation, sharing and reuse in e-learning applications. Through the easy-to-use interface of the customized tools, students are allowed to create their own pieces online and then share with friends in a very easy way. To make the presentation of the piece more interesting, the authoring tool provides the capturing mechanism that records all significant authoring steps as synchronization information: temporal and spatial relations between composed objects. Synchronization module in rendering function enables users to replay a lively, animated multimedia presentation in a form of as close as possible to the original sense.

As stated by the authors, the implementation of their system is based on environment and tools supported where may help children to cultivate their art capacity. As a result on the basis of the proposed framework, authors can develop more interesting authoring production tools for different types of art learning and cultivation. And to advance the significance of the framework and the system, the authors were inviting artists and professionals in different art or education domains to assist them in designing and objective evaluation mechanism.

2.4 Challenges and promises in the cyber world with young children

According Park (2001), he was examining the difficulties of using networks successfully in early childhood education and gives several issues to overcome those barriers. He also stated that the most important needs and characteristics required for the people who will work in the 21st century are greater ability for capturing knowledge and collaboration, emphasis on team work and collaboration, flexible intelligence and lifelong ability to learn new ways of solving problems. Meanwhile

technology should provide meaningful real-world contexts for learning and connections to outside expert's visualization and analysis tools. Otherwise he also stated that vision endorses teaching children to be active users of technology rather than mere reactors to it. A vision wherein technology does not simply entail putting the same old thing inside a box rather than on a piece of paper, a blackboard, or a slate but is a tool for their thinking. While based on evidence it is slowly mounting about technology's positive impact in schools and already clear that digital technologies are well on the way to becoming a permanent part of the educational arena at all levels and in countries around the world. Without proper integration of computers into curriculum, appropriate financial and administrative support and adequate teacher training, the benefits of the technology to foster children's learning cannot be fully achieved.

2.5 The concept of interaction between gender, age and multimedia interface design

In the concept analyzed by Passig and Levin (2001), assumed that multimedia design contributes to an interest in learning by young children where kindergarten children were exposed to interactive multimedia stories. Other than that they also examined previous experience with computers, level of covert time-on-task and level of satisfaction with various interfaces. Based on the research, their initial attempt was made to examine the differences of satisfaction with multimedia learning interfaces between boys and girls and to find the root of the problem. Based on the initial examination, they recommend developing a model of styles of design for learning interfaces in multimedia for boys and girls. They also using an interface checklist based on user satisfaction questionnaire (presentation interface, conversation interface, navigation interface, and control interface) to help future designers verify gender aspects of their products.

2.6 The web-based instruction by item analysis

As been analyzing by Chi, Park, and Rim (2003), according to item analysis, the web-based instruction has been rapidly increasing in the educational environment with the development of information and communication technology. This has

brought a need for evaluating the web-based instruction. So that, they was evaluates the web-based instruction by investigating the levels of student's satisfaction and comparing them with the lecture-based instruction to find the differences between the two instructions and the problems of the web-based instruction. The results reveal that the web-based instruction has the advantage of multimedia effects but needs to be more improved in terms of interactions. Also, the factor analysis shows that the web-based instruction is composed of two dimensions of presenting instructional materials and operating a course while the lecture-based instruction is composed of only one component. These findings suggest that the web-based instruction should be designed and implemented in consideration of the features of the web system. Two types of method used are samples and instruments and data analysis. After implementing the methods, it implies that the web-based instruction can provide much more multimedia effects than the lecture-based instruction.

2.7 The architectural framework of agent-based approach to e-learning

The World Wide Web (WWW) provides new opportunities for online education on the Internet. With other network tools being applied to the Web, it can create a virtual learning environment to bring together a community of learners for interactive education. Based on the investigation of the use of agent-based approach to e-learning, Leung and Li (2001), show on how to develop an architecture framework to apply the electronic education on the Internet in an effective way. An agent-based approach to e-learning and an architectural framework for developing such an application, which has the following main facilities and "building blocks": -

1) An agent-based approach that provides a collaborative approach to apply in e-learning.

2) Web technology that provides a universal communication and presentation platform.

3) Jess that provides a simple tool to store and execute the knowledge rules.

4) Java technology that provides a powerful language, which runs on both client side and server-side. It also facilitates high-level co-ordination support for multi agents.

As been concluded, they remark approach that already applied representing only one of the possible ways to address a very complex and challenging application.

2.8 The instructional uses of the World Wide Web

Palau, (1999) mentioned that, the development of the World Wide Web (WWW) and the subsequent introduction of different browsers with their extensions has changed the Internet from a text-only communications tool to a powerful multimedia platform whose potential applications are increasing day by day. Research efforts in the computer aided education field are represented by a broad spectrum of applications, from the virtual classroom to remote courses. In these environments, visualizing the progress of students in a certain course is an important part of the learning process. Meanwhile their research was result based on the development of a teacher's authoring tool and an evaluation application both developed using Java and based on Internet browsers. With this evaluation tool, teachers can easily create questions of different types that are stored on a database. These questions can later be used to compose different exams or exercises for different students depending on the course and the objective of the examinations. The advantages include an improvement in the fulfillment of the teacher's duties, an increase in the responsiveness of the exam results to the level of student understanding and the potential for using the application in distance learning and training. As been concluded, the computer-based assessment system was developed to provide fast feedback to the students as they can take online self-assessment exercises as part of a computer-based training system.

2.9 The combination of hybrid media tools for web-based education

Chen, Chang and Hsu, (2002) was described on how the Windows media encoder (WME) that are based on remote educational tool could be expanded to accommodate additional media, namely the use of slides and handwriting. The educational system board (ESB) encoder controls these types of media in close accordance with the media produced by the Windows media encoder (WME). Other than that, they also explained the presentation structure and the encoding environment of the educational system board (ESB encoder). Synchronization between the different media originating from different encoders was required and the method used for tracing and synchronizing the exact start time was explained. In addition typical encoder logic and file formats were suggested. In terms of service

quality, there are numerous factors to consider in the integrated pipeline of encoding, transmission and presentation. In the near future, methods for optimizing these factors must also be established. So that different strategies could be developed for different training courses.

2.10 Comparing effective features of children's educational software, television, and magazines

Fisch, (2004), was identifies some of the features that have been found to contribute to the educational effectiveness of magazines, television programs and interactive media for children. Although each medium certainly poses its own unique issues, the review demonstrates in fact many of the same features contribute to educational effectiveness across media. Beside of that through books, conferences and most of all ongoing empirical research, he learned a great deal about what works and what doesn't in designing educational software for children. However for all of the differences that may exist among different media, there are numerous similarities as well. By drawing lessons on children's use of earlier media such as print or television has documented successes and failures in other media, thus he also gain insight into ways in which he can build analogous successes in interactive media while avoiding mistakes and failures.

2.11 Creative multimedia for children: Isis Story Builder

Kim (1995), was develop Isis Story Builder to foster creativity in children and motivate them to do what they can enjoy. At the same time children can create a story by connecting multimedia objects using relationship between them. The multimedia objects are new building blocks. These building blocks not only occupy space but also occupy time, so it was call as 'time-boxes'. As original building blocks can be stacked together, the time-boxes can start together, end together, or occur together. As original building blocks can be put side-by-side, time-boxes can meet one another. Other than that, Isis available as an authoring tool in schools and in homes for children as well as for adults who are non-computer professionals.

Children can make their music videos and build their talking storybooks; students may prepare multimedia term papers; professionals may prepare multimedia presentations; parents may create multimedia stories for their children. Finally those was be develop and implemented because of children ought to be active not passive in the learning process. They ought to be doing something, not merely watching it. So that multimedia technologies offer children the opportunities of learning "actively" by allowing them to construct knowledge as interactive multimedia documents.

2.12 Designing Affect into Social Interfaces for Children

Strommen and Alexander (1999), mentioned about the use of three emotional interactions (humor, praise and affection) in the audio interfaces for two character-based interactive learning toys. Beside that the character-based social interfaces present a unique opportunity to integrate emotion into technology interactions. Then building interfaces that engage user emotions has a far stronger rationale when the users are children. However most interactive products for children have an explicitly educational aim and there is a clear consensus in the psychological and educational fields that a variety of positive emotions play critical roles in fostering learning and mental growth in children. Meanwhile emotions in educational interfaces for children can do more than just improve the interface's quality. Therefore the strategy behind the use of character-based social interfaces is to build on the social responses of users in order to support technology interaction. So that these interactions can engage user emotions especially children as dramatically as they do suggests that have only begun to understand all the different ways that technology applied in a developmentally appropriate manner and also can be used to support mental growth.

2.13 An Engaging Multimedia Design Model

Norma S.Said (2004), was focused on children as users of multimedia applications and investigates children's use of publicly available multimedia. She conducted experimental studies with children aged from 9 to 14 years old. In her experimental studies, six component theories of engagement have been formulated as an engaging multimedia design model for children. The five components involved in creating an engaging experience for children are: -

a) 'Simulation interaction' which allows the child to act on behalf of others such as to role-play; 'construct interaction' which allows them to build and create
b) 'Immediacy' which refers to seeing every movement made when interacting with the system
c) 'Feedback' which is best if immediate rather than delayed
d) 'Goals' that are clear and are either set for them or set by them when no external motivation is present.

