

## Arithmetic Learning of Mathematics for Primary School Student Using Virtual Technique

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**Abstract:** Mathematics could be categorized as a tough subject and lack of enjoyment in doing a calculation. Students need to learn this subject at earlier age. Mathematics also very important to be apply in daily life, kids need to know the operation of mathematics to help them apply in life. This paper considers an alternative way to help kids using the technology of internet and computer for educational purpose. Study had been considered to identify the learning method that best suited for kids on arithmetic and develop the web-based learning application for primary school students. Furthermore, teacher and student can have real time communication using this application to follow up the student activity and progress. The project builds with Virtual Learning Environment (VLE) structure to make sure the application meets the aim of the project. The content in the application consist of attractive graphical question and selective question. The level of question based on age of student where they face difficulty in adapting to the complexity. The understudies found that utilizing innovation in accomplishing numerical training with the end goal of structure mental activities and encouraging inventive learning. Waterfall model is a System Development Life Cycle (SDLC) where the project is developed through a series of different stages. The function waterfall model is to reduce the risk before going to the next stage and a most known methodology. These findings have significant implications for the web application of education. It appears that this method of produces a superior internet service to education purpose.

**Keywords:** *Mathematics, Arithmetic, Web-based Learning Application, Primary School*

### INTRODUCTION

Most students think Mathematics is very difficult subject to study. Although, many countries have this same problem as well as Malaysia. Mathematics could be categorized as at tough subject and lack of enjoyment in doing a calculation. Students need to learn this subject at earlier age. Primary school students in Malaysia will sit for the Ujian Penilaian Sekolah Rendah (UPSR) at the end of Standard 6 and Mathematics is one of the subjects to study for examination. Although the medium of instruction is different, all schools follow a national mathematics curriculum, and all pupils sit for a national examination, the Primary School Achievement Test or UPSR at the end of the six years of primary schooling [1]. Mathematics also very important to apply in daily life, kids need to know the operation of mathematics to help them apply in life. [2] says,

while children who are numerate can apply the math and problem-solving skills, they have to problems that are like the ones they have already solved, mathematical mastery prepares youngsters to combine the tools they already must solve problems unlike ones they have seen before.

Fewer students at primary school in Malaysia had some to understand the mathematics in class. [3] reported that new students particularly those in pre-school, often find it difficult to understand the mathematics learning process, especially those that involve numbers and basic operations such as addition and subtraction. So, this web application is developed to help student response to question faster and get true answers, they need more exercise to be solved as many times. The best and easiest way to train is by providing the graphical, interactive virtual e-learning environment instead of writing on paper.

Nowadays, computer is the most useful technology in world for any purpose. The involvement of computer in education also can help student to focus on the study. Information and Communication Technology (ICT) is important in primary education because it enables kids to search for the information they need and to organize what they have found. As children progress through the school system, they become increasingly responsible for their own learning. Many believe that ICT needs to be better integrated into curriculums, so all schools produce computer literate, independent learner [4].

### **PROBLEM STATEMENT**

Students have some problems to understand math at school, do not attractive learning in class. They also feel lazy to do homework on textbook or exercise book. They have difficult to learn the subject in class because teacher can't focus to each of everyone in the class. Students have difficulty to score the mathematic subject, do not have any attraction to study at class because they do not understand easily on the lecture given. In the nutshell, student could not score the subject even they need to solve the basic operation. Therefore, this arithmetic virtual learning will be the best alternative to help student to learn easily especially for operation about money in mathematics, then introduce to education method using ICT technology.

### **OBJECTIVE**

The objective that needed to be accomplished from this study which are:

- 1) To identify learning that best suited for level one primary school student on arithmetic in mathematics subject.
- 2) To develop web-based learning application for primary school students to learn arithmetic via virtual technique.
- 3) To test and evaluate the propose web-based system for learning arithmetic via virtual technique.

### **SIGNIFICANT STUDY**

The significance of this research is to provide a different way to learn, practice and sharpen the primary school student's arithmetic skill while using mathematics via virtual technique. At the same time,

it will motivate them to love mathematics. If students enjoy doing mathematics, it will encourage them to learn Mathematics most, these also will help teachers to teach their students easier and score Mathematics in exam.

The other benefit is student can calculate and solve the question shorter given time then can focus on the next question by involving an effective virtual learning technique. This is to provide a supplementary tool for students in improving their Mathematics skill and increase their level of excitement without avoiding the normal traditional learning methods from classes and textbook. In addition, to exposes their level how to solve mathematics problem step by step for any arithmetic calculation.

