Courseware for Children with Dyscalculia: DyscalCo

By

Amirah Binti Khairul Anuar

Dissertation submitted in partial fulfilment of

the requirements for the

Bachelor of Technology (Hons)

(Business Information Technology)

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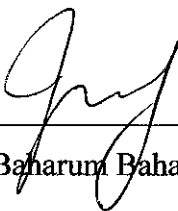
CERTIFICATION OF APPROVAL

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A project dissertation submitted to the

Business Information Systems Programme

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Approved by,

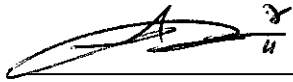
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(Dr Baharum Baharudin)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

September 2011

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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 been

undertaken or done by unspecified sources or persons.

AMIRAH BINTI KHAIRUL ANUAR

ABSTRACT

This project is about developing a Courseware for Children with Dyscalculia. Courseware can be simply defined as multimedia software. The main idea is to design a mathematic courseware for dyscalculic children in Bahasa Malaysia for pupils aged 7 to 9 years old. The courseware can be used as a learning aid for teachers and parents dealing with dyscalculic children. The courseware can also be used by the dyscalculic children as a reference method to improve their mathematics skill as the courseware is full with graphics, sound and video. Further details about the project will be explained in the chapters available in this report.

ACKNOWLEDGEMENT

First of all, I would like to say Alhamdulillah, thousands of gratefulness upon the Almighty Allah S.W.T, with his will I manage to complete my final year project successfully. I owe a great many thanks to great many people who helped and supported me during the completion of this project.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

Dyscalculia is a type of learning disability with problem in learning mathematics but still have a normal or above normal IQ [15]. Dyscalculia may be due to a dysfunction of the part of the brain that process numerical information [16]. The word dyscalculia originated from Greek and Latin and it can be simply defined as "counting badly". The first syllable "dys" comes from Greek and it means "badly". While the word "Calculie" comes from the Latin "calculare", which means "to count". The word "calculare" again comes from "calculus", which means "pebble" or one of the counters on an abacus. When a person has dyscalculia, we call them "dyscalculic" [15].

The significant symptoms that can be identified from dyscalculic people are namely these people having difficulties in following direction, for example, it will be hard for them to differentiate between left and right. They also find it hard to tell the time correctly, having difficulties in handling money and they also having a hard time to learn numbers with zero, for example, they may find it difficult to understand that the word ten, hundred and thousand have the same relationship to each others as the numerals 10, 100 and 1000 [17].

Dyslexia can be simply defined as difficulties in reading. Both dyslexia and dyscalculia are learning difficulties [18]. Researchers have been relating that people who have dyslexia will also have dyscalculia. According to a research, 50% to 60% of dyslexic do have difficulties with mathematics [17].

1.2 Problem statement

Based on several studies and observations, there are no official report indicated on the statistic of children with dyscalculia in Malaysia. But private and public institutions or schools that provide the proper teaching service for this type of children do exist although there are few of them in term of number. Examples of private institutions are Sri Rafelsia and Kidz Grow. While example of public school is the government primary school or Sekolah Kebangsaan (SK) that provide special class with special teaching approach for special group of children who have learning disability. Based on my interview conducted at Sekolah Kebangsaan Seri Iskandar, Perak, the teachers using books as a tool of activity and learning for children with dysclexia and dyscalculia. It seems that books failed to grab the attention of the student as there are some students who still have not improve their mathematics skill after years learning in that class.

1.3 Project objective

The objectives of this project are:

- **To develop a multimedia courseware in mathematic for children with dyscalculia in Bahasa Malaysia.**
The courseware can be used as a learning aid for teachers or parents who are dealing with dyscalculic children.

- **To study on learning method or theory of how the courseware can improve learning.**

For this project, VAK learning method will be used. Further detailed on this learning method will be explained in the next chapter.

1.4 Project scope

The scope of this project will be focusing on primary school children with dyscalculia age from 7 to 9 years old. The content of the courseware will be based on the book entitled LINUS Numerasi. LINUS (Literate and Numerate Program) is a program conducted by the Ministry of Education Malaysia on schools that have learning difficulties pupils.

1.5 Feasibility analysis

1.5.1 Technical feasibility

The courseware will be developed using Flash CS4, Adobe Photoshop CS4 and Sound Recorder software available in Windows. The developer is very familiar in using Adobe Photoshop and Sound Recorder while not very familiar in using Flash CS4. The solution to the unfamiliarity is by learning through video tutorials which help very much in developing this project. The system is believed can be completed within the time given.

1.5.2 Economic feasibility

This project does not cost a lot of money as it does not require the usage a lot of softwares and hardware.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

This chapter will discuss in detail about related literature review that has been published or written before to support this project. The project is about developing a courseware to assist children with Dyscalculia disability. The definition of Dyscalculia will further explain in this chapter.

2.2   Learning Disabilities

There are many types of learning disability namely dyslexia, dyscalculia, dysgraphia, dyspraxia (sensory integration disorder), auditory processing disorder and visual processing disorder [1]. For the purpose of this project I am going to focus on dyscalculia. This kind of disability is not commonly known by professionals like teachers and psychologist as compared to dyslexia. It is crucial to acknowledge this learning disability as over the time, people with dyscalculia will find themselves struggling in life as ability in mathematic is far more important as compared to ability in languages.

According to the Public Law (P.L.) of the Individuals with Disabilities Education Act (IDEA), learning disability is define as "disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations" [2]. It is vital to inform the person who is having the learning disability that they can learn eventually. Learning disability can be a lifelong condition and may affect one's life, therefore it is important to find a proper support and help to this problem. Another definition of learning disability or LD in short is a disorder that affects people's ability to either interpret what they see and hear or to link information from different parts of the brain. These limitations can many

in many ways for example, difficulties with spoken and written language, coordination, self-control, or attention [3].

There are three categories of learning disability. As shown below are two most important categories:

1.   Developmental speech and language disorders
2.   Academic skills disorders

2.2.1   Developmental speech and language disorders

Individuals with speech and language disorders have difficulty producing speech sounds, using spoken language to communicate, or understanding what other people say. It depends on the problem, the particular diagnosis may be:

- Developmental articulation disorder
- Developmental expressive language disorder
- Developmental receptive language disorder

Children with developmental articulation disorder may have trouble controlling their rate of speech. Or they may lag behind playmates in learning to make speech sounds. For example, a kid with this disorder may say "wabbit" instead of "rabbit" and "thwim" for "swim." Developmental articulation disorders are common. Luckily, this kind of disorder can be treated with speech therapy.

While some children with developmental expressive language disorder may having problem expressing themselves in speech. For example, a young girl who often calls objects by the wrong names has an expressive language disorder.