And the results show that: -

• When all five features are present children achieve a high engagement score over a 40 minute period.

• Enabling children to set higher goals for themselves as in construct interaction, often led to more sustained engagement.

• Children with prior experience of the game became engaged much faster than those without experience. Prior experience has been added to the engagement model.

• The Construct Interaction condition tended to sustain permanent skill retention better than the Simulation Interaction suggesting that motor skills assist memory span better than mental model skills.

• Children continue to develop and therefore their aspirations with any application change over time. They continued to be engaged by the application whilst they can still achieve new goals with it.

She also summarizes the results from her studies and shows how the six factors interplay to create an engagement experience and includes past experience of the child on the model in Figure 2.1.

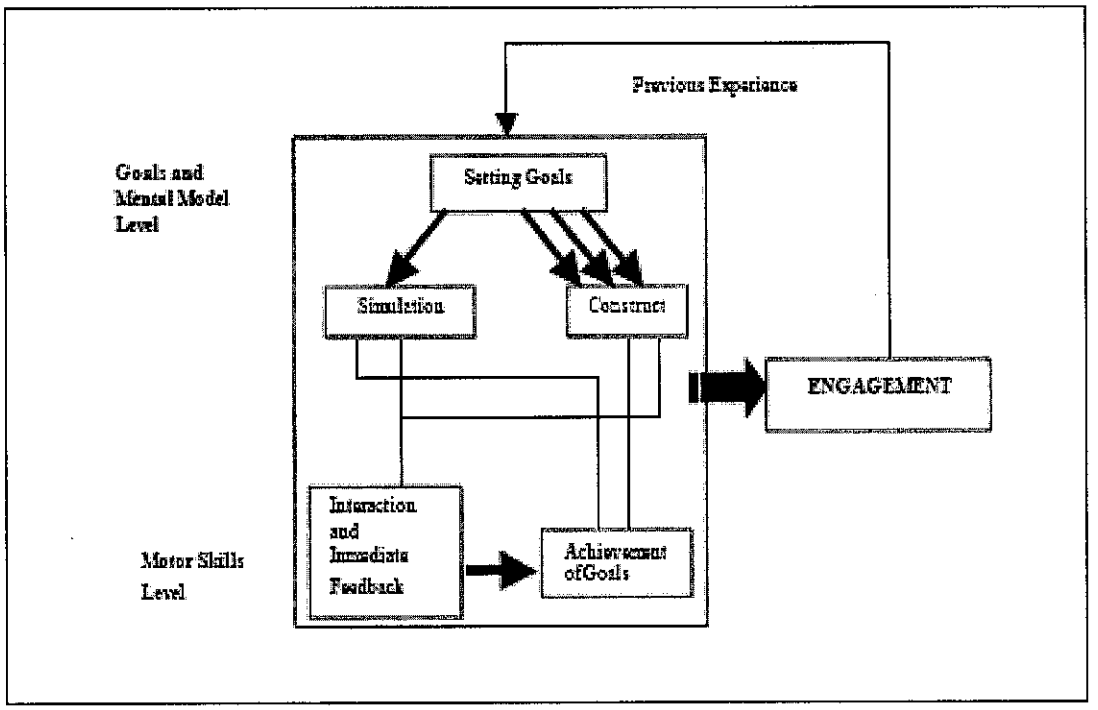

Figure 2.1: The Engaging Multimedia Design Model for Children

2.14 Informant Design for Interactive Learning Environments

According to Scaife, Rogers, Aldrich and Davies (1997), 'informant design', which advocates efficiency of input from different people whereby were maximizing the value of contributions from various informants and design team members at different stages of the design process. So that all of them were illustrate how that can be achieved and the uses of children and teachers as informants at different stages to design an interactive learning environment for teaching ecology. Therefore to develop the informant design, they were treating children's as native informants which to be able to discover what they did not know rather than try to confirm what they thought to know. So that they do not treat them as equal partners since they neither have the time, knowledge or expertise to participate in the collaborative model. They had been using the approach of the child-designer relationship for designing interactive learning environments where to position them between the user-centred and participatory design perspectives. While children are involved they also consider using low-tech materials to bring out their contributions. In particular, it is important to be clear what sort of data might elicit from them. It is frequently noted that (adult) users have difficulty in articulating the ways in which a system

might help them. However, children are likely to have difficulties, by definition with articulating what needs the interactive learning environment should be meeting – since they do not know how to express concepts that they have not yet grasped. Otherwise, they believed it useful to be quite specific about what kinds of suggestions (their level and scope) a designer might expect from working with children, teachers, educational psychologists and others. As a result they have shown how informant design can be used for the design of interactive learning environments and in this case the development of multimedia software for teaching difficult concepts in ecology. They also believe that the framework is also generalize able to other domains, although there have different emphasis on the various contributions of the relevant informants depending on what is being developed and the required domain.

2.15 The Extended Dimensions for Web-Based Learning

Zhuang, Mao, Wu and Pan (2003), was described the concept of 3D model and motion retrieval as a part of e-learning architecture. They also used new approaches including a novel shape descriptor for arbitrary 3D polygon models were proposed as initial solutions to these problems. Their preliminary experiments demonstrated with potential applications in digital library and interactive learning. As been noted 3D motion describes the movement of 3D objects. It can be regarded as an extension of 3D models along the time axis. The dynamic content of a 3D object as well as its appearance is captured in 3D motion, which further increases the power of 3D model as a means of web-based learning. Among the wide variety of applications regarding 3D models and 3D motion, they are particularly interested in retrieving similar objects. It also offers a special tool to augment digital library operations. Besides that it facilitates the making of educational films and provides easy data access for both medical training and designing issues. As a result building a 3D model and motion retrieval system for web-based learning will involved two main contributions which are:- a new shape descriptor based on statistical distribution of normal that is both discriminating and easy to compute; and new retrieval media including 3D terrain and motion, which are useful for applications.

2.16 Merging on-line instruction and the traditional classroom

McCray (2000), demonstrates the utility of online learning environments in traditional classes both as an efficient means for executing activities previously to the classroom setting and as a means to allow the pursuit of higher levels of learning. He also mentioned the efficacy of online learning environments outcomes with a few exceptions expectations of significant amounts of face-to-face contact with the instructors. However in order for this transference of content and process to be effective in courses recognized as face-to-face courses, students must find the virtual environment appealing. They must also achieve learning outcomes at least as high as those achieved in traditional class settings. Therefore the use of information technology and particularly the Internet or World Wide Web whereby to deliver basic business course content and visions of distance education often leap to mind. Certainly, significant attention has been given to gauging the efficacy of computer mediated instruction in its many forms relative to distance education. Web-based distance courses and programs offer the promise of access to educational opportunities to individuals bound by time and geographic constraints. Furthermore, such instruction may generate increased revenues and reduce course-related costs for educational institutions. As a conclusion the virtual learning environments have potentially to support multiple learning styles among students.

CHAPTER 3
METHODOLOGY

3. INTRODUCTION

In methodology part, it will be divided into two main sections, which are Research Methodology and Design Methodology. These sections will be further divided into sub-sections. The research methodology is basically on how the data will be collected and turned into useful information for the study. On the other hand, design methodology is about the development of final prototype product. Both sections need to be combined to ensure the successfulness of the project.

3.1 Research Methodology

3.1.1 Observational evaluation

Observational evaluation involves collecting data that provide information about what users do when they interact with an interface (Preece, J. 1993). These techniques required observing learners behaviors directly and making notes on points of interest or using a video or audiotape to record learners' interaction. The result can be qualitative and quantitative in nature. Meanwhile for direct observation it involves observing learners during task execution, with the evaluator making notes on learners performance and possibly timing sequences of actions (Preece, J. 1993). This method is useful in the early stages of design to describe learner's behavior and this is the simplest and cheapest of all usability methods.

3.1.2 Survey evaluation

Survey evaluation techniques assess learners' subjective opinion of a system. It is essential to check learners' perceptions and preferences at various stages of design so unusable and unnecessary features are not included in a final design. Learners' attitude can be obtained through questionnaires, structured interviews and focused

group. Potentially it can reach different feedback and responds from various area and level between expert and novice users.

3.2 Design Methodology

As far as design methodology is concerned, based of study on methodologies used for developing project, the 'code-and-fix' methodology is been choosing as design methodology. When an action was created (code), the application need to be tested whether it worked and whether it needed any changes to it (Fix). These steps can be summarizing as follows: -

- Design
- Implementation
- Test

3.2.1 Design

Design stage include:

- Design the page layout

This stage can be tedious but it is critical to any multimedia project. Planning before starting the project is to ensure the deliverable a cohesive product to audience. This part should be considered the conceptual design development, target audience analysis and specification creation.

- Design the action and animation

This stage should be considered the delivery platform selection, media selection and selection of tools. It is important to provide meaningful learning experience, which often requires dynamic and interactive media components.

3.2.2 Implementation

Implementation stage include:

- Implement by insert and modify required images

This stage is considerable amount of usable material in digital form in the public area that the web designer can profitably use or adapt. Such materials include texts, clip art, photograph and video clips. It also to ensure the suitable placement of images and texts.

- Implement actions and animations

This stage is to show the object being visualized in a way that look reality and present an analogy of the real thing such as cartoon or schematic drawings. Otherwise it should considered few elements such as finding balance, the use of color in visualizations, the amount of realism in visualizations and the use of cueing techniques.

