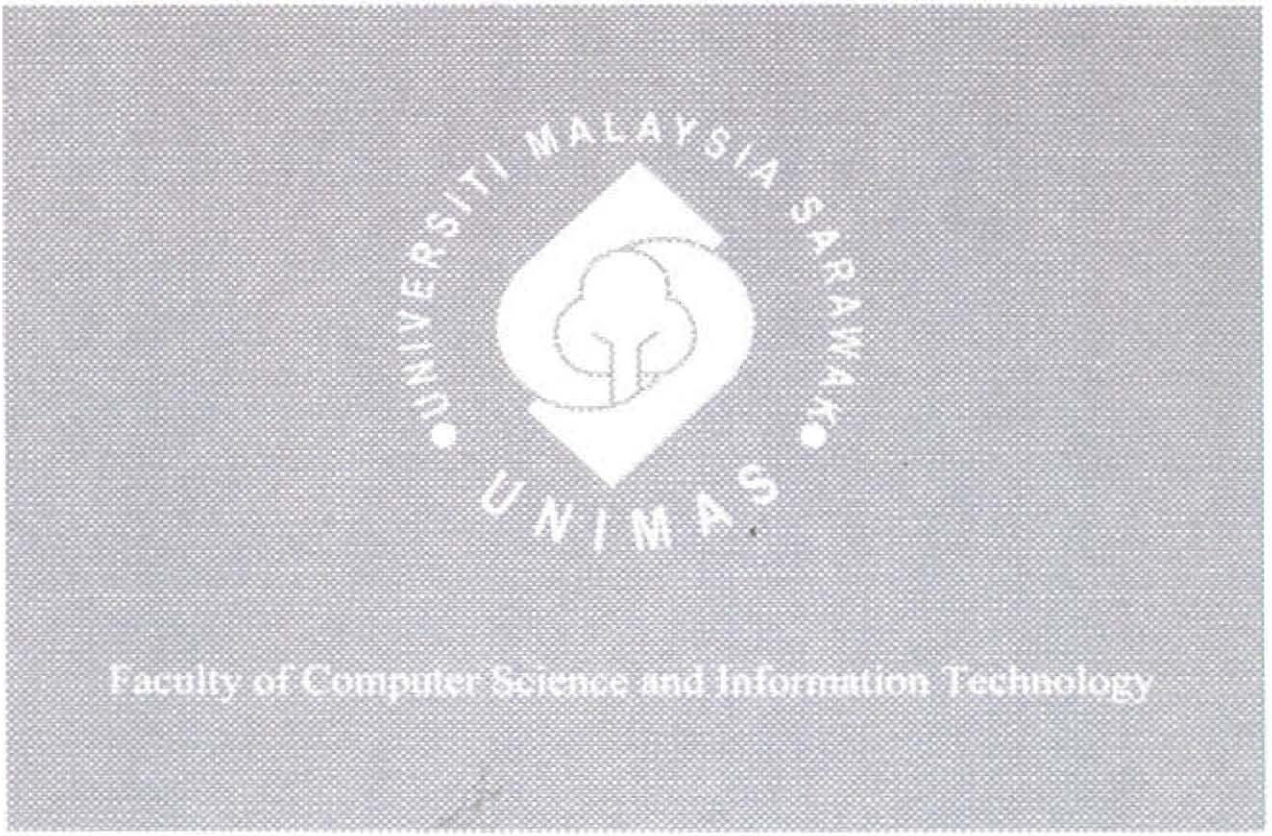


# *MATHFUN-LEARNING MATHEMATICS FOR GOVERNMENT PRIMARY SCHOOL YEAR 1 STUDENTS USING ANDROID APPLICATION*

Tilaga Kunasakaran

(33303)

Bachelor of Computer Science with Honors
(Software Engineering)
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# MathFun-Learning Math ment Primary School Year 1 Studen plication

TILAGA KUNASAKARAN

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(SUPERVISOR'S SIGNATURE)

Norfadzlan bin Yusup
Pensyarah
Fakulti Sains Komputer dan Teknologi Maklumat
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# ABSTRACT

Mathematics is one of the important subject that is being thought in the primary school in Malaysia. According to the new Kurikulum Standard Sekolah Rendah (KSSR) syllabus the students have to master a particular skill in a chapter before moving to the next chapter. Currently, the students in Year 1 of the primary school are facing some problems in learning mathematics. So, this project is aimed to assist the students in learning and acquiring the necessary knowledge in mathematics. The Android application developed in this project can assist the students to learn some basic concept of mathematics like recognizing numbers, writing the numbers correctly in words and digit, addition and subtraction concept and problem based mathematics questions. The students can learn more as the application is designed to be interactive and uses various form of multimedia elements that can provide a enjoyable learning process. The content of the application is in Malay language which is parallel with the syllabus of Year 1 Mathematics.

