

Reading courseware for Down syndrome and Hyperactive students

(Bahasa Malaysia)

By

Nuriman bin Talib

**Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Business Information Systems)**

JULY 2009

**Universiti Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan**

CERTIFICATION OF APPROVAL

**Reading Courseware for Down syndrome and Hyperactive students
(BAHASA MALAYSIA)**

By

Nuriman bin Talib

A project dissertation submitted to the
Business Information System Programme
Universiti Teknologi PETRONAS

In partial fulfillment of the requirement for the
BACHELOR OF TECHNOLOGY (Hons)
(BUSINESS INFORMATION SYSTEM)

Approved by,



(Siti Rohkmah M. Shukri)

**UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK**

July 2009

CERTIFICATION OF ORIGINALITY

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



NURIMAN BIN TALIB

ABSTRACT

This report presents the idea of developing and designing a courseware for Down syndrome and Hyperactive students. The courseware with title “**Mari Membaca**” will be a kit for teachers and assist disabled student to improve their reading skill specifically on Bahasa Malaysia subject. The idea of the courseware is to give effective learning environment to disabled student (Down syndrome and Hyperactive) and optimize their learning ability. The reading courseware is potentially to be developed by using Adobe Flash. The special remedial school syllabus is provided by *Special Education Department, Ministry of Education* is applied in the courseware. By using this courseware, students will experience to play educational games, training and exercise. To overcome reading disability, three techniques (Sound-symbol correspondence, word retrieval and vocabulary) is applied in the courseware. For further enhancement, the project need to be analyzed through user feedback from teacher and also disabled student. The Prototyping methodology used for this project is divided into several phases which include planning, analysis, design, prototype implementation, courseware prototype and implementation. Based on recommendation from Sekolah Kebangsaan Pengkalan Pegoh teachers, courseware is a potential learning tools for disabled student because they can interact with the courseware. The new learning environment could be beneficial for disabled student through the use of computer technology.

ACKNOWLEDGEMENT

Assalamualaikum W.B.T

Firstly, I would like to express my gratefulness to the Almighty, Allah S.W.T; for upon HIS willing and blessing, I manage to complete this project.

My greatest gratitude to my parents who is keeps supporting me until the very end of the project.

Most and foremost, zillions of thank you to my first supervisor, *Ms Emy Elyanee Mustapha* for all the helps in my Final Year Project I, and valuable guidance. Currently she is now pursuing her PHD in Korea and I would like to wish good luck for her study.

I also would like thank you to *Ms Siti Rohmah Mohd Shukri* for lesson and tips she taught in making this project successful. Even though she guided in my Final Year Project II for six month period, her understanding and professional guidance in limited time made me enjoy in doing my Final Year Project.

A valuable appreciation to special remedial teacher at *Sekolah Pengkalan Pegoh, Lahat Perak* who keep advising and sharing the informative experience to be apply in courseware development.

Not to forget to my senior and friend who have been sharing an ideas to make this project go on.

TABLE OF CONTENTS

CERTIFICATIONS.....	i
ABSTRACT	iii
ACKNOWLEDGEMENT.....	iv
LIST OF FIGURES.....	vii
LIST OF TABLES.....	vii
CHAPTER 1: INTRODUCTION.....	1
1.1 Background of Study.....	1
1.2 Problem Statement.....	3
1.3 Objectives.....	3
1.4 Scope of Study.....	4
CHAPTER 2: LITERATURE REVIEW.....	5
2.1 Theory of children development.....	5
2.2 Learning disabilities.....	6
2.3 Technique for reading to children.....	6
2.4 Teaching Reading to Kids with learning disabilities.....	7
2.5 Principle of instruction for learning disabilities student.....	7
2.6 Issues and challenges in courseware development.....	9
2.7 Designing Interactive Multimedia learning for education.....	10
2.8 Previous Final Year Project: Fun Mathematic.....	11
CHAPTER 3: METHODOLOGY.....	12
3.1 Prototyping methodology.....	12
3.2 Planning.....	13
3.2.1 Study	13
3.2.2 Visit and interview	14
3.3 Analysis	15
3.3.1 User requirement	15
3.3.2 User observation	16

3.4 Designing.....	16
3.4.1 Suitable Human Computer Interface	17
3.4.2 Interactivity	17
3.4.3 Curriculum structure	18
3.5 Prototype Implementation	18
3.5.1 Develop prototype	18
3.6 Courseware prototype	18
3.7 Implementation	19
3.8 Gantt Chart	20
3.9 Milestones for ‘Mari Membaca’ content development	21
CHAPTER 4: RESULTS AND DISCUSSION.....	22
4.1 Visit to school	22
4.1.1 About Sekolah Kebangsaan Pengkalan Pegoh	22
4.1.2 First Visit.....	23
4.1.3 Second Visit	23
4.2 First draft courseware layout and content	24
4.3 Discussion with Bahasa Malaysia Teacher	25
4.4 Observation on Normal and Disabled student	26
4.4.1 About Nakief and Majid	26
4.4.2 Observation	27
4.5 Second draft courseware layout and content	28
4.6 Prototype development	29
4.6.1 Main menu	29
4.6.2 Letter recognition	30
4.6.3 Word pronunciation	31
4.6.4 Writing tutorial	32
4.6.5 Focus exercise.	33
4.6.6 March color	33
4.6.7 Body part	34
4.6.8 Flag coloring	34
4.6.9 Let’s sing	35
4.6.10 Reading exercise.....	36

CHAPTER 5: CONCLUSION AND RECOMMENDATION.....	37
REFERENCES.....	42

LIST OF FIGURES

Figure 3.1	Prototype methodology.....	13
Figure 4.1	Sekolah Kebangsaan Pengkalan Pegoh.....	22
Figure 4.2	Observation on normal and disabled student.....	26
Figure 4.3	Content of the courseware.....	28
Figure 4.4	Reading courseware flow.....	29
Figure 4.5	Main menu screen shot.....	30
Figure 4.6	Letter recognition screen shot.....	30
Figure 4.7	Word pronunciation screen shot.....	31
Figure 4.8	Word pronunciation (basic pronunciation) screen shot.....	32
Figure 4.9	Writing tutorial screen shot.....	32
Figure 4.10	Match color screen shot.....	33
Figure 4.11	Body part screen shot.....	34
Figure 4.12	Flag coloring screen shot.....	34
Figure 4.13	Let's sing screen shot.....	35
Figure 4.14	Reading Pantun (teka-teki) exercise screen shot.....	36

LIST OF TABLES

Table 1.1	Total of registered disabled people according to types of disability.....	1
Table 1.2	Total of registered disabled people according to state.....	2
Table 2.1	Principle of instruction for learning disabilities student.....	8
Table 3.1	Gantt chart.....	20
Table 3.2	Milestone for 'Mari Membaca' content development.....	21
Table 4.1	Objective of each level in the reading courseware.....	24
Table 4.2	Result of the observation on Nakief and Majid.....	27

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

1.1 Background of Study

The paper report is about reading courseware development for disabled students. The final product for this study will be a reading courseware in Bahasa Malaysia version. The courseware is potentially to develop by using Adobe Flash. This reading courseware with title 'Mari Membaca' will optimize reading experience to student with learning disability.

Education structure for disabled children in Malaysia was organized by Malaysia Ministry of Education [2]. Ministry of Education is responsible to support and provide facilities to several type of disabled society. World education is face with many new challenges in meeting with the demands of teaching and learning for the 21st century.

The growing number of disabled people in Malaysia can be shown in the statistic done by SWD starting from year 2002 until 2007[3]. The statistic of registered disabled people according types of disability is showed in *Table 1.1*. Showed in the *Table 1.2* is the statistic of registered of disabled people according to state.