3.2.3 Test

- Run the actions and compare with intended design

This stage is to test the design and implementation of the successful product development. It will test whether it functioned well or whether it needs any changes to it. This process was repeated every time especially when new action was created. It is very important phase where to ensure the objectives and requirement of the product have been achieved.

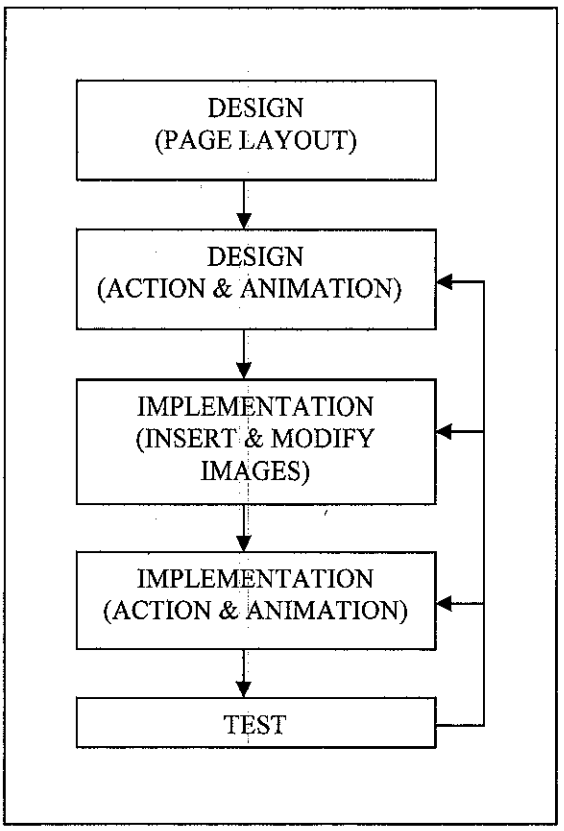

Figure 3.1: Project development with code-and-fix methodology

3.3 Hardware and software used

3.3.1 Hardware

In developing the web-based multimedia for education it's very important to set up the computer and Windows OS for best performance and the project was implemented on: -

a) Operating system (OS): Microsoft Window 2000 Professional
b) Processor: Intel Pentium III, 996 MHz
c) Memory: 120 MB RAM
d) Current display mode: 1024 x 768 (16bit) (60 Hz)

3.3.2 Software

In order to produce the web page, various authoring tools must be use. For the product development timeline-based authoring tools was been chosen where it is based on movie metaphor. It uses visual timeline for sequencing events of multimedia. Otherwise it also works by displaying a series of frames good for creating animations. Therefore after considered and evaluated the variety of authoring tools in the market Dreamweaver MX and Swish version 2.0 is decided to be choosing in order to develop the web-based multimedia for children learning. For this project, several software used are:

a) Dreamweaver MX

Dreamweaver MX contains a wide variety of new features, such as new enhanced templates to help visual designers and many new coding capabilities. Dreamweaver also now includes all of the application-development features of Dreamweaver UltraDev 4, and offers many new ones including a code-centric workspace derived from Macromedia ColdFusion Studio, better runtime code and support for the latest web application technologies.

b) Swish V 2.0

Swish version 2.0 is a standalone windows application designed to make animated text effects quick and easy. Otherwise Swish animations can be exported to a web page and used as a banner or they can be imported into Macromedia Flash and used as part of a larger Flash movie. Meanwhile Swish text effects include explode, squeeze, typewriter and wave. It also supports events and actions that allow user to add interactivity to their animation.

CHAPTER 4
RESULT & DISCUSSION

4. INTRODUCTION

In this section, the results and findings based on observations will be discussed.

4.1 Result

4.1.1 Screenshots

Figure 4.1 shows the interface for the front cover of the book.

Figure 4.1: Cover page

Figure 4.2 shows the interface of the main menu page, which has three sections including introduction, learning section and help. Each of the section will link to other pages that have different contents and elements. To apply the interactive learning process, images displayed using animated elements. At the same time to prevent children from getting bored music effect is been included.

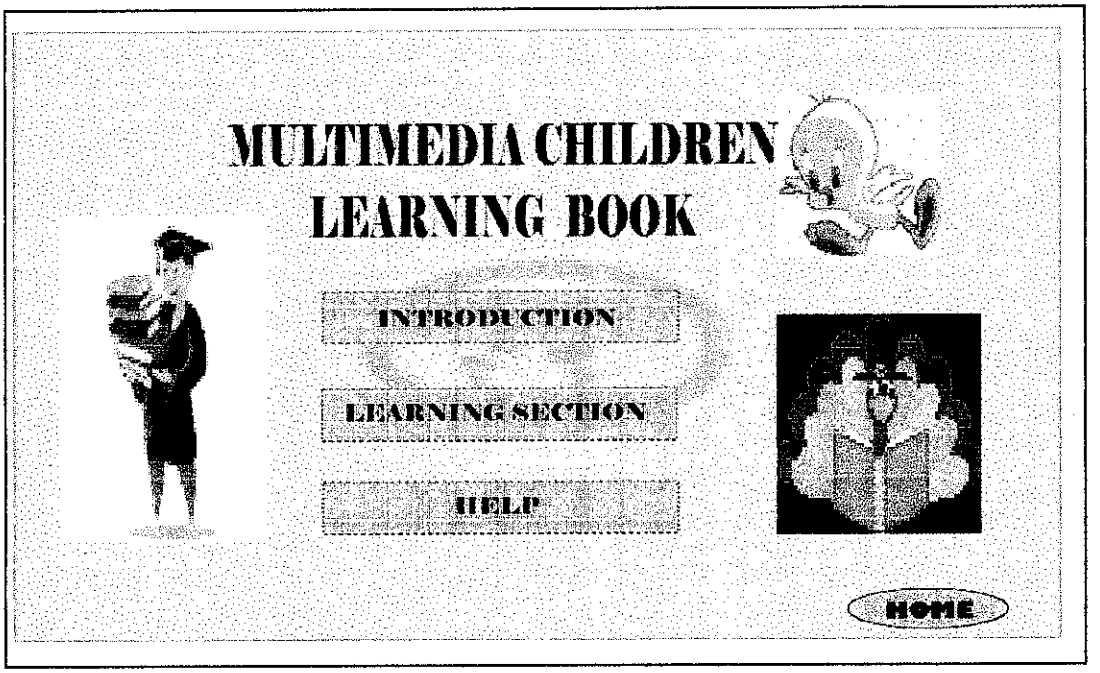

Figure 4.2: Main menu page

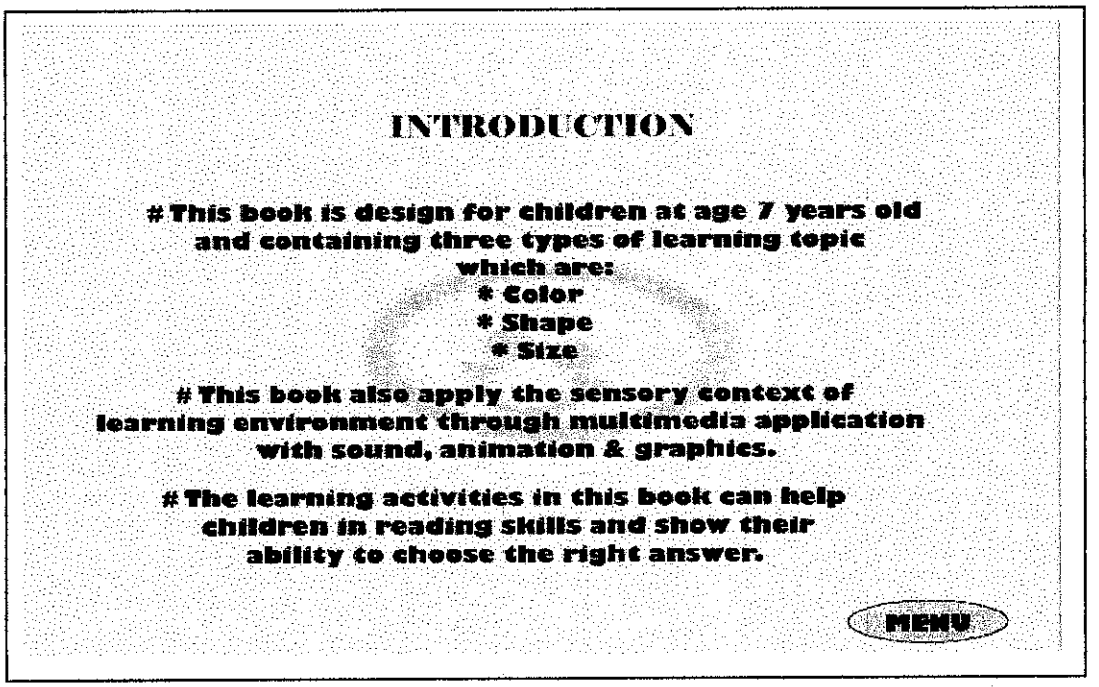

Figure 4.3: Introduction page

Figure 4.3 shows the introduction interface on the contents of the multimedia pop-up book. It is based on elements applied and content topics. This section also includes the background music effect.

