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The Effectiveness of Course Software in Logic Design Learning for System Development

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ABSTRACT

Development of an application system will go through each phase of the System Development Life Cycle (SDLC) model. Students of the Diploma in Information Technology (Digital Technology) need to understand each phase in SDLC as enshrined in the course DFC3043 (System Analysis and Design) and DFT6014 (Integrated Project) in producing their final semester project. The design phase is a major phase are reviewed and understood by students in ensuring the flow of system design to be developed according to the needs and requirements of the user. The main problem faced by the students is difficulty in drawing logical design Schematic Context (CD), Data Flow Diagram (DFD) and linked Entities Relationship Diagram (ERD) as well as translate the logical design that has been drawn, into the development phase system for completion of their final project. Therefore, the courseware entitled Design Logic for System Development was developed to help teaching and learning processes for the course DFC3043 (System Analysis and Design) and DFT6014 (Integrated project). The courseware was developed using the software application Adobe Flash as the main platform and combined application programming language. ADDIE model was used in software development this course. Studies were also conducted to identify whether there are differences between the tests mean achievement between students who follow learning method using the courseware than students who follow learning aid PowerPoint. The sample for this study consisted of 60 students who follow the Diploma in Information Technology (Digital Technology) who take the course DFC3043 (System Analysis and Design) in Kuala Terengganu Polytechnic (PKT). Group experiments using the courseware and the control group using PowerPoint as an aided learning material have been created to assess the effectiveness of the teaching methods used. An instrument for this study is a set of test questions, which contains multiple choice objective questions items and short structure questions. Data analysis made using Statistical Package for Social Sciences (SPSS) version 23.0. The result of the study shows that there are significant differences in the mean achievement tests students who follow the teaching methods using courseware with students who follow learning aid of PowerPoint. The use of courseware proven to increase student academic achievement. Thus, it is hoped that more courseware developed at Polytechnic Kuala Terengganu as it can improve student's academic achievement.

***Key Words**: Software courses, Design logic, System development.*

1. INTRODUCTION

Progress in the field of information and communication technology currently has brought many changes in education. It has attracted the attention of many educators to diversify teaching methods so that learning seems effective [1]. Learning materials should be more easily accessible, disseminated and stored. According to Zamri and Mohamed Amin [2], the ability of computers to deliver an information quickly, accurately and in multimedia format making it as an attraction towards creating a pattern of learning more fun and this will influence on students ' learning patterns.

In Polytechnic Kuala Terengganu, students whose taken programme Diploma in Information Technology (Digital Technology) would follow a total 94 credit hours include various courses during the period of their studies. Among the courses given the emphasis on courses DFC3043 (System Analysis and Design) and DFT6014 (Integrated project), which this courses will help students complete their final semester project. The contents of both this course relate to the implementation phases of the System Development Life Cycle (SDLC). A phase of the SDLC is phase planning, needs analysis, design, development, testing, implementation and documentation. Each phase has continuity between each other and students need to know every detail of this phase. Courseware entitled Logical Design for System Development was developed to help students understand and implement

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the design and development phase of the System Development Life Cycle models. Both this phase is very important in preparing the prototype system. Courseware developed has three main modules module notes, case studies, and video learning. The effectiveness of the use of courseware tested to prove they are a significant impact on the student's academic achievement.

2. PROBLEM STATEMENT

The use of Powerpoint in teaching has long been in use. It is not only used as teaching materials but can help students in learning, especially in terms of student understanding when combined with multimedia elements. A study conducted by Kasks [3], found the use of PowerPoint as learning materials to increase the academic achievement of students, yet there are some teaching materials could not be delivered properly to the use of PowerPoint. According to Sanaky [4], Powerpoint requires certain skills in producing animated complexes and not all teaching materials can be delivered through Powerpoint. For example, for information exchange process from the Context Diagram (CD) to the Data Flow Diagram (DFD), Data Flow Diagram (DFD) to the linked Entities Realtionship Diagram (ERD), Data Flow Diagram (DFD) to the programming code and linked Entities Realtionship Diagram (ERD) to database development becomes difficult, because lecturers had to exhibit a lot of software at a time. Therefore to make courseware developed can translate process happens easier and students can understand the lessons presented more effectively.

