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The Development of Model Learning Media of Sorting Algorithm

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Abstract

This paper is to develop a model based sorting-algorithm learning media. This model aims at studying steps of this algorithm through the use of animation. The work at this stage emphasizes modeling of Insertion Sort. We implemented this learning tool so that students can grasp the material intended in less time and with fun. The preliminary result being sampled from students of Computer Science Program at Suan Sunandha Rajabhat University is found to be satisfactory.

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1. Introduction

The data structure is the subject for the 1st students of Computer Science Program at Suan Sunandha Rajabhat University. The 1st students are complex social environment in which students talk to each other, write, learn and interact with one another. While we are in the classroom, we observe learning behavior of them. They are interested in social environment (Facebook, Game, etc.). They are in the world of multimedia and chatting all time. So this model created by learning behavior of them.

The main purpose of the data structure class practiced the algorithm skills. So the model based sorting-algorithm media is designed for increase persistence of learning and makes it easy for teachers and listeners.

This model has testing function for test understanding of the listeners. Testing Function works by getting data from testers (the students). After that the program will process on sorting-algorithm to check for understanding about algorithm of testers.

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2. Research Methods

In this research, we conducted the quasi-experimental design in the model based learning in sort algorithms with the web environment on students' attitudes towards data structure course, the pretest-posttest experimental design with the control group was used. This project was specially designed as follows:

2.1 Study Group

The study group consists of 20 students who are enrolled in a data structure course, Suan Sunandha Rajabhat University.

Table 1 The Profiles Of Study Group

	Female	Male	Total
Control Group	10	10	20
Experimental Group	4	16	20
Total	14	26	40

2.2 Data Collection and Analysis

In order to collect data, a pre-test-post-test, control-group quasi-experimental design was conducted in the two classrooms: web-based learning and traditional lecturing instruction groups were pretested. During the experimental period, each group was provided with equivalent amount of instructional materials. KR20 formula was used to measure internal consistency reliability. The collected data were analysed by the statistical means (\bar{x}) and standard deviation (S.D.).

2.3 Research Design

To, examine whether algorithm web-based learning did or did not enhance the students' ability. The students in both the experimental and comparison were post-tested at the end following the experimental period. The web based learning was developed by using RAD (Rapid Application Development) technique as shown in Fig 1. The teacher and expert requirements was prepared as information resource to implement this project.

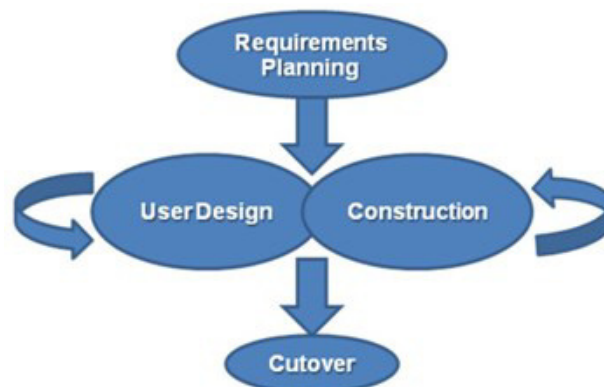


Fig 1.Phase in the James Martin Approach toRAD
(http://en.wikipedia.org/wiki/Rapid_application_development#mediaviewer/File:RADModel.JPG)

3. Results

In this section, experimental results were separated to 2 parts: developing the sorting algorithm web-based application and evaluating the performance and satisfaction of the application.

3.1 Developing the sorting algorithm web-based application

To implement the web application, Adobe Dreamweaver, PHP, HTML, AJAX and Java Script language were used to implement with MySQL database. Fig 2 and Fig 3 were shown the results of web application.