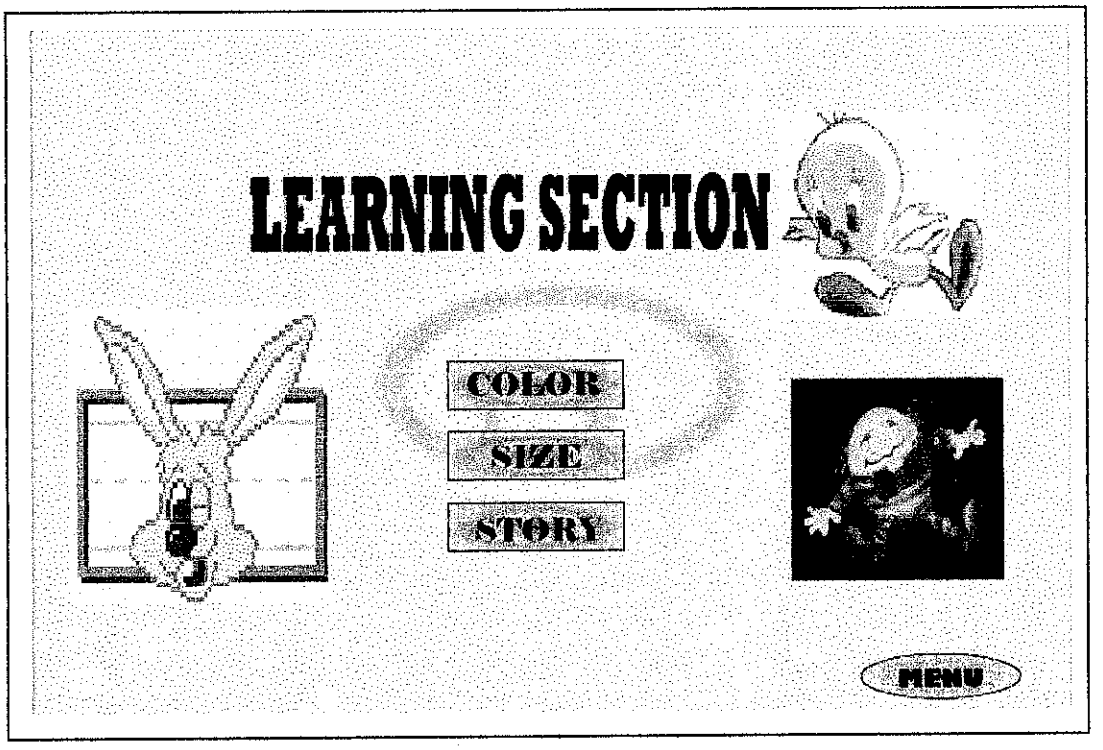

Figure 4.4: Learning section option page

A figure 4.4 shows the interface of learning section option page. In this section, children have opportunity to choose three types of learning topics such as color, size and story. Each of topics will link to another page that has applied different activities and content. For implementing the multimedia elements, this page also included the animated images with background music effect.

For the color activity first page as shown in Figure 4.5, the children will be exposed to a variety of colors with different images. Images that have been used are familiar to the children so that they will be able to recognize and memorize it in a short time. Meanwhile Figure 4.6 and Figure 4.7 show color fun and match page, which require children to test their ability to match color with suitable object. In order to attract children attention's, the images and texts will using variety of effects. At the same time this section also applied the background music effect. Besides of that the Figure 4.8 shows the activity where children need to click the

button at left hand side and the color of object will change according to button color.