On the other hand, developmental receptive language disorder is a disorder where people have trouble understanding certain aspects of speech. For example, a toddler who doesn't respond to his name or a preschooler who hands you a bell when you asked for a ball. Their hearing is fine, but they can't make sense of certain sounds, words, or

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sentences they hear. Because using and understanding speech are strongly related, many people with receptive language disorders also have an expressive language disability.

2.2.2 Academic skills disorders

Children or students with academic skill disorders are usually fall behind their classmates in acquiring reading, writing and arithmetic skills. As shown below is the diagnoses in academic skills disorders category:

☐ Developmental reading disorder
- Developmental writing disorder
- Developmental arithmetic disorder

Developmental reading disorder or also known as dyslexia is learning disability with basic problem in processing auditory or visual information, or both. People with dyslexic problem may have difficulty with reading, spelling, understanding language they hear or expressing themselves clearly in speaking or writing [4]. Children with dyslexia must simultaneously:

- Focus attention on the printed marks and control eye movements across the page
- Recognize the sounds associated with letters
- Understand words and grammar
- Build ideas and images
- Compare new ideas to what you already know
- Store ideas in memory

Such mental juggling requires a rich, intact network of nerve cells that connect the brain's centers of vision, language, and memory. Dysgraphia or Developmental writing disorder is a neurological disorder characterized by writing disabilities. Specifically, the disorder causes a person's writing to be distorted or incorrect. In children, the disorder generally emerges when they are first introduced to writing. They make inappropriately sized and spaced letters, or write wrong or misspelled words, despite thorough

instruction. Children with the disorder may have other learning disabilities; however, they usually have no social or other academic problems. Cases of dysgraphia in adults generally occur after some trauma. In addition to poor handwriting, dysgraphia is characterized by wrong or odd spelling, and production of words that are not correct (i.e., using "boy" for "child"). The cause of the disorder is unknown, but in adults, it is usually associated with damage to the parietal lobe of the brain [5].

Developmental arithmetic disorder will be explained in detail in 2.3.

2.3   Dyscalculia

According to Kosc, developmental arithmetic disorder or dyscalculia is a structural disorder of mathematical abilities which has its origin in a genetic or congenital disorder in those parts of the brain that are the anatomical-physiological substrate of the maturation of the mathematical abilities adequate to age, without a simultaneous disorder of general mental functions [6]. A simpler definition of dyscalculia as described by the American National Center for Learning Disabilities is a term referring to a wide range of lifelong learning disabilities involving math. The difficulties vary from person to person and affect people differently in school and throughout life [7].

Some of the symptoms that can be found in children with dyscalculia include difficulties with [8]:

- Multi-step routines
- Recalling number or facts
- Ordering by sizes
- Symbol recognition
- Understanding numerosity (the number of items in a collection)

Children or students with dyscalculia may struggle with numerical operations, both in terms of understanding the process of operations and in carrying out the

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procedures. Farther difficulties may arise in understanding the systems that rely on this fundamental understanding, such as time, money, direction and more abstract mathematical, symbolic and graphical representations [9].

In Malaysia the statistic of children having Dyscalculia is undefined as compared to children with Dyslexia but there are quite number of awareness have been put to the society about this learning disability through websites and forum, for example, www.DisabilityMalaysia.com. There are also a few schools being opened to provide learning support and intervention for children with learning disability, like for example Sri Rafelsia School.

2.4   Technique used to teach children with learning disability.

Many approaches are available out there to assist children with learning disability. A teacher may use a combination of many approaches in class to create a lively and effective learning. There is no method like one approach fit all students because each and every approach is differently accepted by everyone. But this is also depends on parents and teachers of the children. If the parents can afford to send their children to a school with the right method of teaching then the child will get the right education, if not the parents have to accept the teaching method use in the public school.

Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves [10]. Therefore active learning is suitable for children to get them focus more during the activity conducted in class. Active Learning is anything that students do in a classroom other than merely passively listening to an instructor's lecture. This includes everything from listening practices which help the students to absorb what they hear, to short writing exercises in which students react to lecture material, to complex group exercises in which students apply course material to "real life" situations and/or to new problems [11]. Active learning is an important facet of a constructivist approach to instruction.

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When students are actively involved in the lesson, they learn and retain the information [12]. Such strategies are useful in motivating students with LD, who tend to me more passive learners because of their history of failure [13].

Another teaching method that has been proven effective for children with difficulties learning to read is multisensory teaching method. This method has been under the studies of the National Institutes of Child Health and Human Development. Multisensory teaching approach is helping a child to learn through more than one of the senses. Multisensory methods or also known as VAK Modalities has three learning styles namely, Visual, Auditory and Kinesthetic. Visual is the thing that which you see, Auditory is the thing that which you hear while Kinesthetic is the tactile, where the child touches and handles objects.

Most schools using either visual or auditory teaching method. But the best teaching method is to involve the use of touch and movement (kinesthetic). This will give the child's brain tactile and kinesthetic memories to hang on to, as well as the visual and auditory ones. For example, children with dyslexia tend to be confused over the direction of 'b' and 'd'. Therefore apart from teaching the children to differentiate the alphabet using visual and auditory teaching, the teacher can give the children the tactile experience by letting them to draw the alphabet on sand or using plasticine to mold the alphabet. This will involve the child using their arms, their sense of balance and their whole body. They will remember the day their teacher had them 'writing' on sand or using plasticine, and can use that memory the next time they come to write the letter [14].

2.5   Courseware for Dyscalculia

Courseware is a type of multimedia. Multimedia can be defined as modality of communication or multisensory interaction: visual (eyes), auditory (hearing), haptic (touch), olfactory (smell) and gustatory (taste) [tech1]. Applying computer-aided learning (CAL) in education is a good alternative as children with Dyscalculia need additional aid to support learning as compared to normal children [20].

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According to Singleton (2006) there are five principle advantages of computer assisted instruction for dyslexic children as following:

- Increase motivational value
- Individualized instruction
- Informative feedback
- Promotes active learning environment.
- Customization feature

[21].

This is supported by Michelle where she reported that computer can present information in ways in which teachers are unable; they can present information in multimedia format allowing users to select and experience new knowledge in text, graphics, sounds or video[Teacherless classrooms, issues in teaching using ICT].

Glendon mentioned in his journal that a carefully structured computer program are able to offer an alternative approach which builds on the successful features of traditional teaching methods. The successful features are, first, they can present text in a very highly structured way and can pace the introduction of new concept and skills depending on the progress the pupil makes through the programs. Secondly, they can provide aural feedback to the pupils and thirdly, they will continue to work patiently for as long as the pupil is prepared to keep trying.

Based on above researches and reports, it showed that computer or multimedia will never downplay the student's effort but will readily praise every success. This is the key to motivate the children with disability to keep trying until they have successfully learned [22].