### **LITERATURE REVIEWS**

Mathematics is an essential discipline nowadays. It is a powerful tool for understanding the world around and our perspective of the important issues facing in life. Mathematics is the science that deals with the logic of shape, quantity and arrangement. It is the block for everything in our daily lives, including mobile device, computer, architecture, art, money, engineering and even sports. Teachers should be aware of students' affective beliefs and inter relations of those in learning mathematics to employ more effective strategies in teaching and to improve students' skill by reducing their negative beliefs [5]. In mathematics, to accomplish the outcome for any calculation, students need to have accurate steps must be followed and get the result. The discipline of mind that students learn in math class can be apply into daily life. When shopping, have your child compare prices, estimate the total for several purchases, or estimate the change you'll receive back [6].

Besides, learning arithmetic is a branch of mathematics that deals with properties of the counting (and whole) numbers and fractions and the basic operations applied to these numbers. This might surprise, but the words "arithmetic" and "math" don't mean the same thing. They are, of course, related: arithmetic is math, but math is not arithmetic. In other words, arithmetic is a branch of mathematics, specifically, the part that has to do

with counting and figuring out how to work with and manipulate numbers like integers and fractions. Build this project also to help students' mental arithmetic or known as mental calculation that consist of arithmetical calculation using human brain without support from any tools such as pencil and paper or devices such as calculator. Mental calculation is faster than other calculations even in a competitive context, always involves the use of specified methods to solve problem. [7] Reported that two experiments to test the impact on the memory span of mental abacus training. Subjects were divided into two groups of mental abacus learners and non-mental abacus ones. In Experiment 1, subjects were requested to finish five tests involving forward digit span, backward digit span, non-word span, operation span, and complex spatial span. In Experiment 2, subjects were asked to perform the primary and secondary tasks. Primary tasks include mental addition, multiplication, and division. Secondary tasks, including concurrent articulatory distraction and concurrent spatial distraction, were manipulated to disrupt the subjects' performance. The results exhibited that the trained group had better performance than the non-trained group. The trained group performed mental calculation tasks with a shorter response time and higher percentage of accuracy. The results also suggested that mental abacus training improved subjects' ability to store visual-spatial information.

The understudies found that utilizing innovation in accomplishing numerical training with the end goal of structure mental activities and encouraging inventive learning. In this era, PCs which are viewed as the most dominant intelligent instruments and best individual learning innovation entered to information frameworks and make new procedure to educational systems and learning process. The authors indicate that computers not only propose new areas of Mathematics but deliver to them new ways of thinking about Mathematics. Besides, students who have positive attitudes toward learning Mathematics computer tools to explore and prosper their conceptual understanding. [7] Reported that "49.5% of Mathematics teachers used teaching courseware in class, 40.5% used ICT (Information and Communication Technology) as presentation tools, 8.1% used ICT as a graphical visualizing tool. 6.3% used ICT as an online demonstration tool, and 3.6% used ICT for other purposes in the classroom". So that, virtual learning environment (VLE) was

chose to perform in educational technology as a Web-based platform for the digital aspects of courses of study, usually within educational institutions. They present resources, activities and interactions within a course structure and provide for the different stages of assessment. VLEs also usually report on participation; and have some level of integration with other institutional systems. E-learning produces more angst and enthusiasm than can be consumed locally, so it tends to spill over into other areas [8]. VLE platform are content management, curriculum mapping and planning, Learner engagement and administration, Learner engagement and administration and Learner engagement and administration like live video conferencing [9]. VLE also includes the course syllabus, Self assessment quizzes or analogous devices, normally scored automatically. Formal assessment functions, such as examinations, essay submission, or presentation of projects. The terms virtual learning environment (VLE) and learning platform are generically used to describe a range of integrated web-based applications that provide teachers, learners, parents and others involved in education with information, tools and resources to support and enhance educational delivery and management.

## METHODOLOGY

Waterfall methodology is a System Development Life Cycle (SDLC) where the project is develop through a series of different stages. The function waterfall model is to reduce the risk before going to the next stage and a most known methodology. The Waterfall model is a sequential design procedure because the process is seen to be flowing downwards like a waterfall as shown in Figure 1.

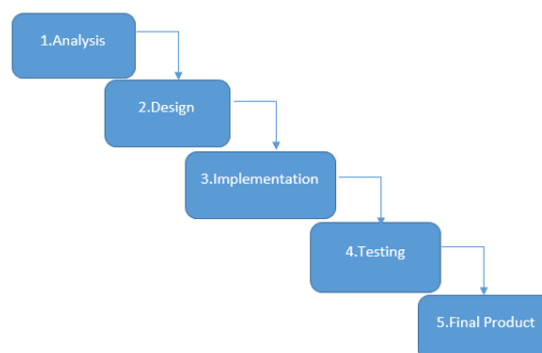


Figure 1 Waterfall Methodology

The stream of the methodology begins with idea phase where the objectives are getting ideas by brainstorming and interview teachers and students. The first phase is the analysis phase; where all the collected data about the project will be accumulated from various sources like an article, journal, online news, books and etc. all requirements are analyzed and issues occur are solved using the chosen method. Then, the process happens as well as models and prototypes were created which represents all system processes, input and outputs. The implementation phase is a phase of project are implement. Lastly, the testing phase, the project is tested by the user. Users will send feedback based on the scale of Virtual learning that they experienced with the project.