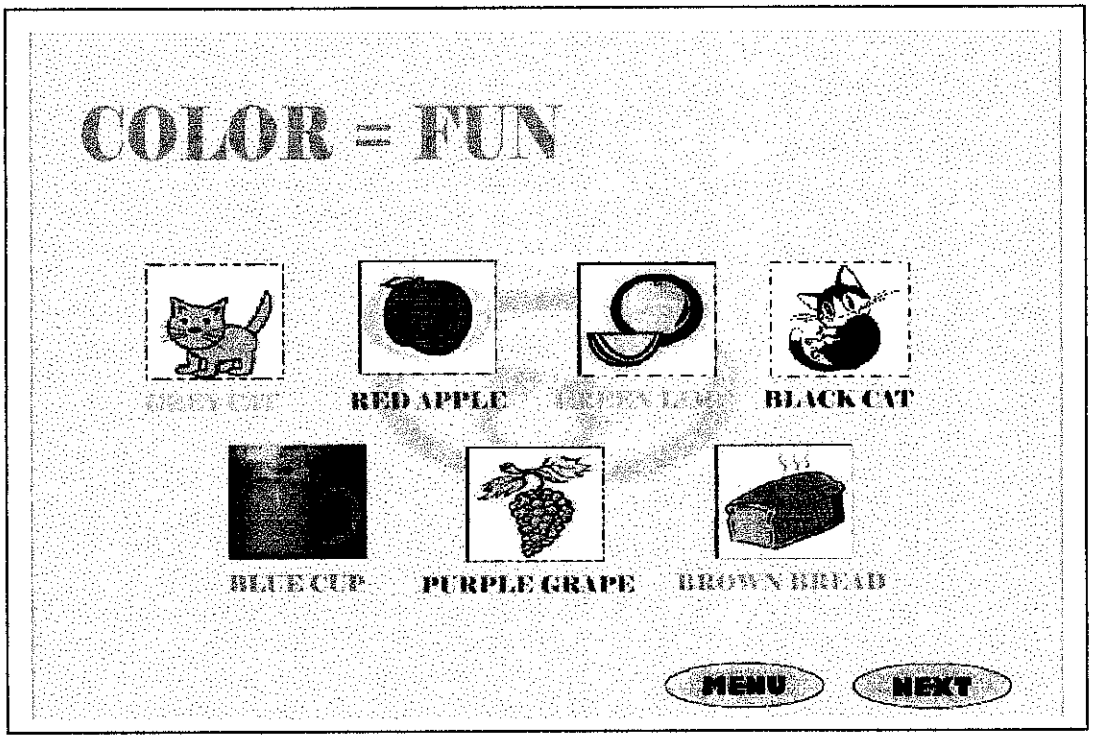

Figure 4.5: Color activity first page

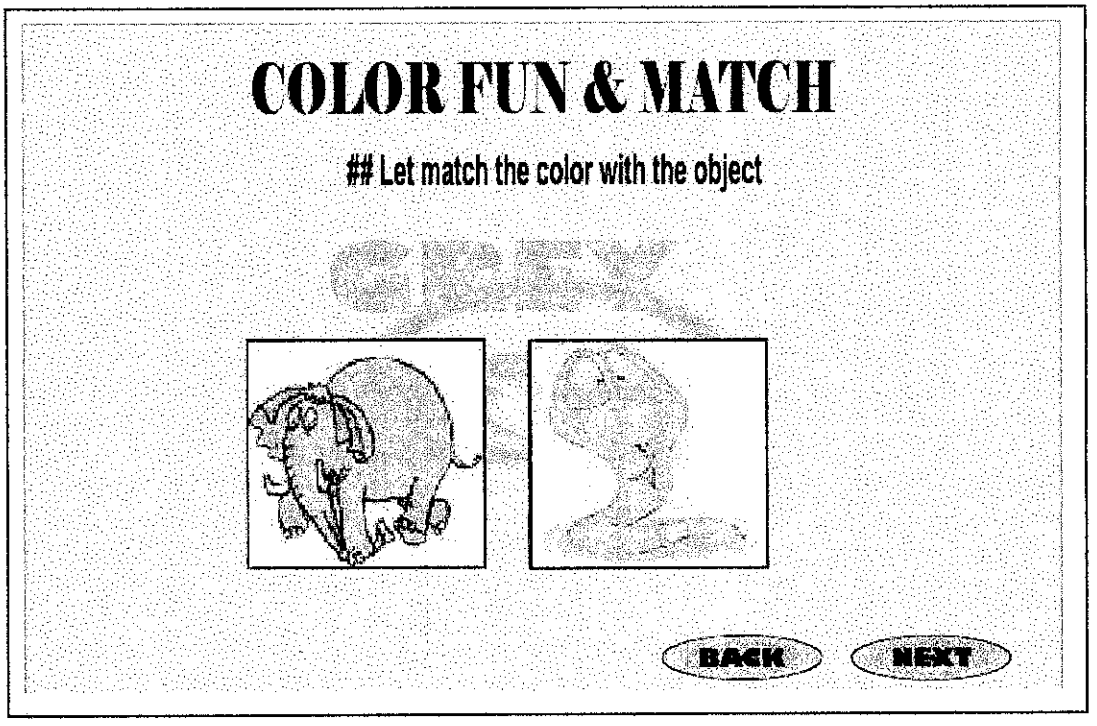

Figure 4.6: Color activity second page

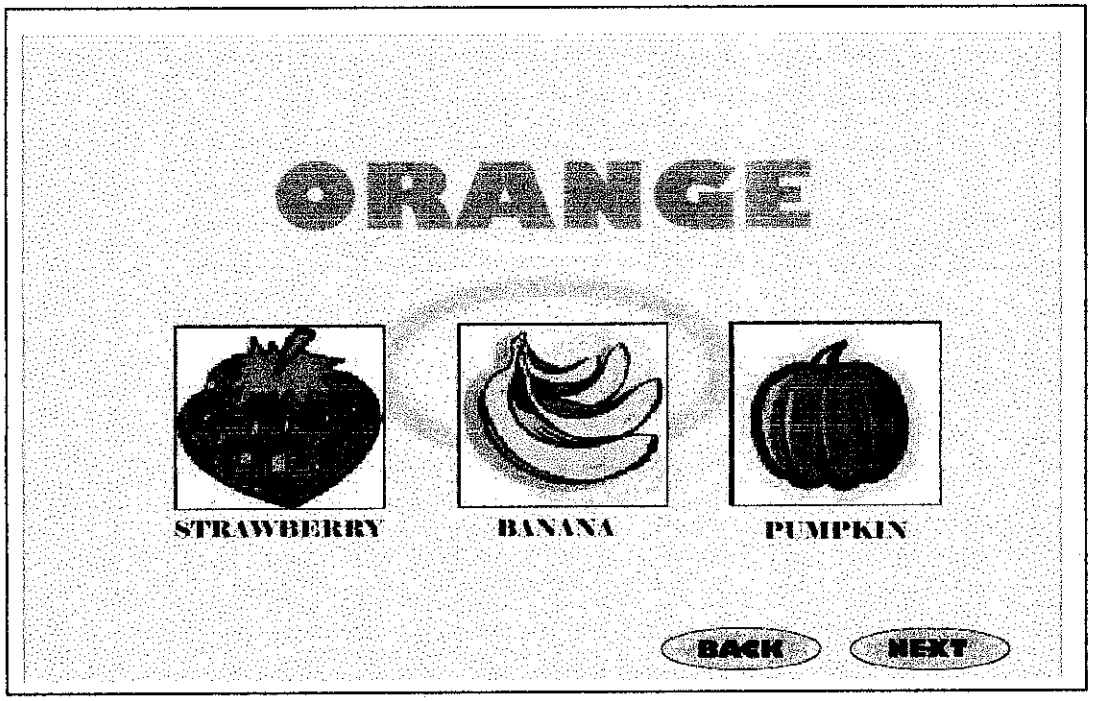

Figure 4.7: Color activity third page

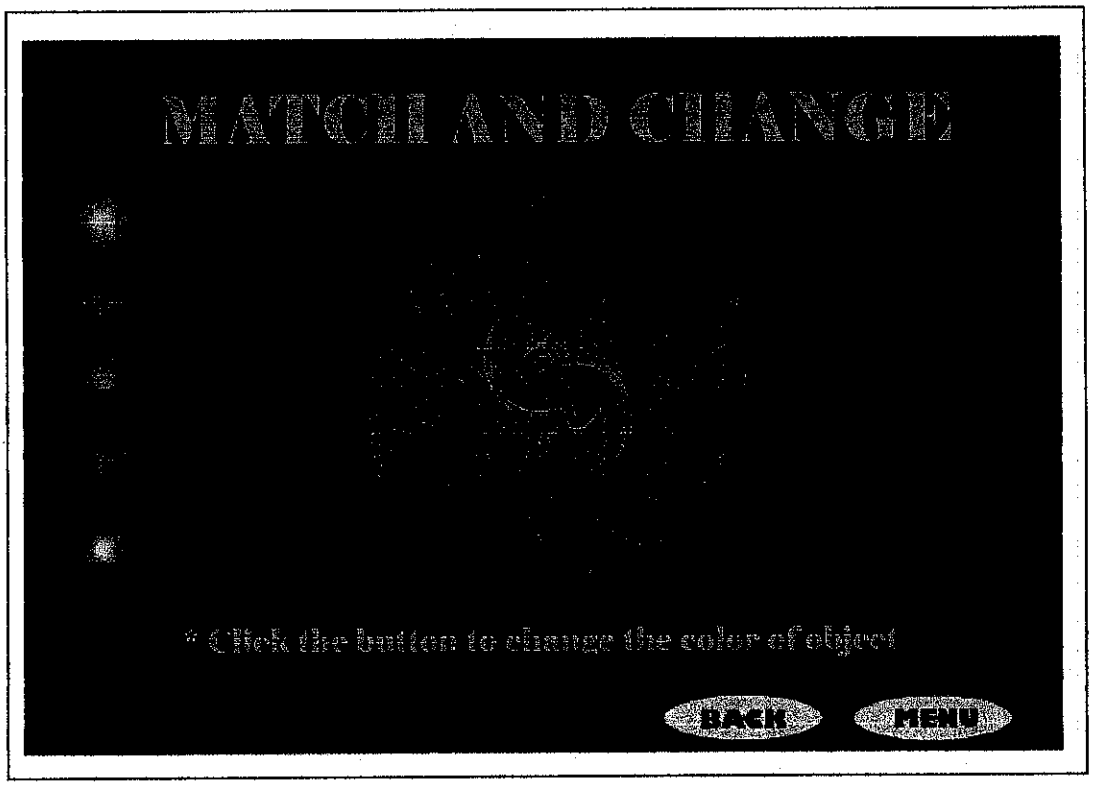

Figure 4.8: Color activity forth page

For the size activity first page as shows in Figure 4.9, aimed to differentiate the size of variety object that been shown. The size elements applied and used different object so that children will get different information about the size. Children can also show their ability to match the size with suitable object by involved in the activity as shows in Figure 4.10 and Figure 4.11. If children fail to match with the object, the different sound effect will be played whereby it shows that they are choosing the wrong or right object.