CHAPTER 3

METHODOLOGY

3.1   Protoyping-based Methodology

Prototyping-based methodology will be used for the systems development life cycle (SDLC) on Courseware for Children with Dyscalculia. By using prototyping methodology, analysis, design and implementation will perform concurrently. User requirement for the system will be met during analysis phase. According to Dennis, A (2008), the key advantage of a prototyping-based methodology is that it very quickly provides a system for the users to interact with, even if it is not ready for widespread organizational use at first (19).   Prototyping methodology reassures the users that the project is working on the system and help to more quickly refine real requirements. Rather than attempting to understand a system specification on paper, the users can interact with the prototype to better understand what it can and cannot do. After the prototype is installed, refinement occurs until it is accepted as the new system.
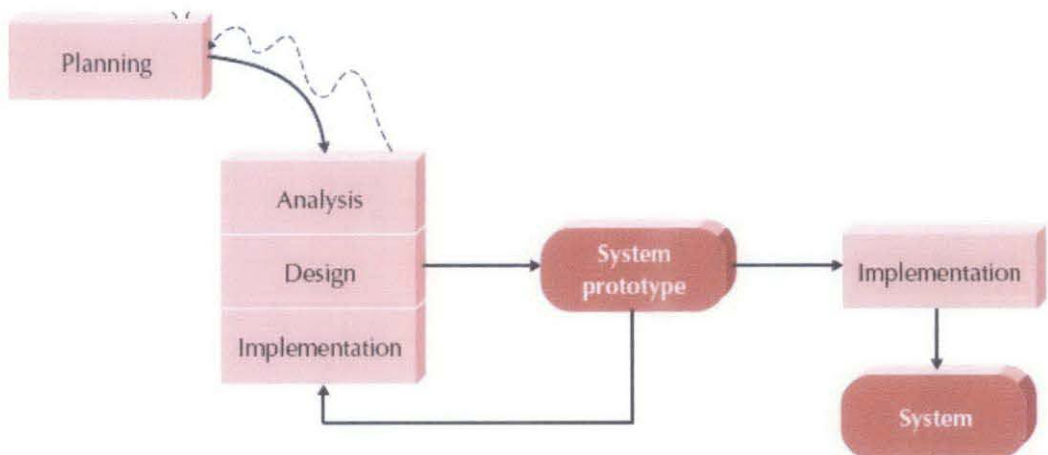
Figure 1: Prototyping-based Methodology

3.2 Research Methodologies

On the other hand, there is also a need to apply interview and survey research methodologies to gather related information for this project.

3.2.1 Interview

Interview will be carried out in order to know in depth details about the behaviors of dyscalculic children and also the school mathematics syllabus for children with dyscalculia.

3.2.2 Survey / Questionnaire

Survey is conducted on teachers, parents and also primary school children on familiarity with computer. The survey also intended to gather necessary information from the perspective of the user's on the requirements of courseware that is to be developed.

3.3 Tools Required

Some software and hardware are needed to make this project as a complete system. Possible software and hardware that will be used are:

Software:

- Adobe Flash CS4
- Adobe Photoshop CS4
- Sound Recorder

Hardware:

Manufacture : Acer

Model :   Aspire 5580

Processor :   Intel ™ Core ™2 Duo processor

System type : 32-bit Operating System

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Interview and Survey Results

Based on the interview conducted with Ms. Salma, dyscalculic program teacher from Sekolah Kebangsaan Seri Iskandar, she said that books are used as a tool of activity and learning for children. However there are few pupils whom their aged had exceeded the class age limit still being put under that class. The reason being is that these pupils have not improved their mathematics skill. It seems that the current learning tools and method had failed to grab the attention of the pupils' hence causing them to have a low motivation in learning. On the other hand, result from the survey showed that, children prefer interactive interface to increase their level of focus and to have better understanding in learning. Therefore the existing Courseware for Children with Dyscalculia is hoped to help student in term of learning and understanding mathematics in Bahasa Malaysia.

A survey had been conducted on parents and primary school teachers and also pupils on their familiarity of using computer and their acceptance of the Courseware. There were 40 people participated in the survey which consists of 12 teachers, 6 parents and 22 pupils. Below chart show the percentage of people participated in the survey.
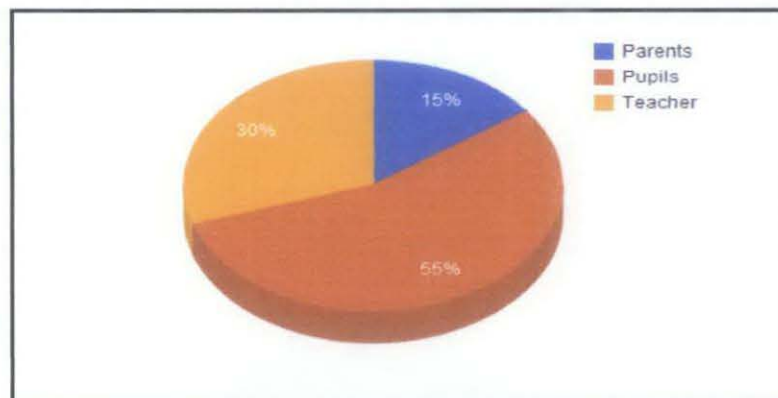

Figure 2

Out of 40 people, 32 of them own at least one computer at home as shown in the figure below. Although not all of them own at least a computer at home but all of them know how to use a computer.

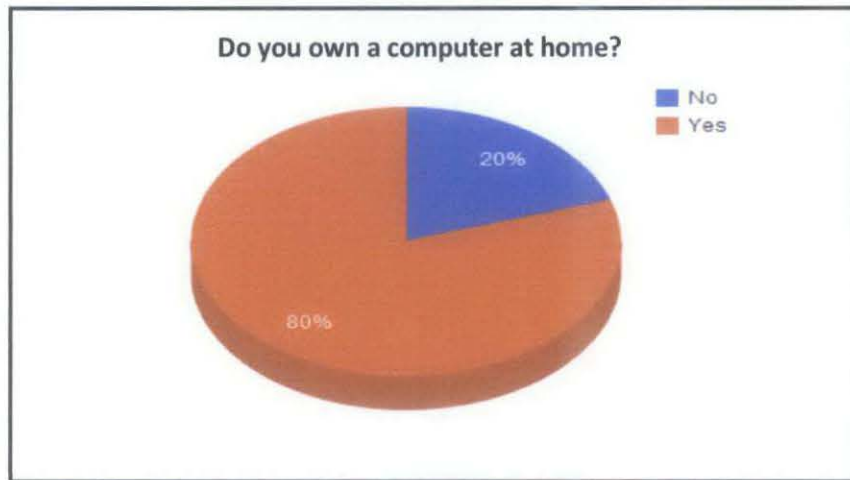**Do you own a computer at home?**

Figure 3

When asked about what they use computer for; most of the surveyed people answer they used computer for working/studying and surfing internet, 10 people use computer solely for surfing internet, another 10 people use computer solely for working/studying and the rest of the number use computer for solely for playing games, working/studying and playing games and working/studying, playing games and surfing internet.