2.1 Objective of the study

i) Develop the courseware entitled Logic Design for System Development for the use of students whose manage final semester projects.
ii) Identifying whether there is a difference between test mean achievements between students who follow the teaching methods using courseware with students who follow learning aid of PowerPoint?

2.2 The Question of the Study

Are there differences in achievement mean test between students who follow the teaching methods using courseware with students who follow learning aid of PowerPoint?

2.3 The Importance of Research

The results from this study will hopefully provide a positive impact towards improving student's academic achievement. In line with the mainstream of national development in line with the progress of information and communication technology, then educators must take advantage of the use of information technology as a medium for strengthening the students learning needs. This study can also be used by the Polytechnic of Kuala Terengganu to support their lecturer teaching the best and make learning more effective so that it can be a catalyst to the increase academic students.

2.4 The Scope of the Study

This study was conducted in Kuala Terengganu Polytechnic (PKT). The subject of research is the students who follow Diploma in Information Technology (Digital Technology) who take the course DFC3043 (System Analysis and Design).

3. LITERATURE REVIEW

Radhika [5] says there is difficulty understanding in the design development of the system, especially when a completed phase and system developers want to change them, then the process involved should be started from the first phase. Understanding logical design process, a system it is important to ensure that the systems developed to the needs of functional areas.

According to Chuck Cobb [6] the purposes of the construction of the system need to be detailed in the past where it involves the process of logical rekabentuk involving income Context Diagram (CD), Data Flow diagrams (DFD) and Entity Realtionship Diagram. Failure to understand the process of logical reabentuk resulted in the system being developed is not perfect.

According to the Boundless [7] use of Powepoint presentation could not unveil the continuity as a whole between the slides because the contents of the presentation material is too simple.

Evans and Gibbons [8] comparative study of running achievement among groups of students taught using interactive materials and students who were taught not to use interactive materials. The results of the study show the interactive materials can help students learn in more active and as a result the student will be able to understand the concept more easily and deeply.

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According to Zarul Akmar [9], courseware development is taking into account the learning theory and learning strategy so that software developed to attract attention and retain first-rate students to continue to learn the topic of topics contained in the software.

4. METHODOLOGY

According to Johari and Ahmad Irzam [10], the methodology is a method which is important during the development of the system. The study is divided into two phases, namely, courseware development phase and phase evaluation of software courses that have been developed.

4.1 Phase Development Courseware Design Logical for System Development

Process maker form is a system of procedures for forming learning materials consistently and can be trusted. There are several models of instructional rekabentuk are often used to produce a very course like ADDIE model, a model of the Dick & Carey, model Hanafin & Peck, model Knirk & Gustafson, model Robert Gagne, model Kemp, model ASSURE and learning model. ADDIE model is selected in software development this course because the effectiveness of the use of this model in past research. For example, a study conducted by Youngmin Lee [11], describes the use of ADDIE model in analyzing about the needs and interests of students. Students will have their multimedia material based on their own interests. Next students will develop materials that have been designed. Researchers will act as facilitators and provide motivation to ensure that the students implement a planned learning arrangements. Researchers and students together to make an assessment of multimedia materials that have been developed. The result of the findings, found students motivated to learn as well as be able to improve the quality of their learning.

ADDIE model selected in the very course of development is one acronym for Analysis, Design, Development, Implementation and Evaluation. Five phases in the model are inter-related to produce programs of teaching or learning modules. Each phase is not necessarily follow one pattern is sequential, but tell each other in one form maker system, of which the output for something phase will be the input to the next phase. One of the advantages of using model ADDIE is the process of building something the system can be done in the ranks and more systematic.