Table 1.1: Total of registered disabled people according to types of disability

JADUAL 7.3 : PENDAFTARAN ORANG KURANG UPAYA MENGIKUT JENIS KECACATAN, 2002-2007

Penglihatan	14,738	14,154	15,364	16,211	18,258	20,039
Pendengaran	21,981	22,728	24,712	26,470	29,522	31,715
Anggota	41,311	45,356	51,090	58,371	66,250	73,559
Akal*	43,042	49,340				
Masalah Pembelajaran			57,483	66,906	76,619	85,812
Cerebral Palsy			34	623	887	1,787
Lain-lain	1,017	1,077	1,934	4,335	5,983	7,338

* Kecacatan akal dimansuhkan, sebaliknya dipecahkan sama ada kecacatan Masalah Pembelajaran atau Cerebral Palsy

Table 1.2: Total of registered disabled people according to state

JADUAL 7.1 : PENDAFTARAN ORANG KURANG UPAYA MENGIKUT NEGERI, 2002 - 2007

Johor	14,089	15,543	17,040	21,232	24,228	27,554
Kedah	8,305	9,823	10,459	11,577	13,963	15,224
Kelantan	11,149	12,763	14,017	15,214	17,239	19,561
Melaka	4,197	4,775	5,530	6,825	8,335	9,687
Negeri Sembilan	5,138	5,826	6,834	7,910	8,964	10,149
Pahang	4,088	4,791	5,715	6,468	7,784	8,496
Perak	15,755	13,892	16,401	18,382	20,285	23,006
Perlis	2,382	2,866	3,065	3,395	3,690	4,024
Pulau Pinang	8,476	8,165	9,646	10,961	12,507	13,824
Sabah	8,462	9,067	10,049	11,083	12,481	13,823
Sarawak	7,833	8,670	9,634	10,549	11,920	13,289
Selangor	13,837	16,174	19,073	22,332	25,624	28,969
Terengganu	7,208	8,123	9,486	10,714	12,302	13,083
W.P. Kuala Lumpur	10,920	11,857	13,295	15,831	17,729	19,060
W.P. Labuan	250	320	373	443	468	501

*terdapat pembetulan data bagi negeri Pahang pada tahun 2005.

1.2 Problem Statements

The increasing number of slow learner children every year creates a concern from the government agencies from various countries. [4] The result of the studies done by Zainudin Mohd Isa shows that;

- 1) The patterns of development of special education differ from one country to another.
- 2) Some school in Malaysia does not provide the special remedial education if the number of slow learner children is too small.
- 3) There are different teaching method to the disabilities children based on their type of disabilities (Slow learner, dyslexia, down syndrome, autistic or low autism, hyper active, speech delay, mental retardation)

Other problems in learning disability, there are no specific approaches to capture student's attentions in class. Special remedial education teacher must understand each student in the class. Most of special remedial education teacher will used their own approaches to capture student's attention in class. Based on the recommendation from SKPP teacher, special children more interested to learn something through interaction rather than passive learning. An attractive courseware technology with relevant syllabus could be a good solution to discover the curriculum and subjects thought by the teachers to these special children.

The courseware is potentially to have loading problem and error if there are too many multimedia elements. Developer must include only necessary multimedia elements in developing the courseware. The size of the multimedia element can be reduced by implement compression. But this action will reduce the multimedia quality and in a result the courseware will not efficient to capture student's attention.

1.3 Objectives

The objectives of this project are:

- 1) To design interactive courseware with [5] multimedia element.
- 2) Select only practical syllabus provided by *Special Education Department, Ministry of Education* to be covered in the courseware.

1.4 Scope of Study

The scope of study in this project is to develop flash courseware for Down syndrome and Hyperactive students. The chosen subject of the courseware is Bahasa Malaysia. Sekolah Kebangsaan Pengkalan Pegoh (SKPP), Lahat Perak is recommended by my Final Year Project supervisor Ms Emy Elyanee Mustapha to be a target user for the courseware development. The school provides an education syllabus and facilities for a student with learning disability. However, targeted school has incomplete facility since some of the facilities were damaged from the previous flood tragedy.

The research's final product is a flash based courseware and it must compatible to the schools' personal computer. After completed design the courseware, feedback from target user will be analyzed to measure the effectiveness of implementing the syllabus provided by the Malaysian Ministry of Education. The content mostly will rely to the school and Ministry of Education syllabus. There are several common teaching method applied in courseware such as [6] sound-symbol correspondences, word retrieval and vocabulary. But some of syllabus and teaching method are not suitable for student with learning disability. By using throw away prototype methodology, the courseware will be modified from time to time based on user feedback. Only practical syllabus and teaching method will be include in the courseware. Getting the user feedback will be done several times to make sure the courseware is well accepted by student with learning disability.

CHAPTER 2

LITERATURE REVIEW

2.0 LITERATURE REVIEW

2.1 Theory of children development

There are a number of theories discussing children development. Some of the theories are contributed by psychologists [7] Erik H. Erikson, Howard Gardner and Jean Piaget. In their theories have explained on factors that optimize children development.

Erikson (1963) believed that play is the child's attempt to synchronize bodily and social process with the self [8]. Playing is necessary for children growing and learning. His work also stresses the need of relationship between mother and child. The need for adult-child interaction is able to develop children's trust, autonomy and initiative.

Howard Gardner (1983) theorist is concerning multiple intelligences [9]. He has identified seven types of intelligence which are *linguistic, musical, logical-mathematical ability, spatial, bodily kinesthetic, interpersonal and intrapersonal intelligence*. The effective form of adult-child interaction will help children in learning to their potential in any types of intelligence.

Jean Piaget (1938) work is in the development of human knowledge, learning and thinking in children [10]. He discovered children learn in three different ways. The first is *social knowledge* gained through interaction with other people. Next is children's understanding of the *physical knowledge* of object through observation. The last, *logic-mathematical knowledge* is an understanding of relationships such as numeration, classification, time and conversation. He also believed that play is a powerful force in the learning process of young children.

2.2 Learning disabilities

Children and adolescents perform poorly in school for various reasons. Estimate about 10 to 20 percent children and adolescents have a neurology-based disorder of the type called learning disability [11]. The reason for their learning problems seems to be their brains have neurology problems in other term their brain slightly different from the average person's. Learning disabilities are lifelong conditions that may require special understanding and help.

By the late 1960s, the model of learning disabilities consists of four stages information processing used in learning: *input, integration, memory and output*. Input is the process of recording brain information that comes from sense. Integration is the process of interpreting information. Memory is its storage and output is information is achieved through language or activity. Learning disabilities can be classified by their effects at one or more in these stages.

Special education is treatment of choice for learning disabilities in school. Treating student with learning disabilities require a specific instruction. The specific instruction student receive will vary depending upon their needs and capabilities. Some student needs related services such as laptop computer, television, radio or extra time for test. Parent must try to understand their children's nature problems. It is essential to recognize learning disabilities as earlier as possible.

2.3 Technique for reading to children

Reading to children is the effort where they will experience more than picking up a book and reading it loudly. Priscilla Carman [12] shared specific technique to use before, during and after reading to children. Parent or teacher should make sure the children are in a mood of learning before they start reading. Try to show the book cover to student and ask their opinion about the cover page. Guidance can get the student into a reading mood by set a purpose before start reading.

Try to encourage student to participate by asking simple question and make some elaboration for their extra understanding. If the book has illustration, try to discuss about it and relate the story with student perceptive. After finish reading, review the story component such as setting, main character and how the problem was resolved. This specific technique is important to encourage children to get interest in reading.

2.4 Teaching Reading to Kids with learning disabilities

Student who is progressing in reading at a normal rate can read faster than learning disabilities kids. Based on the information American Library Association [6], kids with linguistic problem tend to struggle to remember a new character or word. The following are three common methods employed to teach them to excel beyond their limits of disability.

Sound –symbol correspondences – student can be taught to read the sentence and then to spell them in longer.

Word retrieval – Quick speed drills can develop automatic recognition of syllables and words and phrases

Vocabulary - teachers use new words as often as possible in classroom conversation and reward students for noticing the words.

2.5 Principle of instruction for learning disabilities student

In special remedial class teacher need to use some principles of instruction to capture student's attention. *Table 2.1* is a list of principle which applies as teacher work with student with learning disabilities taken from Learning Disabilities handbook by Mary rack [13].

Table 2.1: Principle of instruction for learning disabilities student

Principle	Always do
Be highly structured and predictable	explain the purpose of the lesson; break down tasks into small, sequential parts; present directions one step at a time, using both oral and written directions;
Include opportunities to use several senses and learning strategies	provide auditory, visual, and concrete cues; use physical demonstration of abstract concepts, such as left/right; use color for visual impact; encourage the student to repeat verbal information; act out action verbs
Provide constant structure and multi-sensory review	preview and review major points, both orally and visually; ask the student to state in his/her own words what has been presented; make frequent eye contact to maintain attention and encourage participation
Recognize and build on learners' strengths and prior knowledge	Relate new materials to daily life; combine life skills such as reading medicine labels and filling out forms with phonics, word recognition, and reading comprehension; provide success-oriented activities.
Simplify language but not content; <i>emphasize content</i> words and make concepts accessible	use visual aids such as overhead projectors, films, videos, slides, chalkboards, flip charts, computer graphics, or illustrations; use <i>games, songs, rhymes to help students listen to sounds; concepts accessible through the use of pictures, charts, maps, time lines, and diagrams</i>
Reinforce main ideas and concepts through rephrasing rather than through verbatim repetition.	provide intensive instruction until the materials is mastered; allow ample time for learning a task (a student with a learning disability will take longer to master new material); provide instruction to help transfer of learning from one task and setting to another; set up small discussion groups to allow time for each student to talk and use the language they have already developed

2.6 Issues and challenges in courseware development: project manager's perspective

Many educational institutions venture into courseware development are often not aware of the challenges in managing courseware projects. The article on issues and challenges in courseware development: a project manager's perspective written by Yap Ngee Thai, Chan Mei Yuit & Chow Mee Ling highlight potential challenges a courseware development project may face [14]. It discusses lesson learn from development project carried out in Malaysia for content and language-based courses.