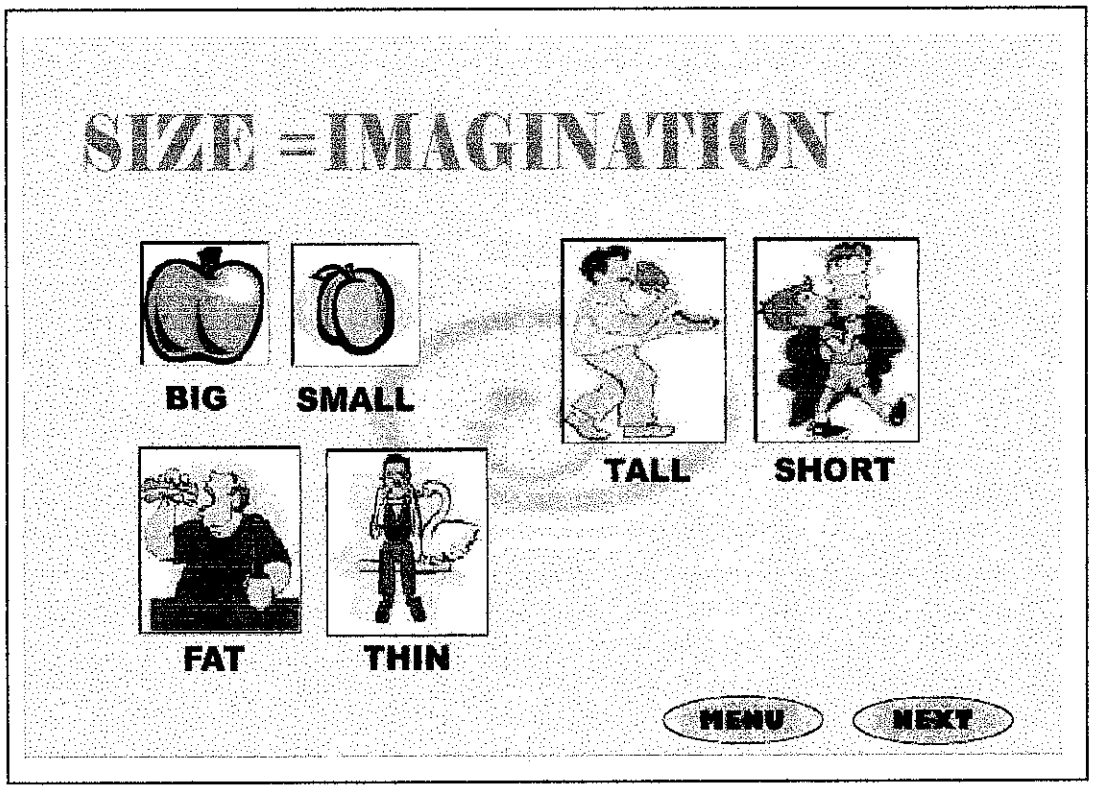

Figure 4.9: Size activity first page

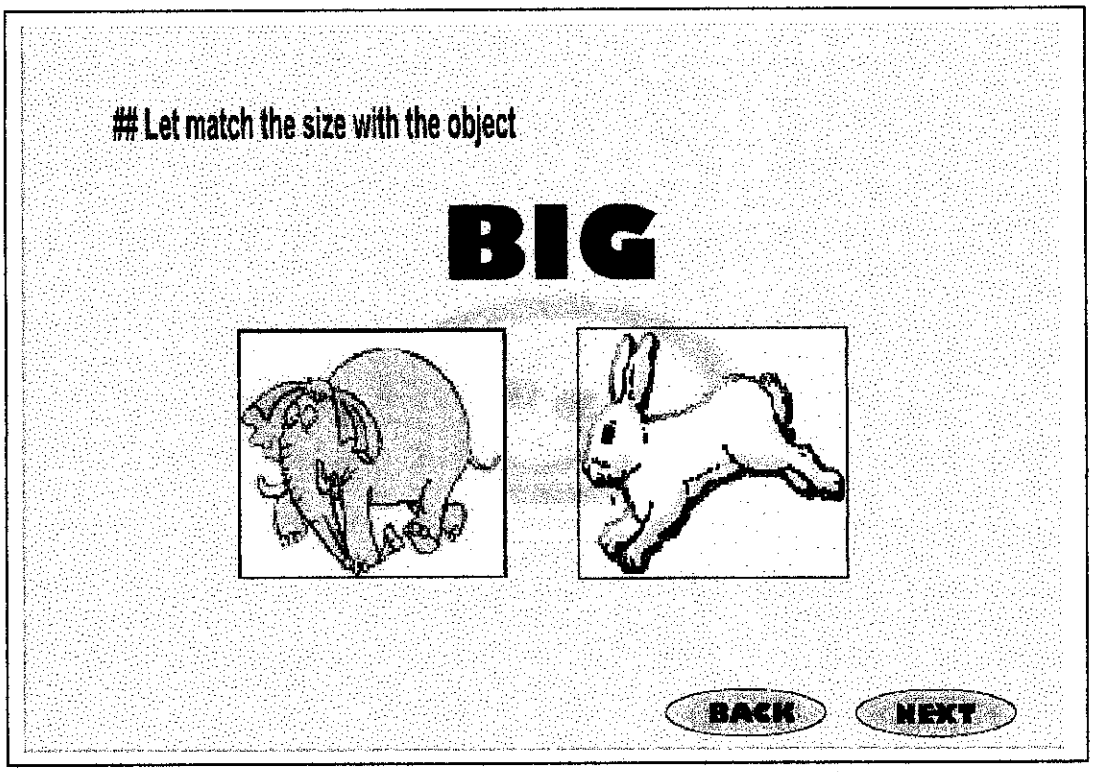

Figure 4.10: Size activity second page

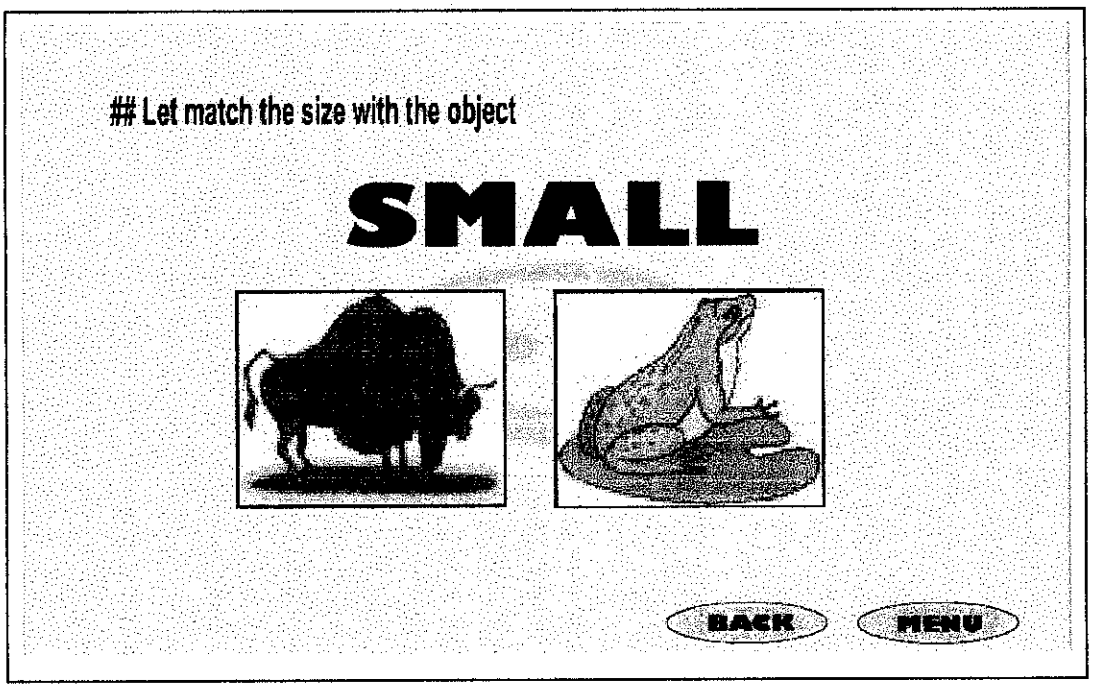

Figure 4.11: Size activity third page

Starting from Figure 4.12 until Figure 4.22 children can test and practice their reading skill by reading a simple story about the color.