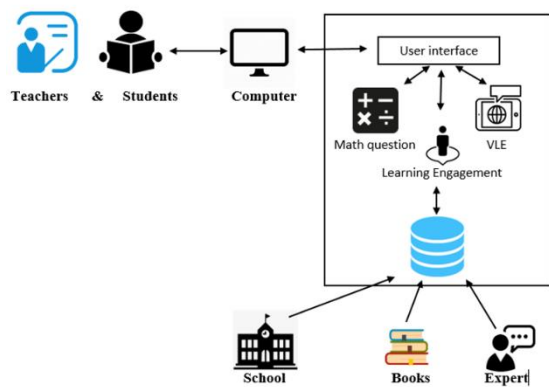


Figure 2 System Architecture

Figure 2 shows the architecture that will be used in the project. The project is web application that includes about arithmetic questions based on the syllabus from standard one to three. This is basic operations that all people need to know in daily life. All the questions or data is collected from primary schools, books, schools and expert. The user for this project is teachers and students as well as

parents, if the students not able to monitor by themselves, their parent will help them to use the learning application. Computer as a hardware needed to use the learning application because this is web-based application and use Windows 8 or upper as operating system. The interface of the web application included login page, mathematics question (arithmetic) with Virtual Learning Environment to be easier student communicate their skill with teachers as a learning engagement. Then, the learning progress and data will be store in database. All the questions, information and data are collected from primary schools, books, schools and expert who are teachers also will be stored in database.

This study uses survey methods and experimental methods. Experimental methods used to measure the effectiveness of the use of traditional methods and the VLE Web Application method for achievement of subjects Mathematics Year 1, 2 and 3 while the survey method is used to measure satisfaction and web application skills with the VLE method among Year 1, 2 and 3. students throughout the implementation planned studies, data are collected and recorded. Once the study period is run. As a result, the reflection is based on the findings and data collected. The subjects of this study were students from Sekolah Kebangsaan Pendita Zaaba. The study sample was randomly selected to carry out this experiment. Sample size are 90 students. A total of 30 students are randomly selected for each year 1, 2 and 3. Students selected as the subject of the control group undergoing the learning process with using traditional methods. The tests are given to students to identify arithmetic levels among students. The researcher used several instruments, namely test questions (pre-test and post-test), questions survey and checklist of competencies in the data collection process.

Table 1: Score range and Grade

Student score	Grade
10 – 9	Excellent
8 – 7	Very Good
6 -5	Good
4 – 3	Fair
2 -1	Below Average

Table 2: Score from 30 students of Year 1 before applying VLE

	Excellent	Very Good	Good	Fair	Below Average
Addition	3	4	4	8	11
Subtraction	2	3	6	7	12
Divide	1	3	3	11	11
Multiply	3	1	6	7	13

Table 3: Score from 30 students of Year 2 before applying VLE

	Excellent	Very Good	Good	Fair	Below Average
Addition	4	4	3	8	11
Subtraction	4	5	4	5	12
Divide	2	2	5	11	10
Multiply	3	1	7	6	13

Table 4: Score from 30 students of Year 3 before applying VLE

	Excellent	Very Good	Good	Fair	Below Average
Addition	6	6	5	4	9
Subtraction	3	5	3	9	10
Divide	4	4	3	9	11
Multiply	3	3	4	10	10

## CONCLUSIONS

This project will help students and teachers, especially for level one of primary school students enjoying to improving their skill and knowledge of mathematics with virtual webbased e-learning. A web based that proposed to ease the students in learning arithmetic operation of mathematics. The content in the application consist of attractive graphical question and selection answers. The level of question based on year of primary school students where they face difficulty in adapting to the complexity. Therefore, this research follows the examination concept by making the students enjoy while responding to arithmetic question. Next chapter is focusing on the literature review. Moreover, teachers need to change their way of teaching, for example use the technology and use two-ways communication using web application to teach the student and interactive multimedia to encourage student feel excited to learn, also create an enjoyment will study. Last but not least, students can be competitive with their friends, with

technology in this 21st Century, interactive multimedia learning combining with virtual environment learning is one of the way and easier compared to self-study because mathematics not only focusing on numbers but teach life skills to adapt on every day since they were born until their adult life.

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