In the section of paper present a real cases to show the different challenges that project manager may face in developing content-based and language-based courseware. Understand on how to effective transfer the content knowledge to the learner is the most important for the effective courseware development. In example for student with learning disability, I need to understand how these special children adapt with courseware learning.

Project manager must sit together with content expert and instructional designer and discus on how to work on the storyboard for the course. It is important for learner to understand the courseware with the good content and instructional design. The project manager must make sure to provide a proper and systematic structure in the initial lessons provided in the courseware, an important aspect of instructional design.

One of the major challenges faces is working with curriculum demands of the courseware. In Malaysia, for example, the Ministry of Education requires stories used to expose about the local culture and include specific moral values (Kementerian Pelajaran Malaysia 2000). Courseware developer cannot buy any stories from outside of the country, but need to working with local writers.

Another major challenge is dealing with the issue of determining the right difficulty levels for materials used in the courseware. For example easy level for urban school may be considered as difficult level for village school. With some projects, this problem was not really resolved.

Project manager need to have sound of knowledge of pedagogical principle and instructional design. Other than that, project manager should also have an understanding of the power of the technology and used it effectively in learning.

2.7 Malaysian perspective: Designing Interactive Multimedia Learning for education

Today greater demands on courseware are being placed in education system from various countries including Malaysia. A majority of the teaching-learning courseware available in the Malaysian market focus on subjects such as Malay language or Bahasa Melayu, English, Chinese Language, Mathematics and Science. This multi racial country needs to cover racial unity in the education. The former Prime Minister of Malaysia, Tun Dr. Mahathir bin Mohamad point out that:

“This country must develop in total in all aspects that encompass racial unity, social, and economic integration, political stability, administration system, quality of life, social and spiritual values, national pride and self confidence” [15]

Malaysia is rich in its oral tradition story, but not much has been popularized. The collection or recording of traditional story in Multimedia Technology is needed to prevent these traditional narratives from extinction and making the tales accessible to a wider audience [16].

The stories are delivered through an indirect learning approach namely the thematic literature-based approach, to involve the learner in mind and spirit. In addition through stories, children are exposed to a wide range of challenges: it offers them an opportunity to widen their past experiences and develop new ones; it affords the unfolding of the pleasures of language; it furnishes a cognitive understanding of human behavior; it expands life experiences; and it yields a sensitivity to the use of languages as an important tool [17].

The story delivered to children should include politeness and sense of duty and honor. The courseware interactive multimedia reveals an interesting and explicit tool for teaching and learning.

2.8 Previous Final Year Project “Fun Mathematic” by Ms Nieleufaa Asriin Padil

A study on similar project was done previously by Ms Nieleufaa Asriin Padil on courseware content development [1]. The purpose of her courseware is to assist teacher in teaching and optimize learning ability of slow learner children. Her courseware with titled ‘Fun Mathematic’ is focus on teaching mathematic subject. The mathematic courseware was developed by using Visual Basic software.

CHAPTER 3

METHODOLOGY

3.0 METHODOLOGY

3.1. Prototyping methodology

Software development methodology is a framework that is used to structure, plan and control the process of developing and information system. Waterfall, Spiral and Prototyping are three basic patterns in software development methodologies. In this project, the preferred method to develop educational software is *prototyping methodology*.

Prototyping is an excellent method for designing good Human Computer Interface [19]. Besides that, this methodology is also good for user participation in courseware development. (i.e. get users' feedback in prototyping development phase).

Prototyping consist six phases start with Planning, Analysis, Design, Prototype implementation, Courseware prototype, and Implementation. Analysis, design and prototype implementation is in prototype building category. Figure 3.1 show the flow of prototype methodology. This model provides advantages of evolutionary prototyping, which gives evaluative feedback throughout the development process [20].

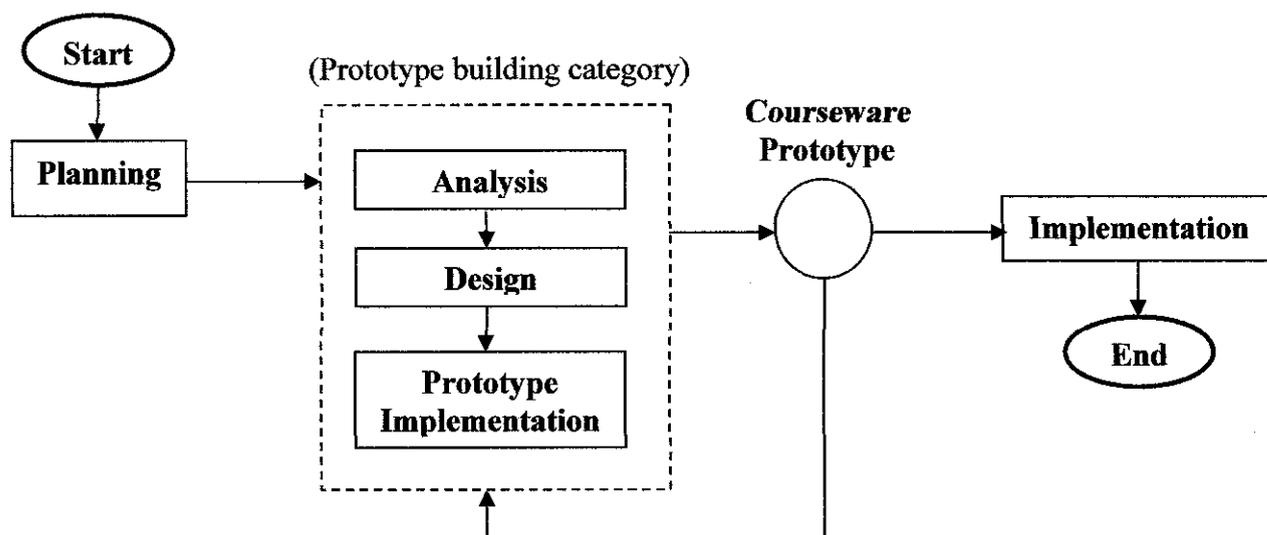


Figure 3.1: Prototype Methodology

3.2. Planning

There are two fundamentals under planning phases which are study and visit interview.

3.1.1 Study

To start developing the project, a study must be done to get an overall idea about disabled student. To get more understanding about this special society, information from internet, book, magazine, and interview session with special remedial teacher need to be study. Deep understanding on student with learning disability will make the courseware development in right path.

Disabled student have learn limitation based on types of disability (*slow learner, dyslexia, Down syndrome, autistic, speech delay, hyper active etc.*). The reason for their learning problems is seem to be their brains have neurology problems in other term their brain is low than average person's brain. Teach disabled student to read can be extremely challenging and often discouraging. However, by capitalizing their

interests and experiences, a practitioner can systematically guide these students in building their confidence as reader [21].

Study on appropriate tools and software is need to be done before start develop prototype courseware. Majority of professional developer is using Flash to create interactive content [22]. Flash tool is not just supported text animation; it can manipulate vector and raster graphic and support bi-directional streaming of audio and video. The code and script of the software need to be study and practice.

3.1.2. Visit and interview people

In this study, visit and interview need to be done regularly to collect information and feedback from teacher and student. Observation and discussion session with certain people who related to the study will help to improve courseware effectiveness.

On 24th February 2009, an observation and interview has been done during 2nd visit to Sekolah Kebangsaan Pengkalan Pegoh (SKPP). During the visit, an observation in class and discussion with Bahasa Malaysia (BM) Teacher has been done to get more understanding about learning environment for special remedial class. 30 minutes observation is conducted during Bahasa Malaysia subject session in Amanah class (most clever group of student for special remedial class). All students and teacher activities can be referred in chapter 4 results and discussion. *Refer 4.1.3.*

An interview and discussion with BM teacher, Ms Izaan is also conducted during the visit. The interviewed is about her opinion and tips regarding teaching method for student with learning disability while the discussion is about the content of the courseware. Detail interview in chapter 4, *Refer 4.3.* All courseware requirement and tips is collected during the session. She explains how the school uses learning facility to give a variety of learning environment for disabled student. She also showed some of courseware and content which is not suitable for disabled student.