# *ABSTRAK*

*Matematik merupakan salah satu subjek penting yang diajar di semua sekolah rendah di Malaysia. Berdasarkan sukatan pelajaran Kurikulum Standard Sekolah Rendah(KSSR), pelajar harus menguasai kemahiran dalam satu bab sebelum mempelajari bab-bab yang lain. Berdasarkan kajian, pelajar Tahun 1 masih mengalami masalah dalam memahami konsep asas dalam matematik. Jadi, projek ini dibangunkan untuk membantu pelajar dalam mempelajari dan mendapat pengetahuan yang lebih luas dalam matematik. Aplikasi Android ini dapat membantu pelajar untuk belajar konsep matematik seperti mengenal nombor, menulis nombor dalam angka dan perkataan, konsep tambah dan tolak dan cara untuk menyelesaikan masalah yang melibatkan ayat matematik. Pelajar akan berasa lebih cenderung mempelajari matematik menggunakan aplikasi ini kerana penggunaan pelbagai elemen multimedia dalam aplikasi ini yang dapat mewujudkan suasana pembelajaran yang lebih seronok. Selain itu, aplikasi ini menggunakan Bahasa Melayu yang selaras dengan sukatan pelajaran bagi pelajar Tahun 1.*

# CHAPTER 1

# INTRODUCTION

## 1.1 Project Title

MathFun-Learning Mathematics For Government Primary School Year 1 Students Using Android Application.

## 1.2 Introduction

Hom (2013) stated that "Mathematics is the science that deals with the logic of shape, quantity and arrangement". Mathematics helps us to understand the world that we are living in today. It is essential to learn mathematics as we can manage our money and solve many problems that occur in our daily life. The knowledge of mathematics should be acquired by all children at early preschool level so that they will be able to use mathematics in their daily life without any problems. It is also important for them to master mathematics so that they can have a promising career in future as most of the jobs like in engineering field, accounting and science related studies require advanced mathematics skills and knowledge. According to Nautiyal (2012), technology sectors depend on mathematics application directly or indirectly and the advancement of technology is impossible without mathematics.

In Malaysia, children that join the primary school Year 1 will be introduced to some of the basic concept of mathematics like whole numbers, addition, subtraction and money. The students will be first exposed to numbers from 1 to 100 so that they can use the numbers to carry out operations like addition and subtraction. The school uses the textbook as a primary

source to teach the children. The Ministry of Education Malaysia has introduced KSSR (Kurikulum Standard Sekolah Rendah) for the students in primary school to improve the current syllabus and to ensure that the students are occupied with the necessary knowledge, skills and values which is important to face the challenges of the 21st century.

Various ways have been used to learn mathematics. An easier way of learning mathematics is by using fingers and toes for doing simple calculations. Pebbles, twigs, counting board and abacus are used to handle more complex calculations. In this modern day, the power of technology made the learning process become much easier. Children can start learning mathematics using applications installed in computers and mobile devices. These applications help the children to learn, understand and add more fun while learning mathematics.

### 1.3 Problem Statement

As learning mathematics is considered to be an important knowledge, the concept of mathematics should be properly delivered so that the students will not face difficulties in understanding the concept. The students need a tool that basically helps them to learn mathematics in a more advanced and interactive way. Based on an interview conducted with Mr. Osman Bin Edi, a teacher in Sekolah Kebangsaan Dato Traoh Muara Tuang, it is known that the students of Year 1 are facing a few problems in learning mathematics. The problems are divided into few categories such as human, technology and teaching pedagogy.

All the problems mentioned regarding the students learning ability are related to human factor. One of the problems is that the students are unable to recognize numbers. For example, writing the numbers upside down and in a different pattern from a normal way of writing and writing the numbers in incorrect order. Apart from that, students face problems in recognizing

and putting information in a logical sequence. For example, they have difficulties to determine which operation to be carried out in a problem statement question and solving it step by step. To be specific, the skills for them to solve a problem based mathematics question are still low. Besides, it is understood that the students are making mistakes in terms of spelling when writing the numbers in words.

As for the technology factor, there are very less android based applications available for the students in Year 1 to learn mathematics especially in Malay language. For the teaching pedagogy factor, the traditional way of teaching like using flash cards is not very interactive for the students. There is no two way communication as the students just flip the manila cards to learn numbers and it is not attractive as well because there is no multimedia elements used which can cause the students to easily lose focus.

### 1.4 Objectives

The objectives of this project are:

1) To design and develop an android application where the students of Year 1 can learn mathematics.
2) To design games so that the student can have more interaction and fun while learning.
3) To improve understanding of students in learning mathematics by providing math based questions.

## 1.5 Methodology

Methodology is a schema used by the developers to properly structure, plan and manage the process involved in developing a system or applications (*Software Development Methodology*, n.d.). Choosing the correct model for developing software and applications is necessary as it has great impact on the success of the project. Rapid Application Development (RAD) methodology is used to develop the application in this project. The reason for the selection is due to time constraint. As the time given for developing the application is short, Rapid Application Development is chosen to be the suitable development methodology for this project.

James Martin introduced RAD in the year 1991. RAD emphasizes more on the development compared to the planning part and this eventually accelerates the development of the system. Rapid Application Development focuses mainly on the methodology, people, management and tools which according to Martin are given importance for the faster development of the system (Agarwal et al., 2000). The user involvement will be throughout the RAD cycle so that the requirements are clearly understood. A prototype will be developed that is presented to users so that they can give comments on the functionality and necessary changes can be made. There are four main stages in RAD lifecycle to make sure that the developers are building the system that is only required by the user (*What is Rapid Application Development?*, n.d.).