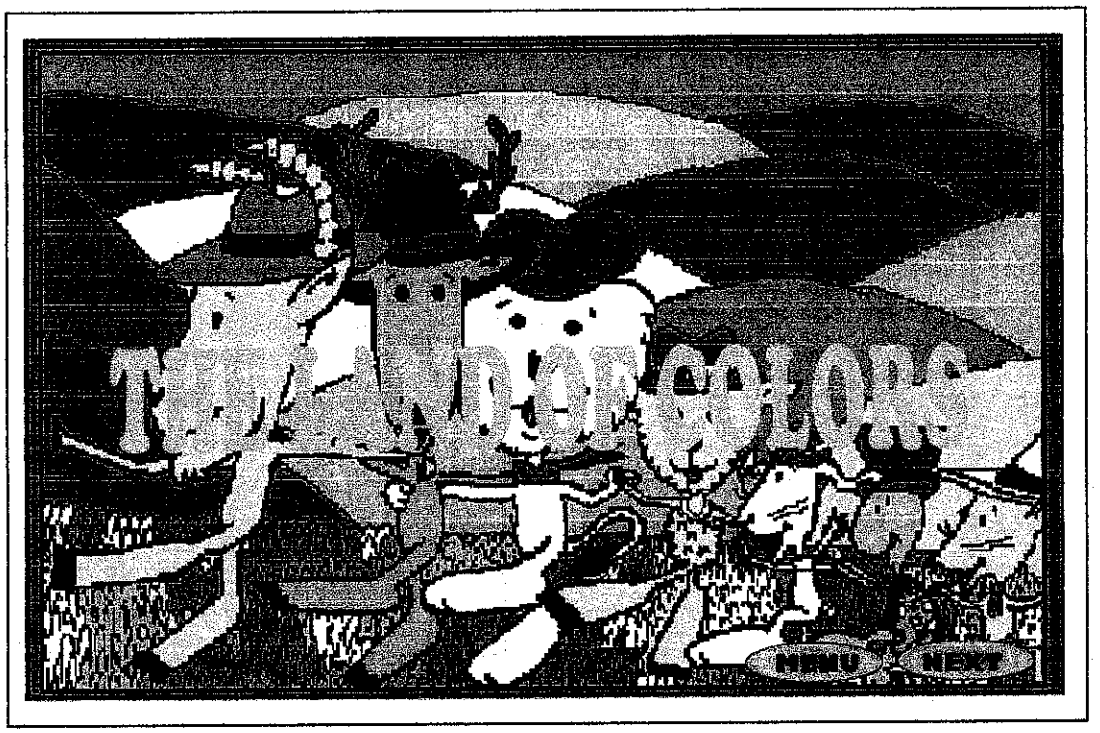

Figure 4.12: Color story cover page

Figure 4.13: Color story page 1

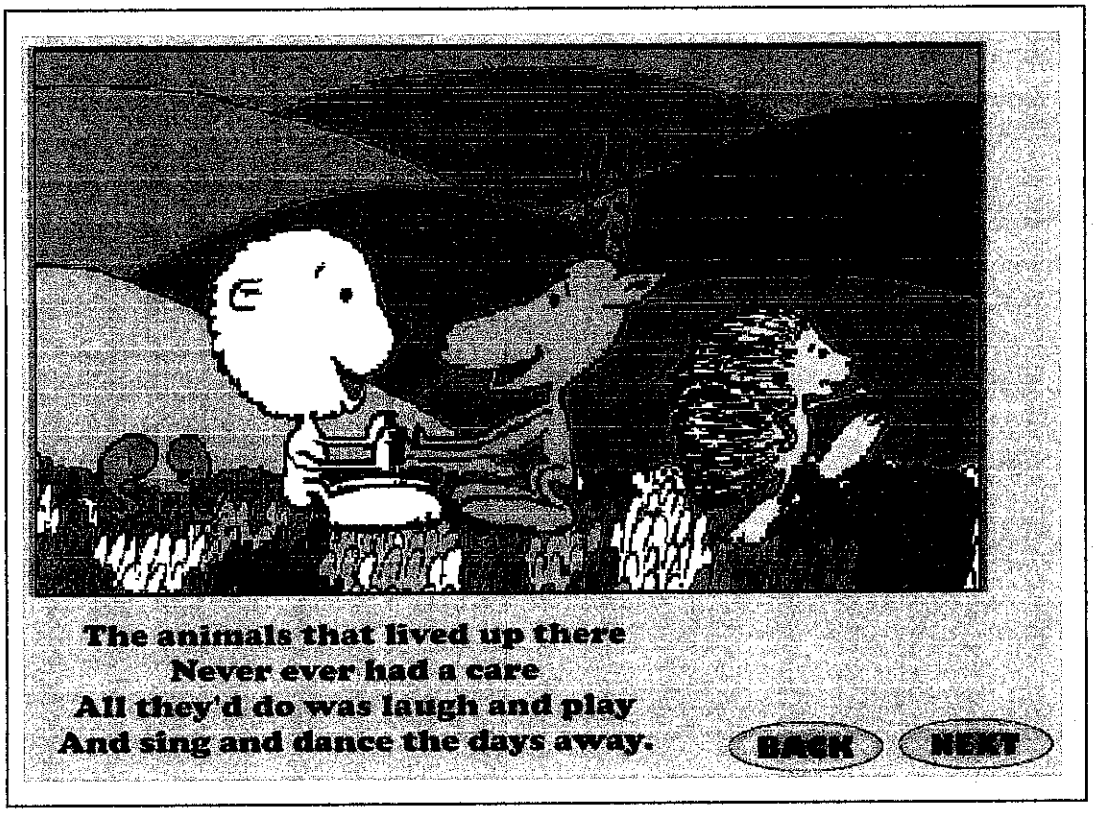

Figure 4.14: Color story page 2

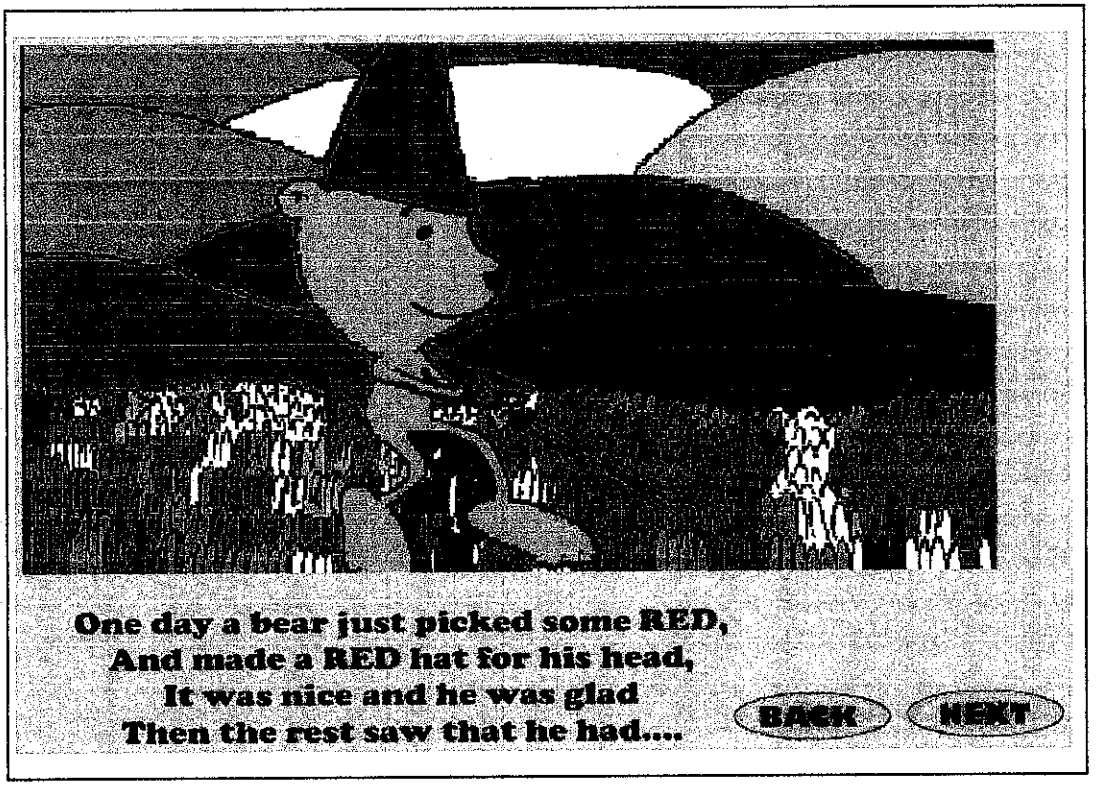

Figure 4.15: Color story page 3

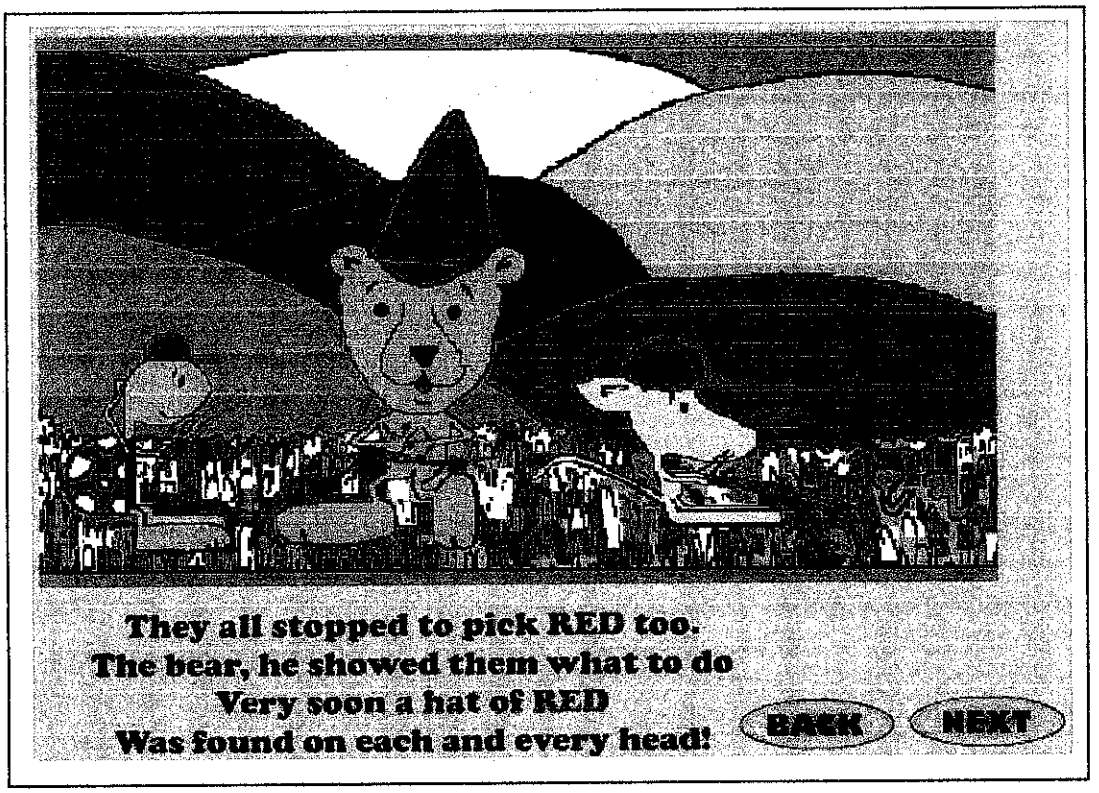

Figure 4.16: Color story page 4

Figure 4.17: Color story page 5

Figure 4.18: Color story page 6

Figure 4.19: Color story page 7

Figure 4.20: Color story page 8

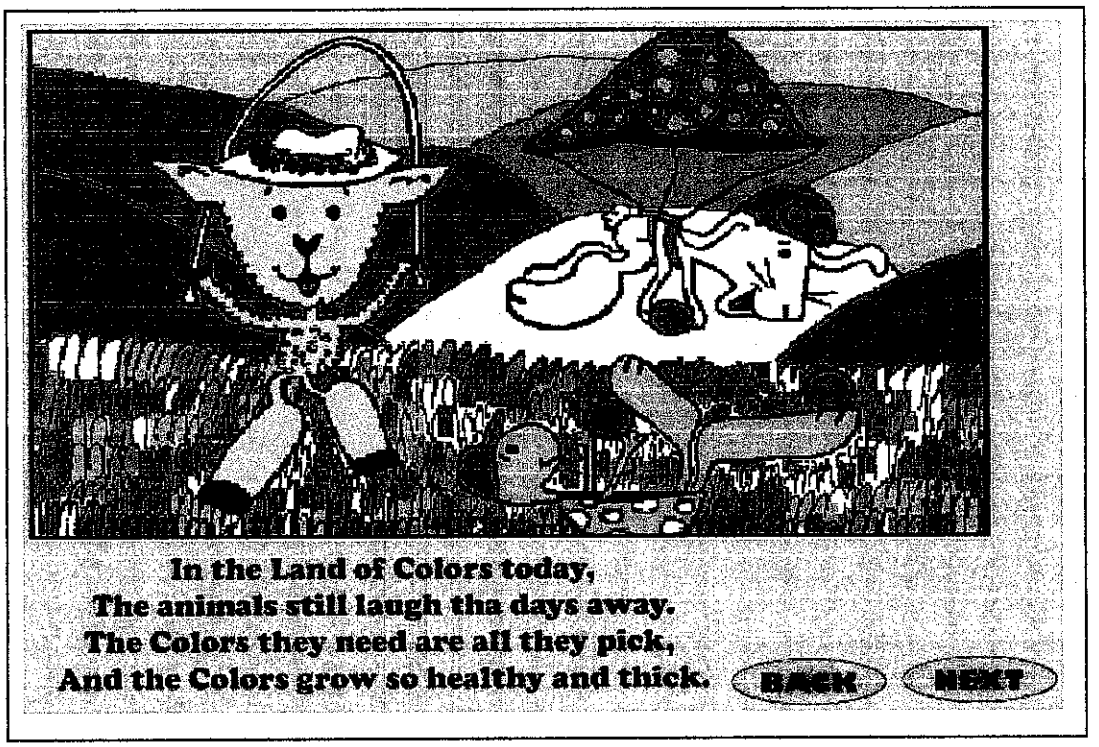

Figure 4.21: Color story page 9

Figure 4.22: Color story page 10

4.2 Discussion

Now days, multimedia-based technology can plays an important role in the education because of its ability to provide a virtual environment for new learners to effectively acquire knowledge. In order to widely sharing and publishing the education information using multimedia application, the web based is the best platform to provide information to anyone via online application throughout the world. Through the Web the latest education information easier to be distributed and users easy to access anytime they needed the information. At the same times, for the younger user they can gain new environment feature where they can familiarize via browsing the Web and having basic knowledge about Internet.