On 22th march 2009 an observation has been conducted on normal student, Abdul Majid and disabled student, Mohd Nakief. This observation was done within time estimation one hour. Both students are given same laptop and tested with Flash games, Microsoft Paint and Microsoft Word application. Both of them are also have some similarity on gender, computer experience, and age. Mohd Nakief is suffering from Down syndrome and Hyperactive illness since born. For details observation result is in chapter 4. *Refer 4.4*

3.3. Analysis

Analysis is critical to the success of a development project [25]. Analysis will create a good learning courseware to make sure the courseware is meeting with academic syllabus and user requirements. Analysis phases includes with fundamentals of user requirement and user observation.

3.3.1. User requirement

User requirement from teacher is analyzed based on the content, the efficiency content delivery and courseware attractiveness.

The content of the courseware will be taken mostly from SKPP syllabus. Based on Ms Izaan statement, she mentioned that not all syllabuses from Malaysia Ministry of Education are included during class session. Only chosen contents are effective for disabled student. The school is focus on teaching daily routine activity such as teach about food, family, time and date. Student with learning disability can simply forgot on what is taught in the class. Every long school holiday, teachers usually teach same content to encourage student recall back on what they have learnt during the class. Because of the student have brain neurology problems, it is necessary to select a contents and analyze the syllabus from SKPP before include in the courseware.

Effective content delivery is important to maintain students learn interest while using the courseware. Computer responses to user are a key factor to make a courseware is adaptable to user [23]. Based on my study and observation, learning disabled student will click on the screen without any purposes. They simply attracted and click to any

blinking or movement object on the screen. Instructional design is required to make the courseware effective in content delivery. Instructional design is usually influenced by content or pedagogy [24]. The courseware must be well organized content, simple, repetition in teaching, attractive and consistent to user.

3.3.2. User observation

The school which provides special remedial class is usually not split their disability student based on type of disability, but the student is split based on the result of examination. From the observation in special remedial class in SKPP, each student has their own learning problems. Teacher will give special attention to each student to assist them learn in the class. Teacher is also repeat on what they teach to student at least twice to give them more time to digest the knowledge. The courseware must be able to be used by several types of disability in SKPP.

The observation between normal student and disabled student showed there are big gap in learning interest. During the observation between Majid (Normal) and Nakief (Down syndrome & hyperactive), Nakief can easily lost his interest in what he is doing. Someone needs to encourage and guide him to make sure he is focus on what he does. Even though Nakief easily get bored with what he doing, but he still show his interest to use the computer. Compare to Majid, he don't have any problem to stay focus on what he is doing.

3.4. Designing

Design phase is a process of problem-solving and planning for the courseware [26]. To design an application, proper flow chart is need to be done for the courseware's flow outline. Besides that, the courseware is also need to have good interactivity and suitable Human Computer Interface (HCI) for student with learning disability.

3.4.1. Suitable Human Computer Interface (HCI)

Suitable HCI for disabled student will encourage student to stay focus while using the courseware. Neurology problem might be the factor that distracts student's focus. The word or symbol should not be too small for the student to see. Some of disability children might have a problem with vision or hearing, a proper use of font, font size, image, colors and audio will make them feel comfortable while using the reading courseware.

The layout arrangement should be adaptable by the student. Too many graphic or text will make the student confuse on what they should do. The interface should be simple and able to give hint to the student. Consistent concept and interface will make the courseware easy to understand by the student.

3.4.2. Interactivity

The courseware interface should be attractive and give appropriate response to the student. Based on the observation, disabled student has a tendency to click the screen without any purpose. The attractive courseware interface will capture student attention to click on the specific region of the screen. Blinking, sizing, movement effect, audio effect and color contrast is one of the way to capture student attention. Appropriate error message and audio effect will help the student to learn from their mistake.

Sound symbol correspondence, word retrieval and vocabulary are learning method that will be use in the reading courseware. In chapter 2 (refer 2.4) has explained on how the method help student with learning disability in reading. This method is encourage student to start reading lesson by remember a characters and word until they can read a sentences. Human narration with clear pronunciation is also need to be included in the courseware.

3.4.3. Curriculum structure

In Malaysia, every school has to follow curriculum documentation guideline under Ministry of Education which provided by Curriculum Development Centre [27]. Based on comments by Bahasa Malaysia teacher from SKPP, she said that not all in the curriculum structure are relevant to the student with learning disability. She is agreed that letter recognition, pronunciation, writing exercise, remember word and read short story to be include in the courseware.

3.5. Prototype Implementation

3.5.1. Develop prototype

A prototype will be developed by use several potential software. Potential software to develop a prototype courseware is Adobe Flash. This software is selected because it can support multimedia elements.

The prototype will be evaluate and tested before deliver to the target user. Any possible input will be tested to see how the courseware responds to the user. User usually have tendency to enter invalid input. In example, the courseware will give appropriate error message when user enters a character for age input data. Appropriate response or error message will guide user on how to use the courseware.

3.6. Courseware prototype

After the courseware prototype is ready, user testing will be conducted at respective school, SKPP. Feedback and opinion from user will be collected for the courseware improvement. Feedback form will be distributed to the user and collect their feedback about the courseware content, design and effectiveness. User requirement will be added in the courseware after the feedback is analyzed.

3.7. Implementation

After the prototype is successfully launched and tested by the user, the official courseware is released to the targeted user. The courseware will then be used officially for SKPP.

User survey and feedback will be collected from user. This will be considered as final step of getting user opinion and comments on the official release courseware. This survey is important to measure user's satisfaction toward the courseware.

3.8. Gantt Chart

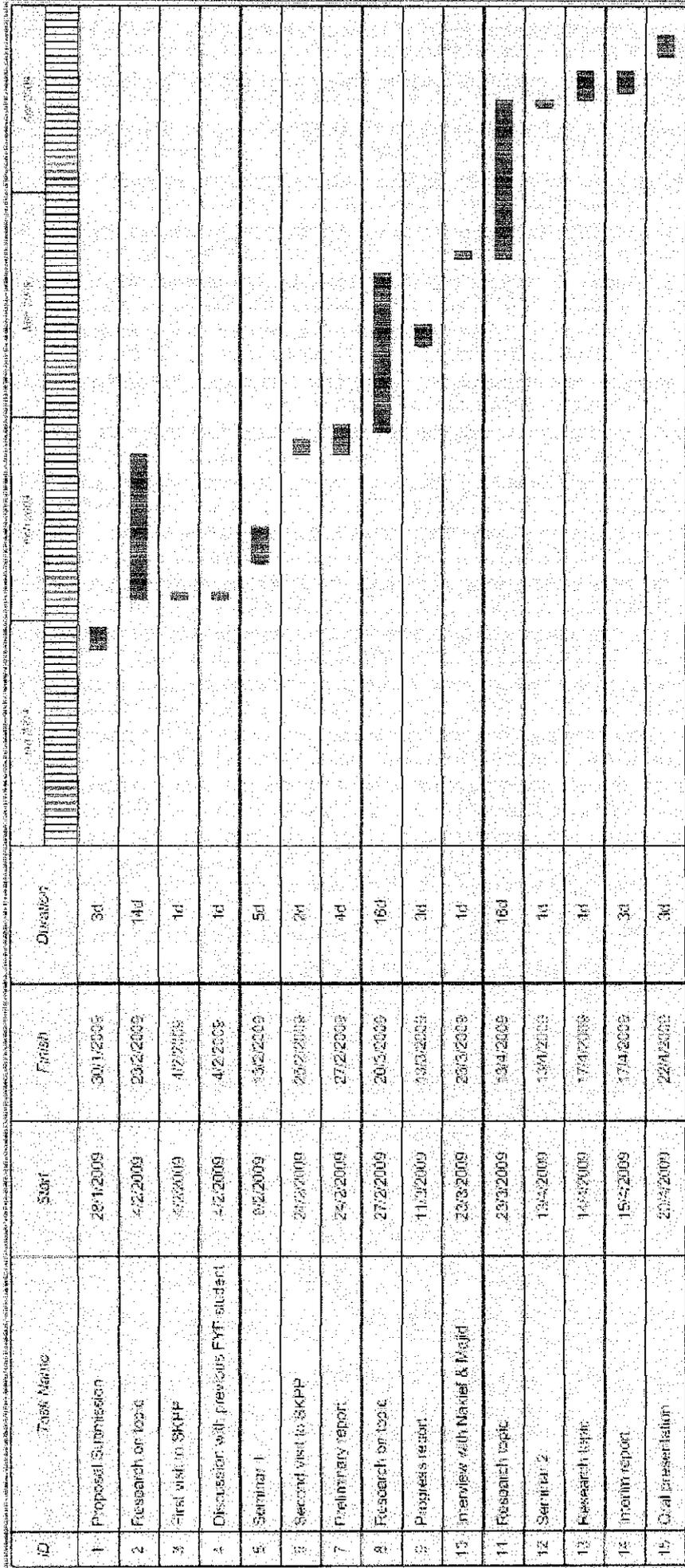


Table 3.1: Gantt chart

3.9. Milestones for 'Mari Membaca' Content Development

No	Detail/ Week	1	2	3	4	5	6
END OF SEMESTER BREAK JANUARY 2009							
1.	Review Syllabus						
2.	Create question						
3.	Training using Adobe Flash						
4.	Record voice narration						
5.	Design and develop using Adobe Flash						
6.	Review interactive effect using Adobe Flash						