The four main stages in RAD are:

a) **Requirements Planning**. The requirements are listed as well as the project scope. The required entities are also identified in this stage. In this project, the requirements are obtained from the Mathematics teacher in Muara Tuang and Dato Mohd Musa primary school to identify the necessary functions that can be included in the application.

b) **User Design**. The prototypes developed during this phase represent all the inputs, output and processes done by the applications. For this project, the obtained requirements will be transformed into logical statements. Unified Modelling Language (UML) will be used to describe the requirements.

c) **Construction**. Developer will work together with the users to come up with the final design of the applications. The necessary documents and instructions for the application to operate are created at this stage. The coding for this project will be developed using the Java language once the design is confirmed.

d) **Implementation**. The application is installed after finalized. The user will have to do the testing and necessary training is provided to the user. For this project, the application will be tested by choosing a few students in the school to use it. The students will be guided on how to use the application.

## 1.6 Scope

The scope of the project includes:

a) The application is designed mainly for the Year 1 primary school students to learn mathematics.

b) The application can be only used in an android based smartphone or tablets.

c) The content of the application will be based on KSSR syllabus.

## 1.7 Significance of Project

The application allows the students to understand and follow the correct way of writing the numbers. This minimizes the mistakes they make when writing the numbers. The application also enables the students to write the numbers in words correctly without making spelling mistake. The application comprises questions in the form of quiz that can help to improve the student's understanding on mathematics. This quiz helps them to recognize on the mistakes they have made after answering the questions. Apart from that, the application comprises games that basically help the students to get more involved in the learning process as multimedia elements like sound, images and text will be used in the games.

## 1.8 Project Schedule

Please refer to Appendix A for the project schedule.

## 1.9 Expected Outcome

The expected outcome of this project is an android application for the students to learn mathematics by providing attractive graphics and sounds that enable a more interactive and engaging learning. Moreover, the students can learn and write numbers properly by using the application. The students will be able to receive feedback for the inputs so that the learning process will be more interactive. Mathematics based questions in the applications will be used to test the understanding of the students and they can view the scores at end of the activity.

## 1.10 Summary

In conclusion, this chapter includes project's title, problem statement, objectives, methodology, significant of the project and also the expected outcome. The project is aimed to develop an android application for the students of Year 1 in the primary school to learn Mathematics. The application enables the students to learn and also test their understanding on a particular concept by doing the mathematics based questions. The students can view their scores after they have finished an activity. Also the application includes games which can add more fun in their learning process.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Introduction

This chapter mainly focuses on comparison of the existing application with the proposed application. Other than that, effective pedagogy practices in teaching mathematics and an overview of mobile based application is also included in this chapter. Also the chapter includes the impact of multimedia in learning process, the use of mobile devices for learning mathematics and an overview of the proposed application. A table is used to represent the comparison of the existing applications. A summary of the chapter in overall is included at the end of this chapter.

## 2.2 Effective Pedagogy Practices in Teaching Mathematics

Pedagogy can be defined as the combination of skills and knowledge that are essential for an effective learning process. Chapuis (2003) mentions that pedagogy can be described as the science or art of teaching that creates a variation between the intellectual and social growth of students. Few pedagogy practices have been identified which can affect the student's learning process.

One of the effective practices in teaching mathematics is classroom community (Anthony & Walshaw, 2009). It is found that an effective teacher aid in learning process by caring about students involvement. The teachers encourage classroom relationship by making the students to think, ask questions and to take some intellectual risks. The activities carry out in the

classroom is very important in developing the student's mathematical thinking. The teachers provide opportunity for all the students to scuffle with mathematics. The developed relationship in classroom becomes the source in improving the students' competencies and integrity.

The second practice is arranging for learning. The teachers need to provide a working arrangement for the students that can be responsive for their needs (Anthony & Walshaw, 2009). The students sometimes need to work independently away from other student's clashing context. At other times, the students work in a group with their partner or peers that provide context for allocating ideas and for learning with each other. The group arrangements are helpful in interchanging and testing ideas and developing a higher level of thinking besides boosting engagement.

Tools and representations used in teaching mathematics are also important. Effective teachers use various tools that can aid in student's mathematical development. Tools like graphs, diagrams, models, images, stories, textbooks and technology can support and enhance mathematical reasoning and sense making. Student's conceptual and computational flexibility can be improved by giving them access to various representations (Anthony & Walshaw, 2009). These tools can assist in communicating ideas that are difficult to be expressed. The technological applications like interactive whiteboard, digital and mobile technologies and the Internet can provide an opportunity for students and teachers to communicate, represent and analyze mathematical concepts.

Teachers also make connections between different ways of solving problems that can help the students in understanding mathematical concept. The students have to develop the understanding of how the concepts are connected to other mathematical ideas in various ways (Anthony & Walshaw, 2009). Teachers help students in making connections by using an array