Developing a computer instructional package for a multimedia program

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ABSTRACT: The purpose of this research was: 1) to develop a computer instructional package for a multimedia program; 2) to evaluate the efficiency of the package; 3) to evaluate the effectiveness of learning using the package; and 4) to evaluate learners' satisfaction with the package. The research tools were: 1) the computer instructional package; 2) tests to measure achievement; and 3) a questionnaire to measure the learners' satisfaction. The research sampling group was 30 students. The research results revealed that the efficiency was higher than a set criterion (80/80). The analysis of pre-test and post-test scores for effectiveness showed that the computer instructional package could increase learning effectiveness more than the set criterion of 60. The mean of *satisfaction* of the sampling group was *high*. It was concluded that the computer instructional package for the multimedia program was good enough to be used for self study.

INTRODUCTION

These days, technology plays a vital role in human lives, with consequences for all of industry. The banking industry, engineering, medicine, agriculture and even education increasingly use information technology to assist their operations. Currently, computers can be considered crucial factors in education and, as a result, developments in teaching have turned to a form of independent learning.

The Interactive Multimedia Computer Assisted Instruction (IMMCAI) helps students to learn by themselves without restrictions of time, place or the ages of students (Assoc. Prof. Pairoj and Assoc. Prof. Paiboon). Student-centred learning in this case means students do not have to attend classes. This approach to learning on the multimedia program encourages students to learn and retain greater interest. Using multimedia to assist in delivering content attracts students' attention and helps them to understand.

THE ORGIN AND MOTIVATION OF THE PROBLEM

For reasons given above, the researchers were aware that teaching and learning patterns have changed. The development to assist the teaching of the multimedia program helps students' learning and understanding and so improves their ability to apply this knowledge in everyday life.

RELATED WORKS AND THEORIES

Sukunya Kiadkirdsuk developed a computer instructional package for the Career and Technology II class. It was found that the computer instructional package, which researchers created, exhibited higher efficiency than the criterion of 80/80. Also, the learning efficiency was higher than the set criterion of 60%. The *satisfaction* of the sample students was at the level of *high* [1].

DETAILS OF THE DEVELOPMENT

The development of the computer instructional package used the Interactive Multimedia Computer Instruction Package (IMMCIP) from the Faculty of Industrial Education and Technology, King Mongkut's University of Technology Thonburi. The development of a computer instructional package has five main steps [2]:

1. Content Analysis (Analysis): to understand the content and details of the course and determine the order of the content. This also avoids duplication. The analysis followed these steps:

- Develop a Brainstorm Chart for the entire package. The work is conducted by researchers and raises issues for content experts. The researchers identify topics in the multimedia class content in the middle of the chart. Related topics are added and linked by relationship lines. The experts then examine and improve the chart.
- Create a Concept Chart by analysing the brainstorm chart to determine appropriate topics and the relationship between topics.
- Create a Content Network Chart, which shows the relationship between the content. It is used to determine the order in which content should be presented. The content expert then reviews the system.

2. Design involves the following:

- The chart network content validated by experts is used to determine the division and sequencing into units of study (Modules) and is presented as lessons in a Course Flow Chart Drafting.
- Create a Learning Management Systems (LMS) Chart Drafting. In this stage, the course management system is designed for control of the learning process using the computer instructional package. This includes registration records, account and passwords, personal information, learning status, learning sequence at school, scores, results and evaluation. It is also useful for raising students' awareness of the lessons.

3. Create a module presentation chart for each module to indicate continuity, standards and relevancy to the behavioural objectives. It includes introduction to the lesson, content, activities to enhance understanding, and summary. The topic presentation and the media should be related and written with an emphasis on the teaching content in support of the lesson objectives. When finished, the content experts review the material.
4. Group the content in the Lesson Unit (Development). This process begins by writing down the content within the content scope (Script), and then putting them into order, according to the Content Network Chart. After validating the contents, an achievement test is created. The steps include test analysis, design, management facilities and quality control. Database and test applications are used to examine the efficiency and effectiveness of the lessons.
5. Implement the content development on the computer, lesson instruction software must first be selected. Then, the media and other information should be provided, already set up for developing into a computer program. The software used in the development of computer teaching must be appropriate to the aptitude of the researcher.
6. Create an achievement test reflecting the behavioural objectives. The number of questions is determined following the Rovinelli and Hambleton method. An average greater than, or equal to 0.5, using a sample group, indicates the test is accurate, relevant and of appropriate quality. The material is then stored in a test database.
7. Test the implementation against the behavioural objectives of each unit that guided the creation of the test. These behavioural areas include cognition, understanding, memory, analysis, synthesis and evaluation:

- The testing management system (TMS) used in this study includes a pre-test of each unit before the study and a post-test for each unit. All tests are stored in the same database. The database can be queried by unit, learning objectives and behavioural objectives. Within each unit, test questions can be selected randomly from the database.
- Create a test with three times the number of questions that is normal. This can be used as a backup exam. The test is reviewed by experts to determine accuracy and to validate the content. Finally, the test is used on the sample group of 30 people.
- The analysis of the test includes difficulty, discrimination and reliability, hence, determining the quality of the test.

8. The database can be used for selecting pre-test and post-test questions, according to the behavioural objectives. The students take the tests on the computer at their convenience.
9. Assessment of multimedia lessons is evaluated by a query scale estimation questionnaire (Rating Scale) using a Likert's scale, in which 4.50 to 5.00 – quality is very high; 3.50 to 4.49 - quality is high; 2.50 to 3.49 – quality is average; 1.50 to 2.49 – quality is fair; and 1.00 to 1.49 – quality is poor.
10. Users' satisfaction questionnaires use a Likert's scale. The five levels are 4.00 to 5.00 – very high satisfaction; 3.50 to 4.49 – good satisfaction; 2.50 to 3.49 – moderate satisfaction; 1.50 to 2.49 – very little satisfaction; and 1.00 to 1.49 – least level of satisfaction.

OVERVIEW OF THE SYSTEM

The results of the development of a computer instructional package for a Multimedia Programme Class were as follows: learning performance improved more than 60%, which is higher than the set criterion. The computer instructional package can be used for teaching. The the computer instruction package is of good quality is shown by:

1. the development used thinking processes, operations planning, development and quality control at every step following the IMMCIP (as per Assoc. Pairoj and others), which is a 16-step process [2]. In each step, quality and content were checked by experts. The computer instructional package serves as effective teaching;
2. the lesson units are flexible, with students able to choose lessons depending on their interests. The lesson units can be selected through menu;
3. the development process involves well-organised activities to enhance lesson understanding;

4. each unit has a content summary which students can review;
5. tests have been designed with four multiple-choice options;
6. post-test results show that students' knowledge is enhanced and can be applied to their careers.

CONCLUSIONS

Conclusions from the development of a computer instructional package for the Multimedia Programme Class are as follows: Efficiency analysis using pre- and post-test evaluation of 30 students with no experience of computer instructional packages showed a package efficiency higher than the set criterion of 80/80 [3][4].

The post-test scores were 20 points. The effectiveness of learning is the difference between the pre- and post-test scores. The learners' satisfaction is evaluated by the questionnaire after the post-test. The learners' satisfaction of the package measured the introduction, content, enhanced learning, test evaluation and summary of lessons. The learners' satisfaction of the package was *high*.

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