Table 3.2: Milestone for 'Mari Membaca' Content Development

Legend

 Process

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Visit to school

4.1.1 About Sekolah Kebangsaan Pengkalan Pegoh (SKPP)



Figure 4.1: Sekolah Kebangsaan Pengkalan Pegoh

Sekolah Kebangsaan Pengkalan Pegoh is located in Lahat, Perak Darul Ridzuan Malaysia. *Figure 4.1* is taken during school assembly. Besides provide an education for normal student, this primary school is also provides special remedial education for disabled student. There are 8 different special remedial class based on student's examination grade. The school has more than 20 dedicated teachers with high skill and knowledge about special remedial education.

4.1.2. First visit to SKPP

First visit to SKPP was done on 4th February 2009 accompanied by FYP supervisor, Ms Emy Elyanee. The purpose of the first visit is to get more understanding about the school background. Besides that the visit is also to get acquainted with special remedial teacher in SKPP. Bahasa Malaysia teacher, Ms Izaan will be the reference for the content study in the courseware development.

4.1.3. Second visit to SKPP

Second visit was done on 24th February 2009 with purpose to conduct an observation on how teacher teach Bahasa Malaysia (BM) subject in special remedial class. The observation was done in the most intelligent class, Amanah. The total of student in Amanah class is seven. The duration of Bahasa Malaysia class is around 30 minutes.

Based on the observation result, the teacher teaches and asks about daily routine at the beginning of the class. In example, teacher greet student and student will response from the greeting. Besides that teacher also ask about the homework given, what they eat for breakfast, who sent them to school and some other question that related to daily routine.

During the class session, teacher teaches student with clear and correct pronunciation. In example, teacher will pronounce the word two or three times before wrote it on the whiteboard. Then student will try to pronounce the word on whiteboard.

Teacher will assist each student in the class because the class consists of different type of disabilities. Some of student able to obey teacher's instruction but some them will ignore the instruction. Student who ignores the instruction is usually suffered from hyperactive illness. This type of disability has a tendency to disturb other friends in the class.

During the observation, monthly examination was conducted in the class. The time given for the examination was approximately 15 minutes. The examination based on exercise given in the previous class. But the student still cannot answer the examination well and need assistant or hint from teacher.

The class is provided with teach facilities such as Projector, Radio cassette player, VCD player and television. Some of the equipments are broken because of the flood tragedy. During the observation, no media equipment was used in the class.

Teacher never harsh to student even some of them are not behave in the class. There is one student in the class that cannot control his emotional and easy to get fight with other friends. Teacher will console to student individually to abate the situation. To control students in the class, teacher also gives rewards to those who can behave or answer question correctly.

4.2 First draft courseware layout and content

During a second visit to SKPP, the first draft of the courseware layout and content was presented to Bahasa Malaysia teacher, Ms Izaan. Refer to appendix 1.0 to see the first draft layout and content. Basically the courseware has five levels of difficulties where each level have different objective. The objective for each level is listed in Table 1 below:

Level	Objective
One	Teach student on letter recognition
Two	Teach student the correct pronunciation
Three	Teach student how to write in a correct technique
Four	Exercise on remembering new word
Five	Exercise read a short story

Table 4.1: Objective of each level in the reading courseware

4.3 Discussion with Bahasa Malaysia Teacher

A discussion with Ms Izaan was arranged about 30 to 40 minutes [18]. The content of 'Mari Membaca' courseware mostly will refer to Ms Izaan. She is teaching Bahasa Malaysia subject in SKPP. Three years of experience teaching disabled student will help the courseware's content development become efficient.

The purpose of discussion is to present the teacher with first draft layout and content of the courseware. She was satisfied with the first draft layout and content but she requested of some modification and improvement on how to deliver the knowledge to disabled student. Ms Izaan mention usually she skips level 1 and level 2 and start teaches on level 3, level 4 and level 5. Refer *Table 4.1*. Because the student having difficulties in memorizing, she starts teaching level 1 and level 2 every year to recall back whatever the student have learnt in class.

Ms Izaan mentioned repetitive music is most effective method to improve students' memorizing skills. A suitable audio and music should be included in the courseware to encourage student to recall on what they have learnt. Music also will capture and retain student's learn interest in the class. However music cannot be play frequently because student can easily get bored. Therefore, the courseware needs to include of variety learning approaches such as hand movement, body movement, exercise, and singing pronunciation.

In the discussion, Ms Izzan showed several coursewares that she likes and dislikes as teaching tools in the class. Currently the school already has courseware for teaching Bahasa Malaysia. Some of courseware have very well and organize content, but not suitable for the student with learning disability. The courseware need to be more attractive to capture student's attention. Some of the courseware creates confusion to the student. Example from writing lesson, student usually will confuse to write 'a' instead of 'ā'.

4.4 Observation on Normal and Disabled student



Figure 4.2: Observation on normal and disabled student

The two hour observation on normal and disabled student was done on 22nd march 2009 at my house in Melaka. The purpose of the observation is to see the response from normal and disabled student while using computer. The laptop was used in the observation and approximately one hour was allocated for each person. Both of the students are having some similarities on age (10 years old), gender (male) and computer experience (no computer at home). Both students are tested on flash games, Microsoft Word and Microsoft Paint.

4.4.1. About Nakief and Majid

Mohd Nakief is a student who suffers from Down syndrome and hyperactive illness since born. He lives in Selangor, Malaysia with his family and gets education from special remedial class in Selangor. Based on his parent's statement, Nakief is not able to speak with clear pronunciation. Similar to other hyperactive student, Nakief also have problems to retain his focus on what he is doing.

Abdul Majid is a normal student since born. He lives in Negeri Sembilan, Malaysia and gets education from normal class. As normal 10 years old children, Majid don't have any difficulty to speak with clear pronunciation. He is also able to retain focus on what he is doing.

4.4.2. Observation

The result of the observation is documented in *Table 4.2* below.

Table 4.2: Result of the observation on Nakief and Majid

Observation	Hyper active & down syndrome	Normal
	- Easily get bored with same movement or effect	- Show his interest to play flash game
Flash games	- Always clicking without any purpose while playing	- know when to click while playing
	- only attracted to blinking word or symbol	- Know function of the symbols. i.e. play button
	- cannot read	- able to read
Microsoft paint	- excited to scribble draw and easily get bored.	- know what to draw creatively using paint.
Microsoft word	- type anything he want and ignore my instruction	- able follow my instruction to write name