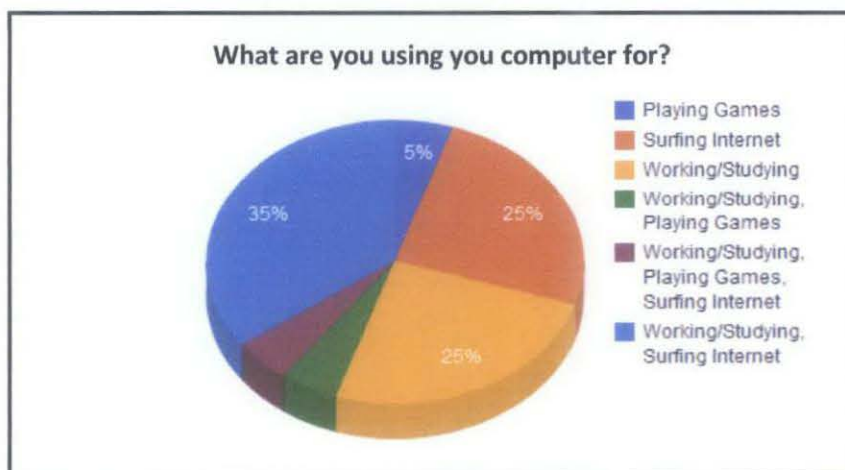**What are you using you computer for?**

Figure 4

The next questions asked about users' acceptance of the courseware. Users were asked to choose from scale 1 until 5 with 1 being the lowest while 5 being the highest to answer the question that followed. The first question is concerning about the readability of the text available in the courseware.18 people out of 40 scale the first question as very good while the rest scale as good.
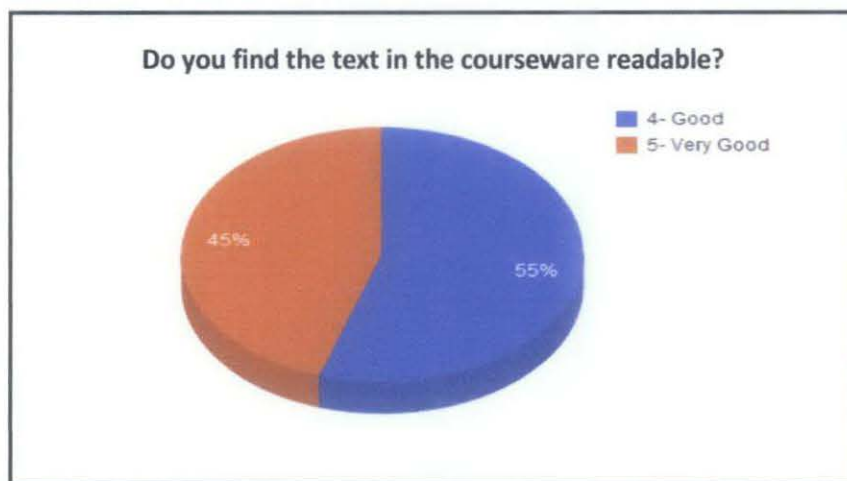

Figure 5

The second question is concerning about the suitability font color and size for children. 14 people answered very good, 24 answered good while others scale 3 where the font color and size does not affect them.
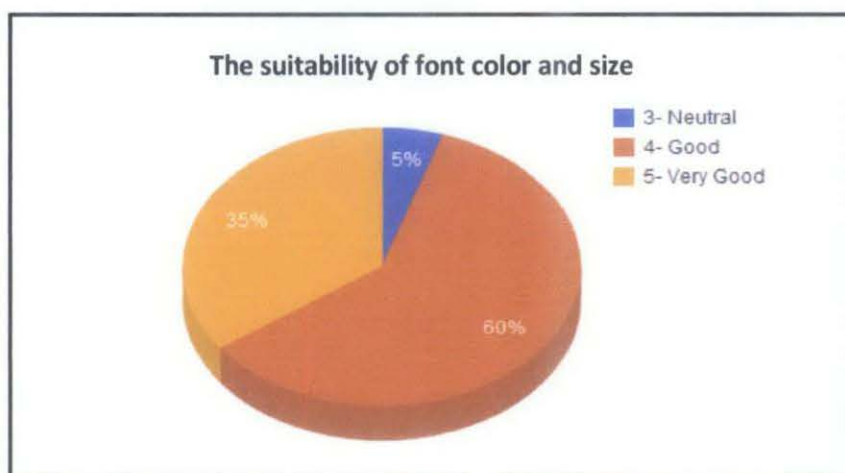

Figure 6

The next question is about the suitability of background color used in the courseware. 14 people answer very good, 24answered good and the rest scale as 3 where it does not affects them.

The suitability of background color

- 3- Neutral
- 4- Good
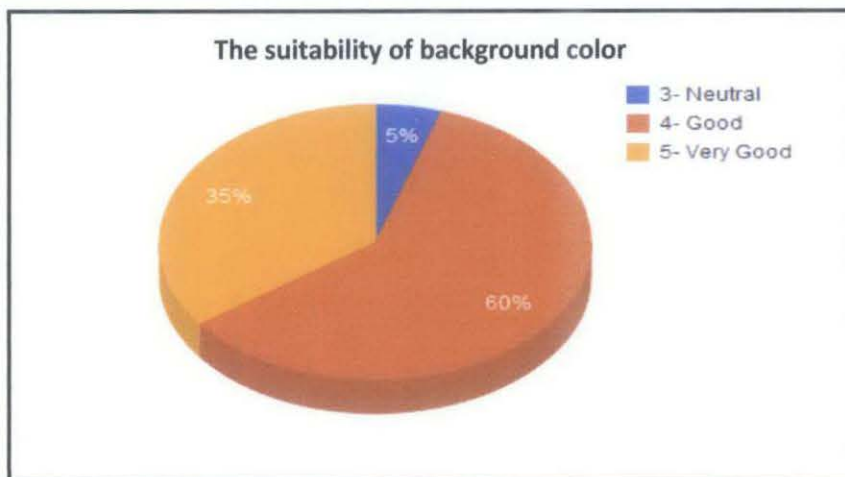- 5- Very Good

5%
35%
60%

Figure 7

Next question asked on whether the instructions found in the courseware is easy to understand. 10 people answered very good, 24 answered good and the rest scale 3 where it does not affect them.

Is the instructions found in the courseware is easy to understand?

