Designing Effective Instruction for Computer in Education Courses

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Abstract

The study is an R&D research comprised of two phases study, the first phase aimed to investigate the problems of teaching educational computing courses and the second phase utilized the results of the study in the first phase to design and develop an effective instruction for Computer in Education course. In the first phase, questionnaire, interview, and focus group were used as tools to investigate the problems of teaching instructional computing courses at university level. The data was later used for designing instructions in the second phase. In the second phase of study, the researchers designed and developed the instruction according to the problems discovered in the first phase. Three instructional approaches were used to increase the effectiveness of the instruction namely, expository, problem solving and construction method. Different delivery systems were also developed to solve students’ problems including, hand-outs, manual, worksheets, CD-title, self-instruction packages, distance learning through internet, tutorial, and constant feedback. There were seven instructional packages developed, they were revised twice before putting into field tryout. Upon the field tryout with 40 of second year university students, it was found that all students had done well over mastery level, they produced highly satisfaction on problem solving and construction tasks. It is concluded that the designed instruction helped students learn effectively.

Introduction

Problem of teaching and learning computer is one of the most discussed topics in the computing instruction field. The problems ranged from problems of instructors, teaching strategies, instructional media, curriculum, and evaluation (Pongpradit, Wantanee, 1996). There are many approaches to tackle the computing instruction problems. A good instruction design is one of the approaches. Learning should not occur in a haphazard manner but should be developed in accordance with orderly processes and have measurable outcomes (Seels, Barbara and Glasgow, Zita 1994). To achieve the best results, effective instruction must be delivered. This study utilized Seels and Glasgow instructional design model (Seels, 1994) to develop the instruction. The constructionism, the problem solving, and the expository approach were selected as the instructional activities.

Purpose of the study

The purposes of the study were to:

1. Study the problems of teaching educational computing courses
2. Design and develop an effective instruction for a Computer in Education course.

Methodology

The authors conducted the study in two phases. The first phase was studying problems of teaching educational computing class at university level to gain knowledge of problems of teaching computing class. The second phase was designing and developing instruction for teaching a Computer in Education course. The data from the first phase was analyzed and used as the input to the second phase of the study.

Phase one: study the problem of teaching educational computing class.

The researchers employed three techniques of data collection: questionnaire, interview and focus group. Two hundred questionnaires were distributed to computer instructors in Chonburi province asking about the problem of teaching computer courses. Thirty academic experts in the computer in education field were interviewed asking about the problems of teaching computing classes. A focus group technique was also conducted to investigate
Phase two: design and development of the instruction

The design and development phase in this study comprised of seven steps using Seels and Glasgow’s instructional model (Seels and Glasgow, 1994). They were: problem analysis, task and instructional analysis, writing objectives, developing the assessment, developing instructional strategies, media selections, materials development, formative evaluation and summative evaluation.

Problem analysis: The problem analysis steps were previously done in the first step. The results of the analysis were that; students did not have adequate prerequisite knowledge, instructors did not have effective instructional strategies, and students could not solve problems by themselves. The problem analysis had also revealed the content that students needed to study. They were; 1) Computer Basics. 2) Microsoft Word. 3) Microsoft Excel. 4) Microsoft PowerPoint. 5) Computer for Education. 6) Internet, and 7) Management Information System:(MIS)

Tasks and instructional analysis: The 7 contents were later divided into 20 subtasks. And the 20 subtasks were finally divided into 72 sub-subtasks. The prerequisite to each subtask were identified as the results of instructional analysis. Seven problems and seven construction tasks were identified.

Writing objectives: Behavioral objectives were written covering all tasks. The objectives told exactly what and how the tasks would be carried out. The conditions and the degree of achievements were also identified.

Developing the assessment: Multiple choices test items were developed. Seven problems solving situations and seven construction tasks were identified. Ten attitude test items were also developed.

Developing Instructional Strategies: In developing instructional strategies, the researchers considered the problems of computing instruction analyzed in the first step, analyzed the objectives then decided the instruction activities. Three kinds of instructional approaches were selected, the expository method, the problem solving method, and the constructive method.

The expository method was used for presenting information. The expository method comprised of many different activities including, lecturing, booklet, manual, content in the e-learning format, multimedia package, text and journal.

The problem solving method was used to train and encourage students to exercise their problem solving ability. The construction method was designed to enable students to create and to be able to build programs during their learning.

Media selections: Media were selected accordingly to the instruction method. Booklet, web page, CD-title, transparency, journal, text, simulation and video were used.

Materials development: The researchers have developed the following materials including, course contents, lesson plans, test items, work sheets, self-learning programs, course manuals, and evaluation forms.

Formative evaluation: At the end of the development, seven instructional packages were developed. They were individually tried out with the prospective learners. During the tryout, the researchers recorded all the incidents students reacted to the packages. The information was later used to revise the packages. After the revision, the packages were again tried out with a group of six students. The results were again used to revise the packages.

Summative evaluation: After the seven packages were tried out and revised two times, they were field-tried out with 40 students who enrolled in the Computer in Education Course.

Results of Study

At the end of a study, 7 instructional packages were developed. The researchers then evaluated the developed packages by considering students’ performance after studying the packages. It was found that all students performed at the mastery level. They produced highly satisfaction on problem solving and construction task. This indicated that the developed instructional packages helped students learn.

References