4.2 Courseware Evaluation Phase

4.2.1 The Hypothesis of the Study

Based on the review questions presented, hypothesis-alternate hypothesis tested in this study are based on the 0.05 level of significance p < as follows:

Ha: There is a significant difference in the mean achievement of students who attend test method learning to use the software courses with students who follow learning aid of PowerPoint.

4.3 Sample

This study is the designs of the control group were not similar. These designs involve samples of 60 students from two different classes, namely, existing class DDT 4A and DDT 4B. Class 4B group experiments that use courseware as learning materials and Class 4A is a control group that uses learning materials based on PowerPoint and it has been determined by the course Lecturer teach. The increase in performance is assessed based on the difference in their performance in tests taken. Test performed to see equivalence between the groups, as both groups of students not selected at random. It is also intended to be used as control statistically. Post tests are carried out after the two groups finished follow teaching methods, respectively.

4.4 Instrument

Instruments to study is a set of test questions, to sample the DDT 4A and DDT 4B which samples of the test contain 20 items multiple choice questions and a short 3 question structure. This instrument is used to evaluate the effectiveness of the use of courseware developed whether to increase student academic achievement.

4.5 Data Analysis

The findings will be analyzed using Statistical Package for Social Science (SPSS) ver. 23.0. Motivated statistical t-test is used to test achievement score compares between the control group and experimental group. No significant decision making level is set at level 0.05. The hypothesis will be rejected if the value of p is less than 0.05 or otherwise.

4.6 Study Findings

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Comparison test between the mean achievements of students who attend the learning method using the courseware to students who follow learning aid of PowerPoint.

Table 1: Test-t does not lean to score test (test post) between the experimental group and control group

Group	Number of Student	Man	Standard Deviation	t Value	Signicfican
Experiment (DDT 4B Class)	30	69.30	10.77	5.00	0.00
Control (DDT 4A Class)	30	58.60	9.35		

Analysis on test score shows that there are significant differences between the control group test score (M = 58.60, SP = 9.35) and experimental group (M = 69.30, SP = 10.77; t = 5.00, p =. 000 >. 05). In conclusion, hypothesis developed received. This shows that there are significant differences in the mean achievement tests students who follow the teaching methods using courseware with students who follow learning aid of PowerPoint. Found to mean experimental group score (69.30%) were higher than the control group (58.60%) respectively. This shows that the use of courseware can help improve students academic achievement.

5.0 DISCUSSION AND CONCLUSIONS

5.1 Discussion Of Findings

Development of courseware for courses related to the implementation of final semester is seen to affect students academic achievement and understanding. In the development of courseware involved model ADDIE has been used to produce thin software effectively. Models affected were chosen because they are easily to implement. It consists of five phases that are inter-related and structured systematically. Multimedia elements and were incorporated together for hypermedia interest and attention as well as student motivation. The findings show that the increase for the test mean is higher for the group of students who follow learning method using the courseware. This be shown courseware developed capable of improving students academic achievement. Therefore, lecturers are encouraged to develop courseware in accordance with the requirements of the curricula as well as combining with multimedia elements. Lecturers should also plan and figure out the most effective strategy to increase the level of awareness of students

5.2 Reserve For Advanced Studies

Among the suggestions advanced studies that can be implemented are as follows:

i. Review of the relationship between teaching methods using courseware with students ' academic achievement for other courses.

ii. Review the effectiveness between teaching methods using the courseware and the use of social networking applications in the learning environment.

5. CONCLUSION

Software development course entitled Design Logic for the development of this system can meet the needs of educators and students involved with the course DFC3043 (System Analysis and Design) and DFT6014 (Integrated project). Courseware includes sub-context design topics, Data Flow Diagram and Schematic Relationship-linked entities. It also describes the development of courseware in terms of design and translation. A study of the use of courseware is expected be the catalyst software development courses in Politechnic of Kuala Terengganu. Its effectiveness in increasing student academic achievement has been proven through studies that have been carried out. Lecturers should ensure the courseware to be developed should meet the curriculum courses and all apsek content structure, user interface and multimedia elements need to be assessed with combined with earlier, before the lecturer and students use it as the main teaching and learning materials.

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