- 3- Neutral
- 4- Good
- 5- Very Good

15%
25%
60%

Figure 8

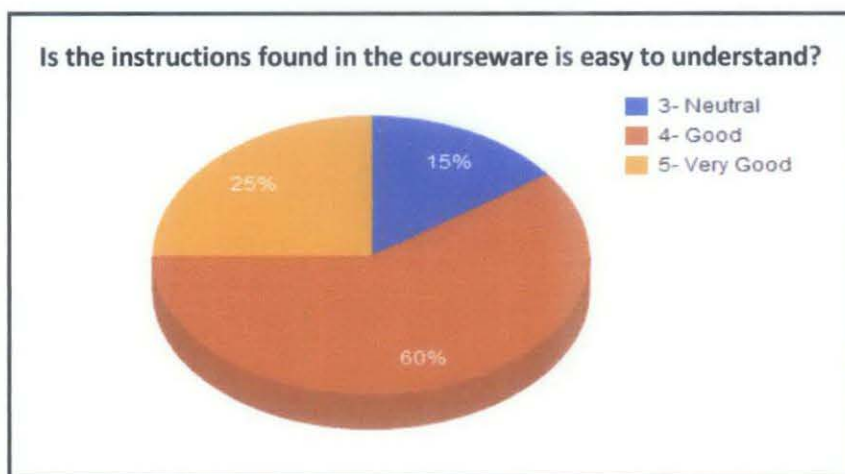The fifth question asked whether the topics covered in the courseware is capable of being understood and 16 scales as very good, 22 scales as good while the rest scale as 3 where it does not affects them.
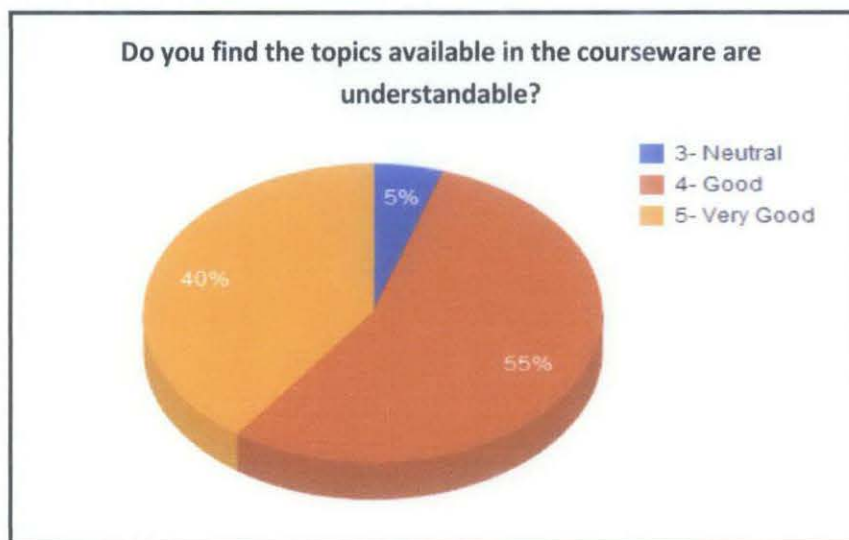

Figure 9

The sixth question is concerning about whether the courseware is fun and interesting.

Out of 40 surveyed people, 16 answered very good and the rest answered as good.
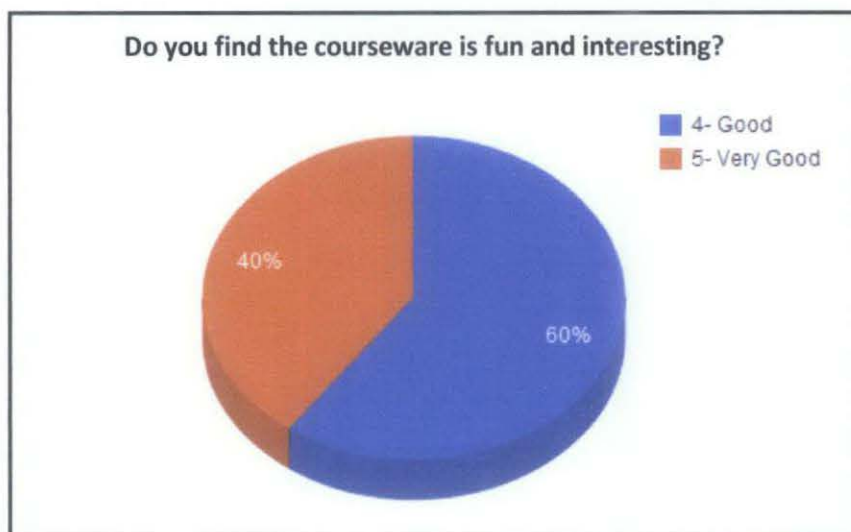
Figure 10

Next quest is concerning about the appropriateness of information available in the courseware for children. 20 people answered as very good, 18 answered as good while the rest scale as 3where it does not affect them.

Figure 11

The next question asking on whether the video and animation found in the courseware able to grab the users' attention. 26 people answered as very good, 12 answered as good while the rest scale as 3 where it does not affects them.
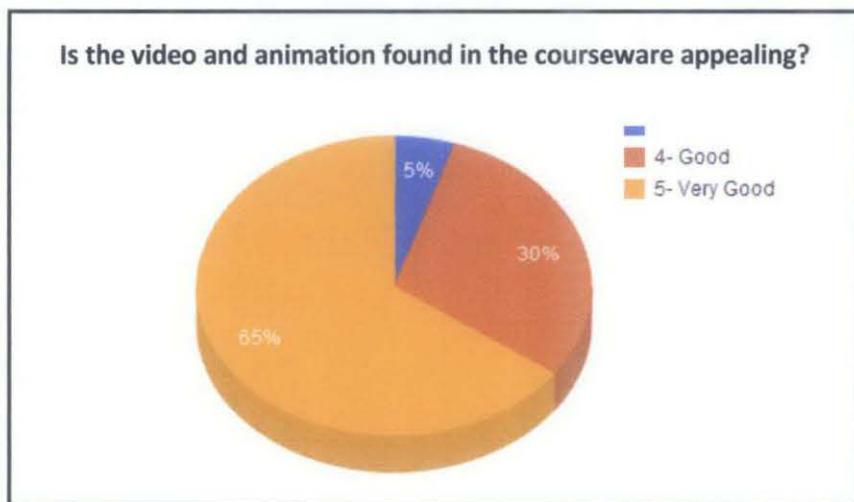
Figure 12