4.5 Second draft courseware layout and content

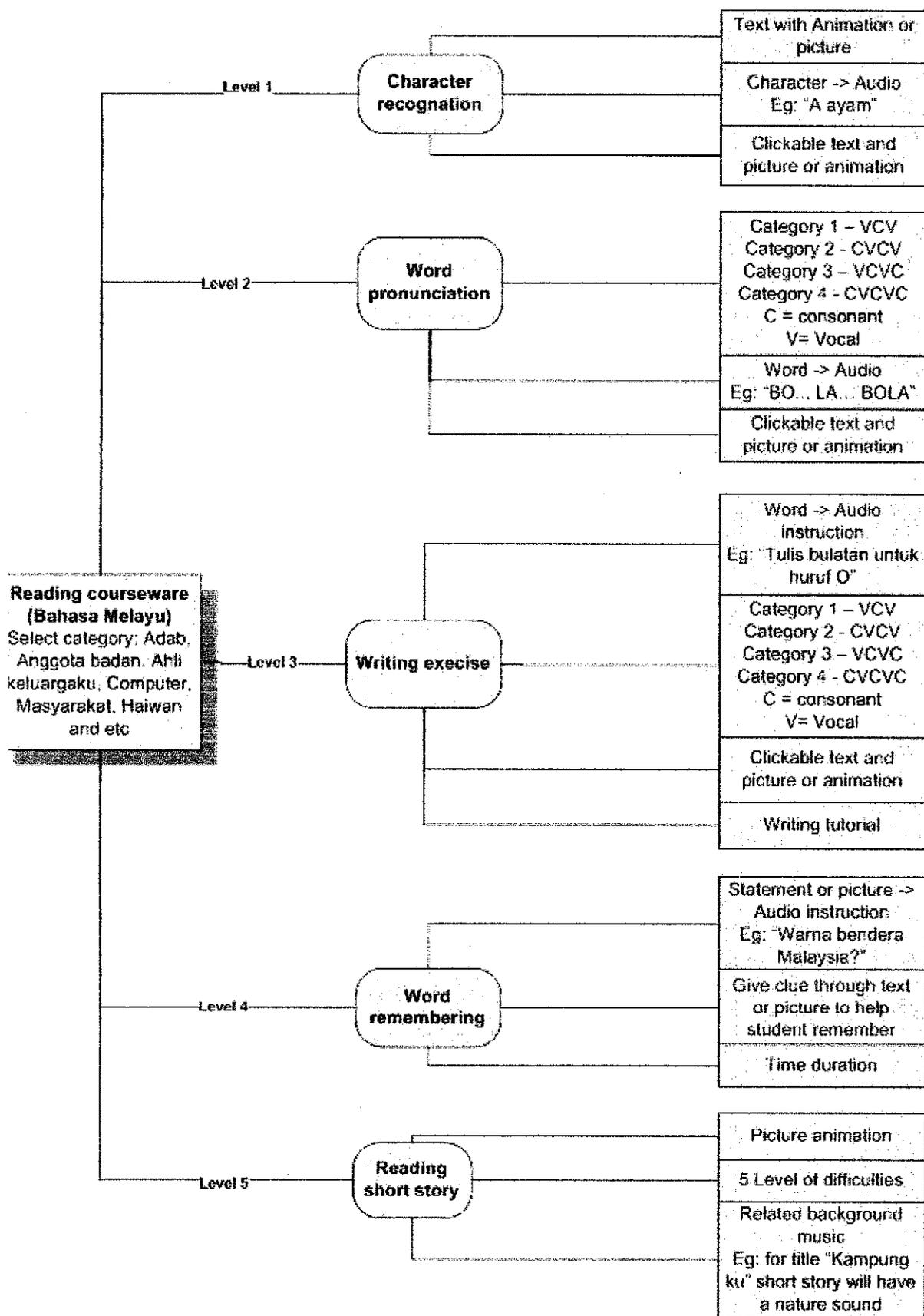


Figure 4.3: content of the courseware

4.6 Prototype development

The courseware able to capture students' attention is by focusing on the interactive aspect. For the second draft courseware layout, there are not many changes is been made. The plan to implement several approaches for the courseware as shown in *Figure 4.4*:

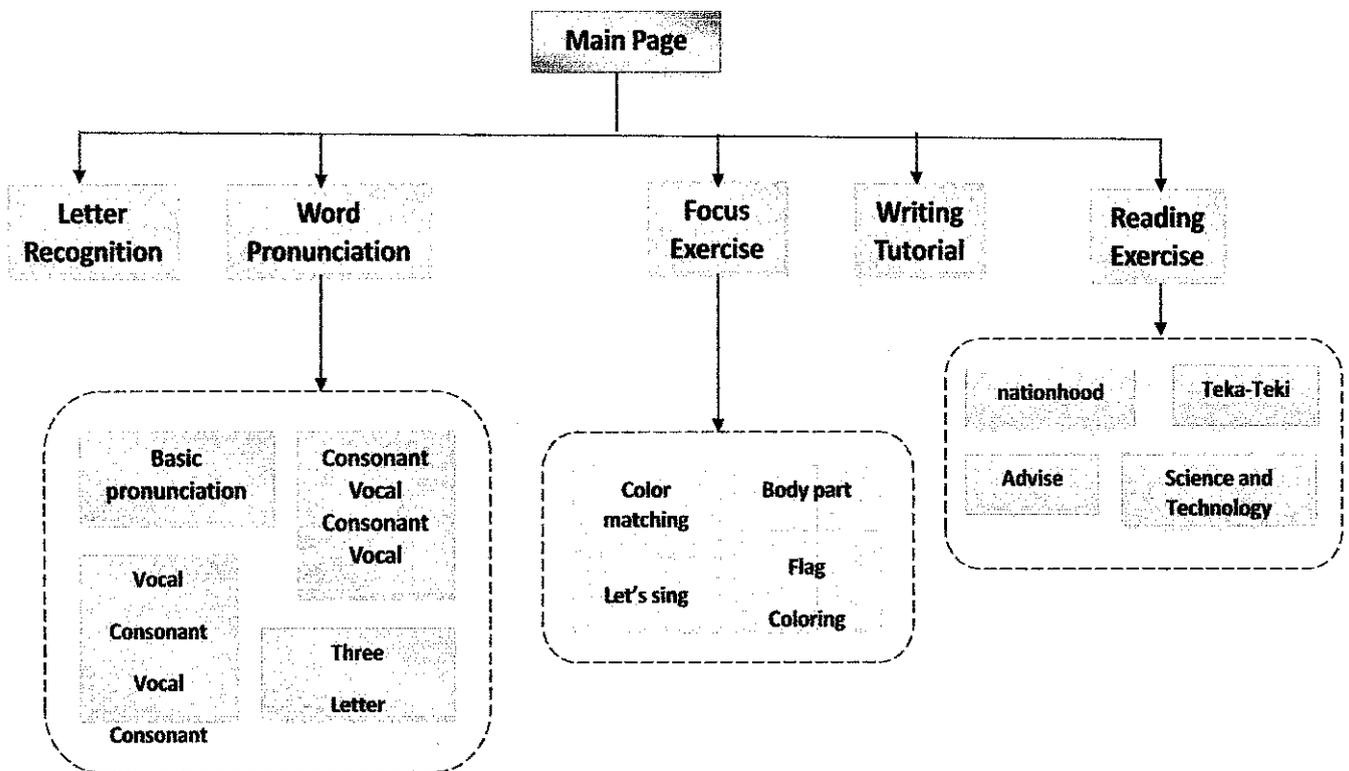


Figure 4.4: Reading courseware flow

4.6.1 Main menu

As the courseware starts, the screen will display main menu with five topics which are *Letter recognition*, *Word pronunciation*, *writing tutorial*, *Focus exercise*, *Reading exercise*. Main menu is included with the interactive element and students are able to click the object such as sun and the animated cat. The "Matahari" word will appear if students overlay the mouse on sun object. The cursor design must be in reasonable size for Down syndrome and hyperactive student to capture their attention on cursor. To create student's awareness about date and time, the cursor will show the time and date if there are no movements. *Refer figure 4.5*:

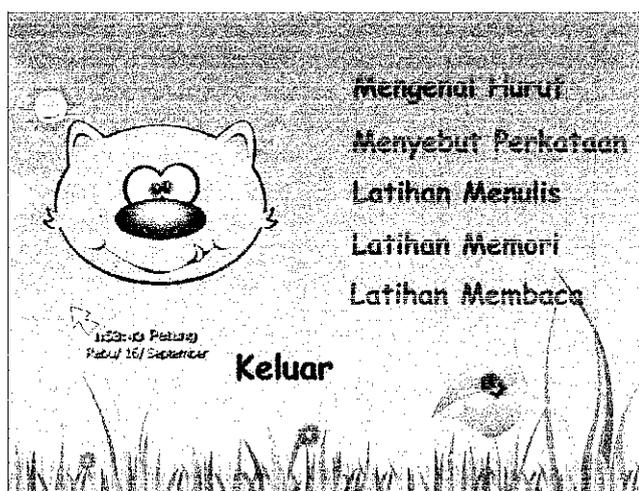


Figure 4.5: Main menu screen shot

4.6.2 Letter recognition



Figure 4.6: Letter recognition screen shot

The objective of the letter recognition is to let students learn and remember A to Z letter by display a related image. The word of the letter should not difficult to pronounce and remember. This is because the familiar word will encourage the learning disability students to recall something that they easily remember. Students are free to click any letter as many times they want. Voice narration also will help students in remembering the letter. Refer figure 4.6:

4.6.3 Word pronunciation



Figure 4.7: Word pronunciation screen shot

Word pronunciation will help student to develop their pronunciation skills. This section is divided into four sections which are *basic pronunciation*, *vocal consonant vocal consonant*, *consonant vocal consonant vocal* and *three letters*. Four different colors of button are assigned in this section. This different will help student to remember the section through different color.