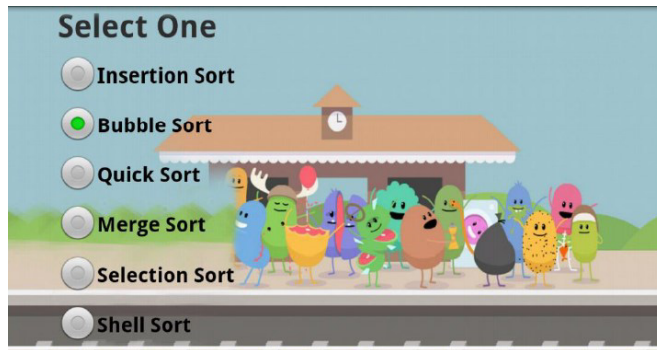


Fig 2. Example web page

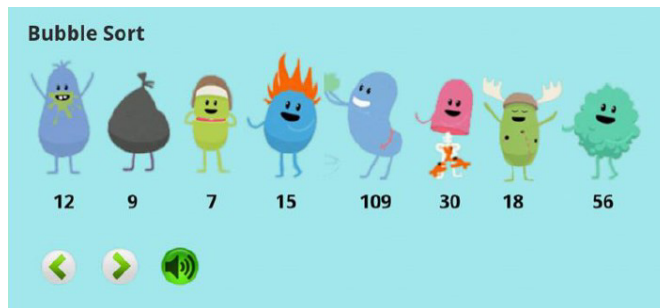


Fig 3. Example web page

3.2 Evaluating the performance and satisfaction of the application.

In this study, it was aimed to investigate the effect of web based learning method in sort algorithm with 1st student. Participates were administered to take achievement tests before and after this application. Pre-test scores of students in control groups are presented in Table 2. Students’ pre-test scores indicated the prior knowledge of student. The difference between post-test scores and pre-test scores showed as indicator of students’ efficiency.

Table 2 the distribution of pre and post scores

	number	Control Group		Experimental Group	
		\bar{X}	S.D.	\bar{X}	S.D.
Pre-test	20	3.2	1.32	2.4	1.07
Post-test	20	4.8	0.42	4.3	0.67

To test and evaluate the qualities of the system, Black box Testing and Questionnaires by 5 experts and 20 users were used to test this application. Black Box testing was assessed in the error of the project as following: functional requirement test, Function test, Usability test, Performance test and Security test. Functional Requirement test was evaluated the ability of the system to serve the needs of the users and Functional test was used to evaluate the accuracy of the system (Amman and Offutt). Usability test was tested the suitability of the system. Performance test was assessed the processing speed of the system. Finally, Security test was used to evaluate the security of the system (Laurie Williams, 2006). In the table 1 was described the ability of the system by 5 experts and 20 users. The table shows that assessment of the ability of the system to meet the needs of the experts and users respectively in average of 4.4 and 4.35 and standard deviation of 0.55 and 0.67 so that satisfaction in quality toward the system is well.

Table 2. The results of the Black box testing of the system

	Experts		Users	
	\bar{x}	SD	\bar{x}	SD
1. Function Requirement Test	4.4	0.55	4.35	0.67
2. Functional Test	4.4	0.55	4.6	0.5
3. Usability Test	4.8	0.45	4.45	0.69
4. Performance Test	4.0	0.71	4.1	0.55
5. Security Test	4.4	0.55	4.7	0.47
Summary	4.4	0.56	4.44	0.58

The results show that a quality assessment of the system is well in all aspects and Mean were 4.4 and 4.44 and standard deviation were 0.56 and 0.58. It can be concluded that the traditional occupation web base application is good.

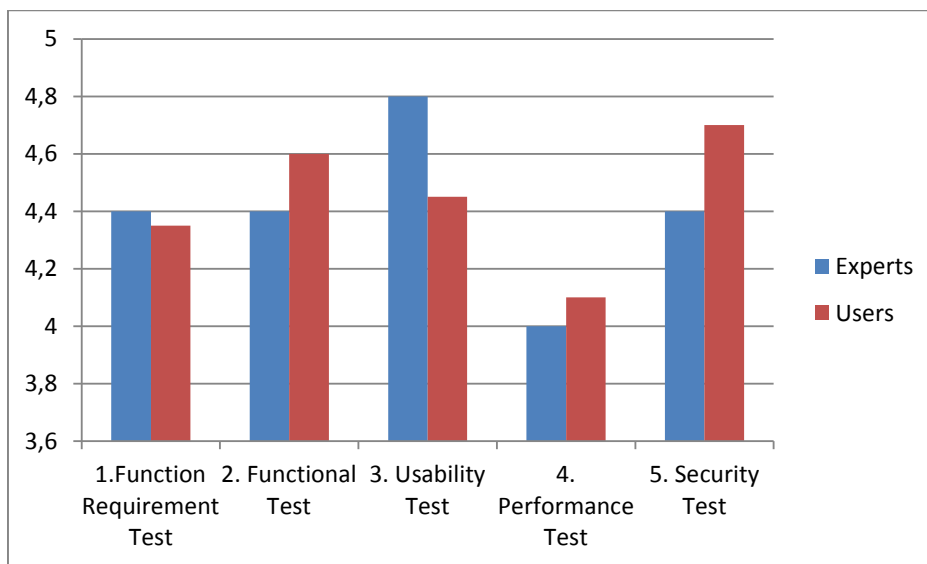


Fig. 4 the results of Black box testing

4. Conclusion and Future Works

From the results of this model, the average scores of post-test higher pre-test. To have confidence in this conceptual for aimed to increase learning efficiency of students. So continued to be developed the other algorithms further for efficiency of students.

Acknowledgements

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