The final question is concerning about whether the buttons found in the courseware is easy to use. 12 people answered very good, 24 people answered good while the rest give a scale of 3 and 4 where it is not easy to use.
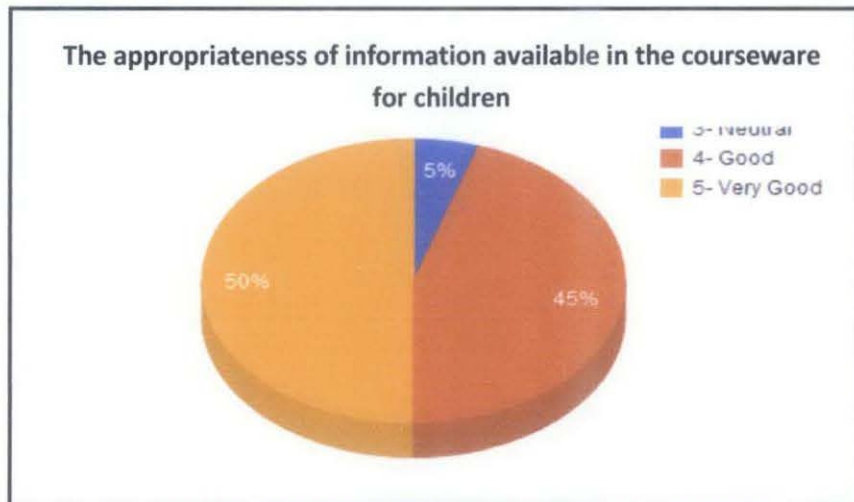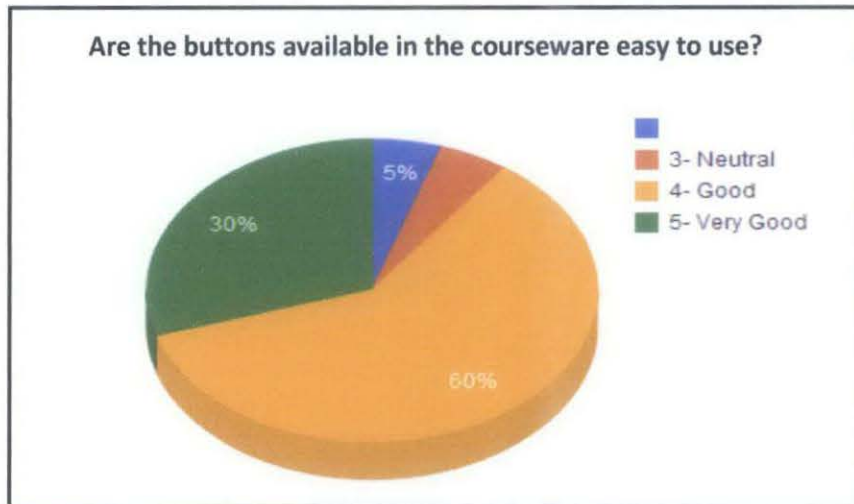

Figure 13

From the survey, it can be concluded that majority of the surveyed people know how to use computer therefore there is no issue in introducing the courseware to the target user as they are IT savvy. In term of user acceptance of the courseware, majority of them find the courseware is appropriate for children. The background color, video and animation are found appealing. All in all the courseware had successfully meet the objective of this project.

4.2 System Design: System Architecture
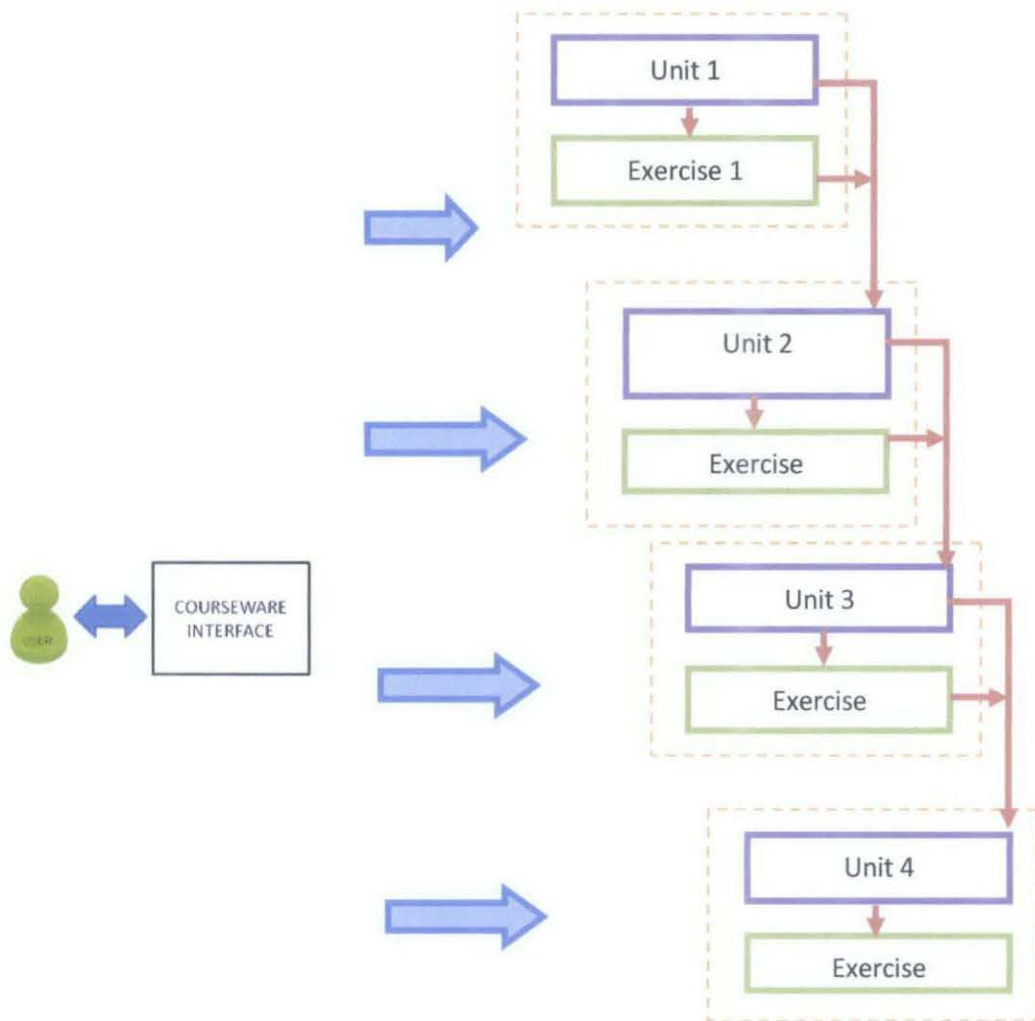
Figure 14: System architecture of Courseware for Children with Dyscalculia

The courseware will consist of 4 learning units and 4 exercises that suitable for Standard 1 to Standard 3 pupils aged from 7 to 9 years old. The modules are *Mengenal Nombor Bulat 1 Hingga 10* (Learn Number 1 Until 10), *Wang Hingga RM10* (Learn Handling Money Up to RM10), *Masa* (Time) and *Ukuran Panjang* (Measure). There are 4 exercises available for pupils to choose from according to their preferences. Student may do the exercise without learning the module or once they finish the module to enhance their understanding on the current topic.