In designing successful web based multimedia for children in respect to distance learning process, the relevant area should be focused are on: -

1. Content presentation
2. User-friendly interface design

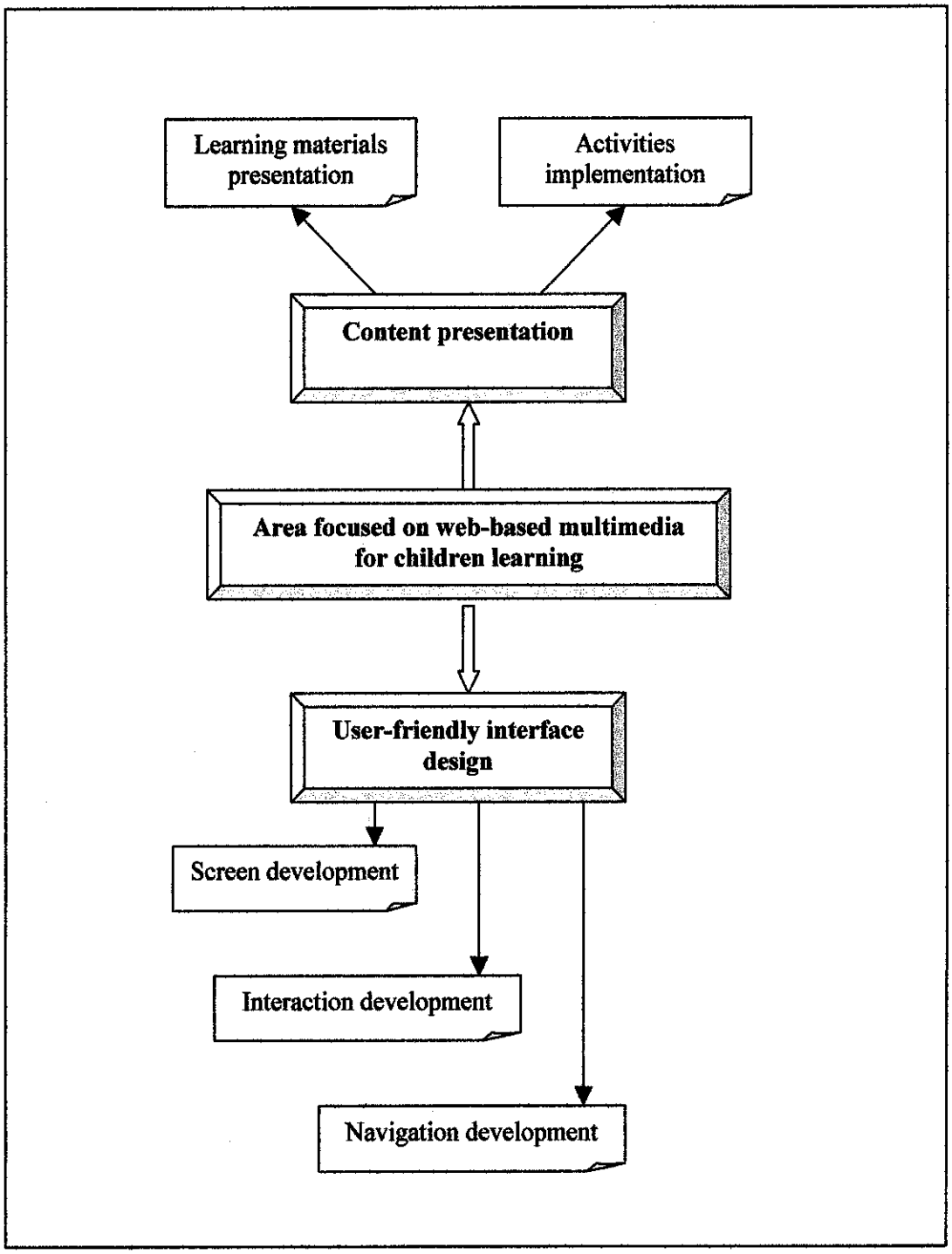

Figure 4.23: **Area focused on web-based multimedia for children learning**

4.2.1 Content presentation

In the content of the presentation of the prototype, two elements are involved which are learning materials presentation and activities implementation.

a) Learning material presentation
   - text / hypertext
   - clip art / images / pictures
   - music fragments / sound effects
   - animated images / animation

b) Activities implementation
   - fun and match
   - story telling
   - match and change

4.2.2 User-friendly interface design

The interface is an extremely critical feature of a web-based multimedia so screen design must well think out from the perspectives of good graphic design; user friendliness and appropriateness to the learning content. Interface implementation includes:

a) Screen development

   This process is basically to balance design components of simplicity and complexity. On the other hand, it is important to create a module that is easy to navigate, downloads quickly and includes the most fundamental information. Otherwise the rich and meaningful learning experience that often require dynamic and interactive media components also need to be created. While at the same time creating and environment that is user-friendly enough to keep learner from becoming overwhelmed and frustrated in such way that it interferes with learning.

b) Interaction development

This process is a large body of educational that indicating learner learns most effectively when they are activity engaged in learning. Meanwhile interactive components require the learner carry out some activity besides simply reading or listening. Hypertext such as World Wide Web is suited for increasing activity in that just requiring the learner click through pages of hypertext in a non-linear fashion requires a level of activity greater than traditional paper-based book / linear reading.

c) Navigation development

Navigation should be seamless. Otherwise it should be easy to navigate from any pages. All links within a page should work smoothly all the time or enables learners to easily jump back to the page they left. This process needs to consider few elements, which are: -

- Current location clearly stated at the beginning of each prompt
- There is clear way to return to a starting point/main menu
- Categorization of content is clear an unambiguous
- Menu structure is simple with no unnecessary level
- There are no more than six options in any menu
- Menu structure is simple with no unnecessary level

CHAPTER 5
CONCLUSION & RECOMMENDATION

5.1 Conclusion

With the advent of new millennium, web-based multimedia application is as an important medium to deliver information and learning tool. Therefore through developing this product it acquire few advantages for teachers, parents and children. So that one of the great promises of computer-based and web-based instruction is that can potentially facilitate the process of integrating activity into education. Interactive components of web-based software are requiring the learner carry out some activity besides simply reading or listening. Such as World Wide Web, it is well suited for increasing activity in that just requiring the learner click through pages of hypertext in a non-linear fashion require a level of activity greater than traditional text-book or linear reading.

However to develop a model how to best translate to the learner using web-based multimedia as a tool, the process of analyzing the learner (the children), defining the usage context and defining the learning goals is often overlooked. With respect to learners, the most important factor in hypermedia performance is knowledge and experience. Other than that the web-based learning should be designed differently depending on the learning context or environment. In order to consider the learner and the context in which web-based learning, the most important factors in guiding the whole process of design and development are the learning goals. The goals of the learning should be clear to the designer and these should then be communicated to the learner. Of course real learning is more than simply memorizing facts hence the goals should involve some sort of application or integration of foundational knowledge.

5.2 Recommendation

After went through this project, it seems that time is the most important factor to make it more interactive, interesting and helpful especially for children in their learning process. There are several parts that can be improved to enhance the application. They are:

5.2.1 Audio fragment (spoken text)

In enhancing the multimedia children learning process, audio element must sound crisp and clear. The used of voices can be as more powerful instruments, capture attention, send a message and set a mood. In order to make an enhancement in this project, the spoken text needs to be included as one of the audio fragment. Otherwise to putting new emphasis and interest into ideas, the spoken text can be useful for explaining some topics to children who do not learn well from reading text. Meanwhile it can motive attention for the children who do not have interest in reading process and easier get bored. Therefore the spoken text should be spoken clearly and slowly enough so that children can understand what as been said.

5.2.2 Video fragment

Video are certainly the best visualization tool available and often the only way to truly communicate message and can made dramatic points or punctuation to deliver quick message to learner. Otherwise including the video element in developing this project can make it more effectively and efficiently in order to help children in their learning process. There are few advantages for video use in multimedia web-based pop-up book: -

a) be engaging and can be a powerful way to teach children that do not learn well by reading or might not be motivated to read about certain topic
b) capture attention especially for the new learners
c) be used as a cognitive tool to help children think more clearly about certain process or topic
d) can make an instructional material come alive but they must play smoothly each and every time

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APPENDIX