Figure 4.8: Word pronunciation, basic pronunciation screen shot

Basic pronunciation is consist of letter pronunciation and two letter pronunciation. For instance of basic pronunciation is letter *A until Z* and “*BA*”, “*BE*”, “*BI*”, “*BO*”, “*BU*” and “*BE*”. In Bahasa Malaysia, it is necessary to have two combination letter of vocal and consonant. This section concept is similar to the word pronunciation where students are free to click any letter or word they want. *Refer figure 4.8:*

4.6.4 Writing tutorial

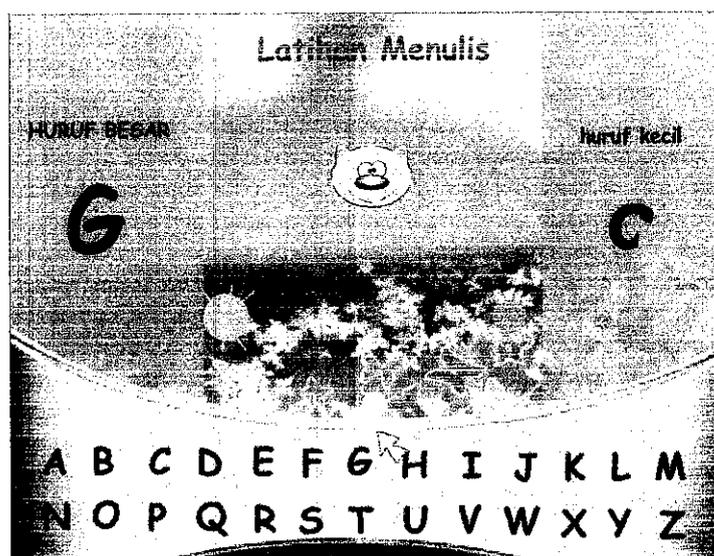


Figure 4.9: Writing tutorial screen shot

Writing tutorial layout and design is similar to letter recognition. The reason to use almost similar layout is because want the students familiar while using the courseware. The objective in the writing tutorial section is to show student the correct step to write a letter. A writing animation will be played right after students click the letter. Students are free to replay the writing animation by clicking the same letter. Audio narration will play at the same time animation is playing. *Refer figure 4.9*

4.6.5 Focus exercise

Focus exercise is divided into four sections. The sections are match color, body parts, and flag coloring and let's sing. The objective for this section is to enhance student's focus ability. This section the student will enhance the skills of using mouse.

4.6.5.1 Match color

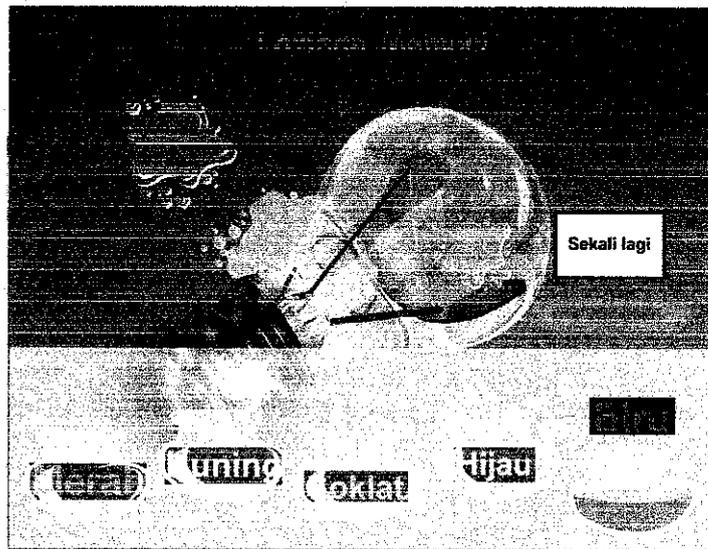


Figure 4.10: Match color screen shot

There are five different colors to be dropped in the labeled jar which are red, yellow, brown, green and blue. To fill the water into the jar, student should match the color with the labeled jar. Students can guess the color either from the *label name* or *label color*. Students can replay the game by clicking the “Sekali lagi” button. The objective of this section is to develop student common sense thinking and response with appropriate action.

Refer figure 4.10:

4.6.5.2 Body part



Figure 4.11: Body parts screen shot

In body parts section, student will learn eight different of human body parts. The selected body parts are eyes, mouth, ear, leg, hair, nose, teeth and hand. This section will help the student to understand their own body part. Most of the contents are modified from IQ Basic website [31].

Refer figure 4.11:

4.6.5.3 Flag coloring

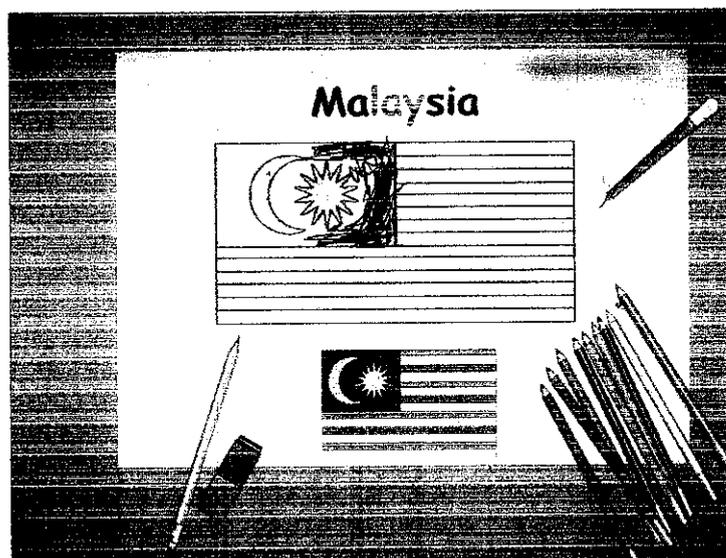


Figure 4.12: Flag coloring screen shot

To create patriotism awareness among the students, flag coloring is included in this section. In this section, students can chose their flag and select the stationery they want to use. The color pencils that provided in this section are blue, purple yellow, light purple, green, light green, orange, grey, brown and red. Students can erase the unwanted line or color by selecting eraser object and drag the cursor to erase. *Refer figure 4.12:*

4.6.5.4 Let's sing

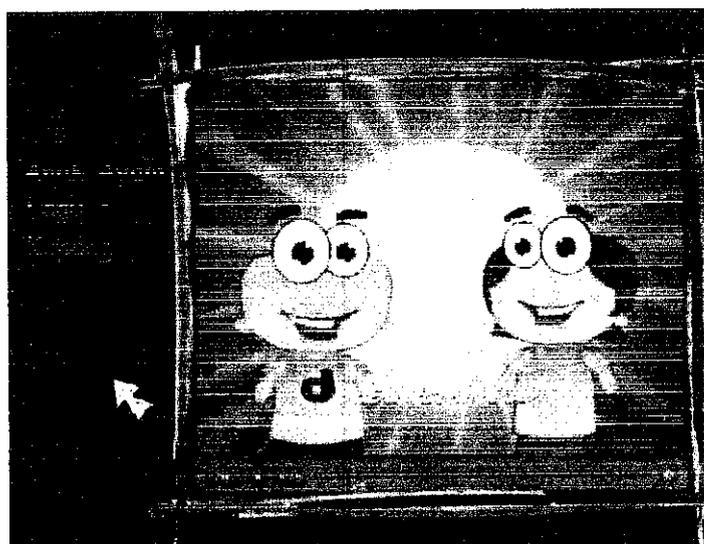


Figure 4.13: Let's sing screen shot

Based on experience of special remedial teacher in SKPP, video clip song can maintain the interest of hyperactive student on computer. This section will enhance students to keep focus on what they are doing. Music is one of the method to train the students in memorize something. Study shows that student can expand cognitive development through the music education [29]. Only slow and easy to pronounce lyrics are selected into the courseware. This is because to adapt learning ability of the student. *Refer figure 4.13:*

4.6.6 Reading exercise

Let's reading section will challenge students to read the *Pantun*. The *Pantun* is a Malay poetic form and originated as a traditional oral form of expression [30]. *Pantun* is selected as a reading material because it can deliver a message in a few lines of sentences. There are four types of *pantun* will be included in the section which are patriotism *pantun*, guess *pantun*, science and technology *pantun* and advice *pantun*. This section will cultivate students to love about Malaysian culture. The content in this section is 100% taken from "Mari Berpantun" book written by Mardiana Idayu Ahmad [31]. Refer figure 4.14:

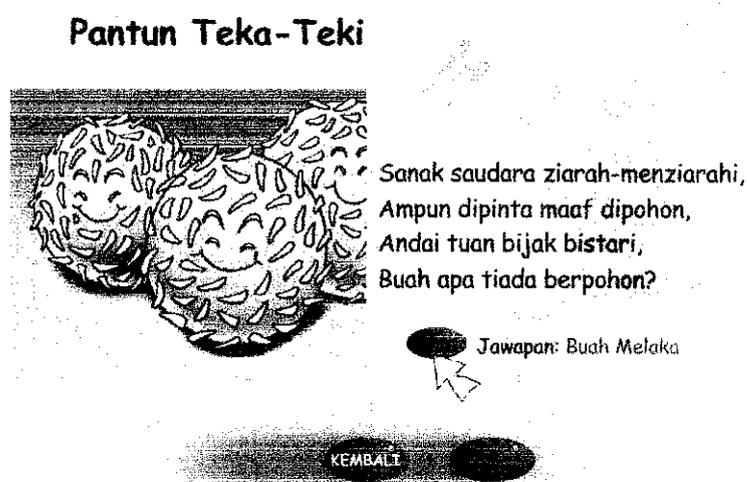


Figure 4.14: Reading *Pantun (teka teki)* exercise screen shot

CHAPTER 5

CONCLUSION

5.0 CONCLUSION & RECOMMENDATION

As a conclusion, 'Mari Membaca' courseware development is in analysis and design phase on the way to develop a prototype for user in SKPP. Many misconceptions in courseware development are usually occurred at analysis phase. Proper planning and analysis is important to select suitable content and multimedia elements for disabled student.

Deep understanding about student with learning disability is necessary to make courseware learning is effective in knowledge content delivery. Face-to-face learning is not the same as courseware learning. A good selection of suitable contents and multimedia will make the reading courseware is adaptable for disabled student. Understanding how to effectively transfer content knowledge to the disabled learners is critical to effective courseware development.

The expectation for 'Mari Membaca' courseware is to optimize reading experience to disabled student by encouraging better reading skills on Bahasa Malaysia subject. Although the courseware might not be perfect to all users, it will give opportunity for disabled student to expose with the technologies.

For the recommendation, the prototype courseware need to be analyzed based on the feedback from student and teacher to see whether the courseware improves student with learning disabilities.

REFERENCES

- [1] Nielufaa Asriin Bt Padil (2008), *Content Development: Courseware for learning disabled students*, Malaysia: Universiti Teknologi PETRONAS
- [2] Menu Utama. Portal Rasmi Jabatan Pendidikan Khas, (2009), Retrieved: February 20 2009
<http://www.moe.gov.my/jpkhas/index.php?option=com_content&view=article&id=1:selamat-datang-ke-portal-rasmi-jabatan-pendidikan-khas&catid=1:latest-news >
- [3] Statistik Orang Kurang Upaya (2009), Protal Jabatan Kebajikan Masyarakat , Retrieved: April 16 2009
<http://www.jkm.gov.my/jkm/index.php?option=com_jdownloads&Itemid=314&task=view.download&cid=62&lang=ms >
- [4] Zainudin Mohd Isa. (2004) *THE implementation of inclusive education programme in one of the school in Kuala Lumpur* from UKM Academic
<<http://akademik.ukm.my/eda/projekge6553/khas.htm>>
- [5] J.Hepple. (1995-2008). *what is Multimedia?* From J. Hepple, Inc.
< <http://www.jhepple.com/MultiMedia/whatsmultimedia.htm>>
- [6] Math and reading help (2003-2009) *Teaching reading to older kids who have learning disabilities* from American Library Association Participation.
< http://math-and-reading-help-for-kids.org/articles/Teaching_reading_to_Older_Kids_who_have_Learning_Disabilities.html>
- [7] Kathleen S. Ralph, E. Anne Eddowes (2002) *Interaction for development and learning: Theory of children development*, New Jersey: Merrill Prentice Hal
- [8] Erik H. Erikson, (1963) *America: Erikson Institute*,
<<http://www.erikson.edu/default/aboutei.aspx>>

- [9] Howard Gardner, (1983) *Multiple Intelligences*, America
<<http://www.howardgardner.com/>>
- [10] Jean Piaget, (1938) *Development of human knowledge*, Switzerland
< <http://www.piaget.org/aboutPiaget.html> >
- [11] Suzanne Ripley, Donna Waghorn, Lisa Küpper (2004) *Reading and Learning Disabilities*, From US: National Information Centre for Children and Youth with Disabilities (NICHCY)
< <http://www.nichcy.org/InformationResources/Documents/NICHCY%20PUBS/fs17.pdf> >
- [12] Priscilla Carman, *Technique for reading to children*, From America: Penn State
<<http://www.ed.psu.edu/americanreads/resources/techniquesforreading.htm>>
- [13] Mary Rack, (2005), *Learning Disabilities: a handbook for instructors and tutors*, Kansas: Johnson County Community College
<<http://web.jccc.edu/academic/math/faculty/Learning%20Disabilities%20Handbook.pdf>>
- [14] Yap Ngee Thai, Chan Mei Yuit & Chow Mee Ling (2008) *Issues and Challenges in Courseware Development: a Project Manager's Perspective*, Thailand
<<http://ejournals.thaicyperu.go.th/index.php/ictl/article/view/22>>
- [15] Nappie, M. (1991). *Sastera untuk Membentuk Pemikiran Generasi 2020*. Berita Harian, 30 August, 5.
- [16] Mohd. Taib Osman (1982). *Manual for collecting oral tradition with special reference to South East Asia*, Kuala Lumpur: Dewan Bahasa dan Pustaka
- [17] Ruddell, R, B (1992), *A whole language and literature perspective: Creating a meaning making instructional environment*, Language Arts, 69 (8), 612-620
- [18] Ms Izaan, Bahasa Malaysia Teacher, Sekolah Kebangsaan Pengkalan Pegoh, Perak, Malaysia, Personal Interview, Feb. 24. 2009.
- [19] S. P. Overmyer: *Revolutionary vs. Evolutionary Rapid Prototyping: Balancing Software Productivity and HCI Design Concerns*. Center of Excellence in Command, Control, Communications and Intelligence (C3I), George Mason University, 4400 University Drive, Fairfax, Virginia.

- [20] Andrew Hunter & Ainslie Ellis (2000), *The Development Process for Courseware Material: A Computing Methodology Approaches*, Australia: Monash University
- [21] Hsuying C. Ward (2005), *The use of language experiences in teaching reading to students with severe learning disabilities*, Publication: The Reading Matrix
- [22] Aaron Simpson, (2008), *Grandmasters of Flash: An Interview with the creators of Flash*, Article Retrieved: April 14, 2009
<<http://coldhardflash.com/2008/02/grandmasters-of-flash-an-interview-with-the-creators-of-flash.html>>
- [23] Ms. D. M. Paramskas, (1983), *Courseware-software interfaces: some designs and some problems*, Publication: CALICO Journal
<<https://www.calico.org/a-213-Courseware%20%20Software%20Interfaces%20Some%20Designs%20And%20Some%20Problems.html>>
- [24] Mr Yew Kwang Hooi, (2009), *TAB4213 Multimedia System Slide: Instructional Design*, Malaysia: Universiti Teknologi PETRONAS
- [25] Requirement Analysis, (2009), Retrieved: April 14, 2009 from Wikipedia:
<http://en.wikipedia.org/wiki/Requirements_analysis>
- [26] Software Design, (2009), Retrieved: April 14, 2009 from Wikipedia:
<http://en.wikipedia.org/wiki/Software_design>
- [27] Kementerian Pelajaran Malaysia (2001), *Sukatan Pelajaran – Kurikulum Bersepadu Prasekolah Kebangsaan*, Kuala Lumpur: Pusat Perkembangan Kurikulum
<<http://sekolah.edu.my/kurikulum/prasekolah/sukatan-pelajaran-kurikulum-prasekolah-kebangsaan/>>
- [28] IQ Basic, (2007), *Anggota Badan Manusia*, Website Retrieved: September 17, 2009
<<http://www.iqbasic.com>>

- [29] Music Education, (2009), Retrieved: September 17, 2009 from Wikipedia:
<http://en.wikipedia.org/wiki/Music_education >
- [30] Pantun, (2009), Retrieved: September 17, 2009 from Wikipedia:
< <http://en.wikipedia.org/wiki/Pantun> >
- [31] Mardiana Idayu Ahmad (2005), *Mari Berpantun, siri kuda belang*, Malaysia:
Ferringhi Distributors