Figure 15: Main Menu Page

In the main menu, user can choose either Unit 1: *Mengenal Nombor Bulat 1 Hingga 10* (Learn Number 1 Until 10), Unit 2: *Wang Hingga RM10* (Learn Handling Money Up to RM10), Unit 3: *Masa* (Time) and Unit 4: *Ukuran Panjang* (Measure). They also can choose either Latihan 1 (Exercise 1) to Latihan 4 (Exercise 4). After clicking on the desired module button, user will divert to the unit interface.

4.2.1 Unit 1: *Mengenal Nombor Bulat 1 Hingga 10* (Learn Number 1 Until 10)

In this unit, pupils will be teaching to learn number 1 until 10. Pictures of objects will be provided for number 1 until 10 to represent the amount of numbers. The pupils can also listen the pronunciation of each numbers when they move the cursor to the words. This unit also allows pupils to learn how to write number 3 by pointing their finger to the screen and following the animation on writing the number. This is in line with the VAK learning method that is to apply the kinesthetic learning method which involve the sense of touch or feel to improve the learning of children with learning disability.

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Figure 16: Unit 1 interface
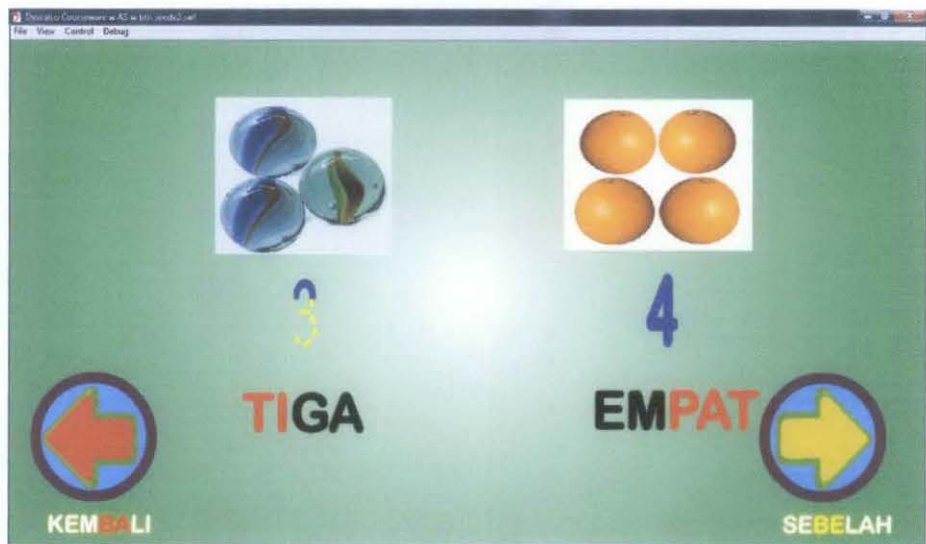
Figure 17: Unit 1 content

4.2.1 Unit 2: *Wang Hingga RM10* (Learn Handling Money Up to RM10)

In this unit, pupils will be learning on money handling up to RM10. This unit will be divided into learning about coins and learning about paper money. Coins covered are from 5cent to 5o cent while paper notes covered are from RM1 note to RM10. This unit is aim to let the pupils differentiate the different sizes of coins and the different colors of paper money.

Figure 18: Unit 2 interface

Figure 19: Unit 2 content (Coins)

Figure 20: Unit 2 content (Paper money)

4.2.3 Unit 3: *Masa* (Time)

In this unit, pupils will be teaching on how to tell the time. There is a clock available on each page telling the pupils what time is it now. The long hand which is red in color showing the minutes while the short hand which is blue in color showing the hour. Throughout this unit, the pupils will only be exposed to tell different time in hours only and not in minute since the target user for this courseware is pupils' age 7 to 9.

Figure 21: Unit 3 interface

Figure 22: Unit 3 content

4.2.4   Unit 4: *Ukuran Panjang* (Measurement)

In this unit, pupils will be teaching to differentiate the sizes of objects. They will be exposed to differentiate between big and small objects, long and short objects and high and low objects. Below are few screen shots of Unit 4.

Figure 23: Unit 4 interface
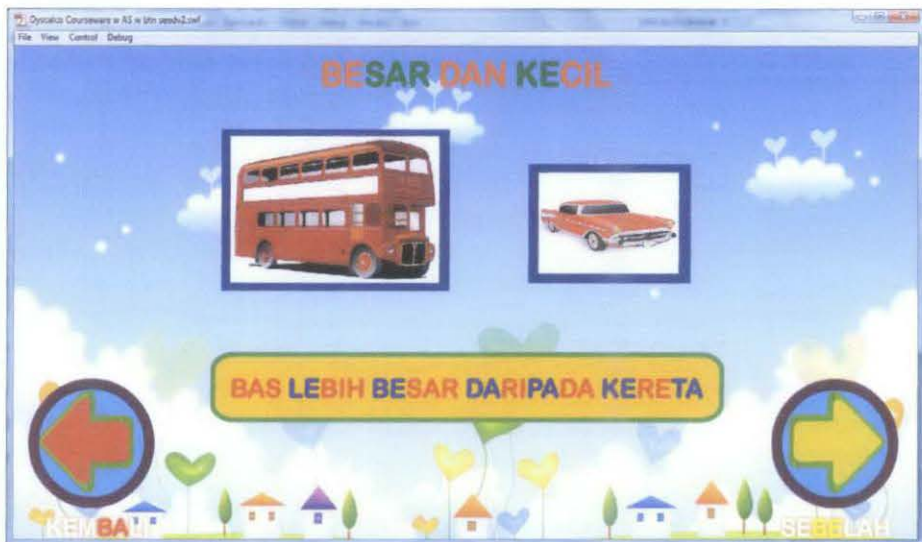
Figure 24: Unit 4 content (Big and small size)

4.2.5 *Latihan 1* (Exercise 1)

In the exercise, pupils will experience watching video and at the end of the video a question will be asked on the quantity of objects found in the video. While on the next page of the exercise, pupils can put the answer into an input box. If the pupils answer the question correctly a message will prompt to congratulate them while if the answer is wrong a message will prompt to let them try doing it again with the correct answer.

Figure 25: Exercise 1

Figure 26: Exercise 1 result

4.2.6 *Latihan 2* **(Exercise 2)**

In this exercise, user has to determine or choose which coins or paper money that represents the value of the objects as shown. If the pupils answer the question correctly a message will prompt to congratulate them while if the answer is wrong a message will prompt to let them try doing it again with the correct answer.

Figure 27: Exercise 2

4.2.7 *Latihan 3* (Exercise 3)

In this exercise, user has to choose what time is it by looking on the position of the short hand as shown below. If the pupils answer the question correctly a message will prompt to congratulate them while if the answer is wrong a message will prompt to let them try doing it again with the correct answer.
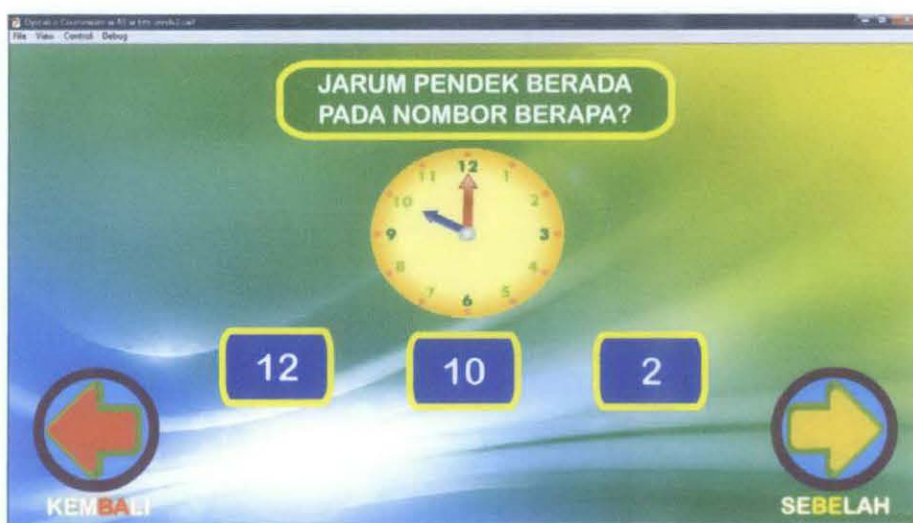
Figure 28: Exercise 3

4.2.8 *Latihan 4* (Exercise 4)

In this exercise, user will learn to differentiate between left and right by comparing the sizes of two objects. Questions will be ask on the sizes of the objects that available on the right and left hand side of the screen and the user will have to answer by choosing left or right. If the pupils answer the question correctly a message will prompt to congratulate them while if the answer is wrong a message will prompt to let them try doing it again with the correct answer.

Figure 29: Exercise 4

CHAPTER 5

CONCLUSION

The goal of this project is to develop a multimedia courseware in mathematic for children with dyscalculia in Bahasa Malaysia. With the right used of learning method such as VAK learning method, it is hope that it can improve the mathematics skill of pupils in primary schools. The interactive courseware which contains videos, graphics and animation will provide alternative means of learning for students with dyscalculia to pull in their attention in learning mathematics. According to Shaywitz, IT does help children with dyscalculia learning; therefore I hope that in the future, a lot of research being conducted to help these children.

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APPENDIX

SURVEY QUESTIONS

Nama:_____

Bahagian A: Maklumat Berkaitan Pengisi

(Pilih satu jawapan sahaja)

1. Anda adalah seorang..
   o Ibu bapa
   o Guru
   o Ibu bapa dan Guru
   o Murid
     Lain-lain:_____

2. Jantina
     o Lelaki
     o Perempuan

3. Sila nyatakan umur
   Umur:_____

4. Anda mempunyai computer atau laptop (komuter riba) di rumah?
     o Ya
     o Tidak

5. Tahu menggunakan computer
     o Ya
     o Tidak
       Lain-lain:_____

6. Menggunakan computer untuk..
     o Bekerja/Belajar
     o Bermain 'games'
     o Melayari Internet
       Lain-lain:_____

*Jika anda tanda sebagai Ibu bapa pada soalan 1, sila jawab soalan ini

7. Adakah anda bekerja?
   o Ya
   o Tidak

Bahagian B: Maklumat berkenaan pendedahan murid kepada Multimedia Courseware
(Untuk diisi oleh guru dan ibubapa)

1. Adakah anda meggunakan bantuan pembelajaran untuk mengajar kanak-kanak?
   o Ya
   o Tidak

2. Jika Ya, apakah jenis bantuan pembelajaran itu?
   o Berkaitan computer (software, powerpoint slide)
   o Buku
   Lain-lain:_____

3. Adakah anda mempunyai anak?
   o Ya
   o Tidak

4. Jika Ya, adakah anak anda menggunakan computer di rumah?
   o Ya
   o Tidak

5. Adakah anak anda menunjukkan minat ketika belajar dengan menggunakan computer?
   o Ya
   o Tidak

6. Jika Ya, adakah anda pernah menggunakan Multimedia Courseware yang terdapat di pasaran?
   o Ya
   o Tidak

7. Jika Ya, apakah jenis Multimedia Courseware itu?
   o Huruf (Cth: ABCDE)
   o Nombor (Cth: 12345)
   o Buku cerita

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Lain-lain:_____

8. Apakah pandangan anda tentang Multimedia Courseware?
   o Membantu
   o Sangat Membantu
   o Neutral
   o Tidak Membantu

Bahagian C: Berkaitan Dyscalco

(Pilih satu jawapan sahaja)

Sila nyatakan skala untuk soalan di bawah (1-Sangat Tidak Bagus 2-Tidak Bagus 3-Neutral 4-Bagus 5-Sangat Bagus)

1. Kesesuaian penggunaan tulisan dalam Courseware ini? (font, size, color)

   o 1

   o 2

   o 3

   o 4

   o 5

   Komen:_____

2. Adakah tulisan mudah untuk dibaca?

   o 1

   o 2

   o 3

   o 4

   o 5

Komen:_____

3. Kesesuaian pada penggunaan warna

- o 1
- o 2
- o 3
- o 4
- o 5

Komen:_____

4. Adakah penggunaan video dan animasi menarik minat anda?

- o 1
- o 2
- o 3
- o 4
- o 5

Komen:_____

5. Adakan arahan/objektif yang terdapat di dalam Courseware mudah difahami?

- o 1
- o 2
- o 3
- o 4
- o 5

Komen:_____

6. Adakah anda memahami topic yang di ajar?

- o 1

- o 2

- o 3

- o 4

- o 5

Komen:_____

7. Adakah butang yang terdapat di dalam Courseware mudah di gunakan?

- o 1

- o 2

- o 3

- o 4

- o 5

Komen:_____

8. Adakah Courseware ini menarik perhatian anda?

- o 1

- o 2

- o 3

- o 4

- o 5

Komen:_____

9. Adakan maklumat di dalam Courseware sesuai untuk kanak-kanak?

      o   1

      o   2

      o   3

      o   4

      o   5

Komen:_____

Pendapat/pandangan anda tentang Cousreware ini. Sebarang cadangan amat dialu-alukan:

GANTT CHART

No	Detail/Week	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
1	**Project Title Selection**	█	█	█												
	Discussion with supervisor															
	Search through research title of past FYP projects															
	Research on possible project															
	Propose new project title															
2	**Project Development**				█	█	█	█	█	█						
	Data gathering through interview and survey															
	Search related information through journals, books and internet															
	Develop the courseware															
	Learn how to use Flash software from video tutorials															
3	**Progress Report Submission**											●				
4	**Pre-EDX**											●				
5	**Submission of Dissertation**												●			

Legend
█ Process
● Milestone

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