

## DEVELOPMENT AND EVALUATION OF A WEB-BASED COURSE FOR COMPUTING AND INFORMATION TECHNOLOGY

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### ABSTRACT

Most educators in this country have heard about the World Wide Web that is growing at an exponential rate. Many have explored this resource, and some are now publishing their own materials for student access. Educational content on the Internet is rapidly increasing. More course materials are placed online to supplement classroom situations. Prior research found that this new web-based technology had not integrated sound pedagogical practices into the authoring process when developing new courses. One of the most widely acknowledged problems is the lack of knowledge of instructional development and delivery among educators.

This research grew from the concern about the current status of instructional design in a college as well as the desire to help faculty implement sound instruction on the web. The research justifies and describes instructional design principles that can be used to transform web material from simple informational resources to a powerful instructional medium.

An overview of Instructional Design process is presented to guide us systematically to create the blue print or specification for the Web-based course. A sample Web-based course that includes all the important instructional design principles is finally developed. The Web-based course includes instructional goals, objectives, learning outcomes, instructional sequence, strategies as well as enrichment and remedial exercises.

The Web-based course was reviewed and evaluated by two different groups of users - 25 students and two lecturers. A questionnaire was distributed at the end of the course to gather information related to the Web-based course. Instructional and technical aspects were evaluated. Interviews were carried out with the

lecturers and randomly selected students. Pretest and posttest were conducted to assess the performance of students.

Data collected from the feedback, interviews and assessments were analyzed using simple quantitative and qualitative statistics. Students' scores in the pretest were compared with the posttest to find whether there was any improvement in performance. A t-distribution test was conducted to find if there was any significant difference. Interviews and feedback forms were used to find the acceptance of the Web-based course by the students and the lecturers.

Guidelines to develop, implement and evaluate Web-based course are also proposed. These guidelines will help us develop a quality program to be delivered over the Web.

### INTRODUCTION

Information Technology (IT) plays a major role in our current education system where the Internet is used widely as a tool of instruction. The part of the Internet that has grown the most and has received the most attention is the World Wide Web (WWW). WWW is a vast network of information servers located in the Internet. These information servers are scattered across the globe and contain information on practically everything. The best feature of the WWW is that it specializes in multimedia aspects such as graphics, sound, audio, movie as well as text (Smith, 2001). WWW has provided higher education institutions with an effective medium to distribute course materials over the Internet.

This is the time when lecturers worldwide and especially in Malaysia are being faced with many new challenges. They are being asked to change the way they teach, adapt curriculum so as to meet new curriculum standards, change

assessment and evaluation practices and to integrate technology into their teaching and learning. They have to make a choice by slowly changing the traditional teaching and learning process to one that is more in line with the IT era. Lecturers need to change the traditional teaching and learning process in relation to one of the primary roles that they perform, as well as act as designers and implementers of instruction. They prepare plans that aid in the organization and delivery of their daily lessons. In order to negotiate a successful change they need a pedagogical framework that contains educational goals and objectives, the ability to sequence objectives, and proficiency in the skills and knowledge of a particular discipline. Goals and objectives are set to focus on the required achievements.

Lecturers choose the World Wide Web (WWW) as the tool for educational course delivery, and to establish their instruction. They are rapidly placing their course materials on the Web to meet many different needs. Web-based courses are instructions delivered on the web. Lecturers utilize the attributes and resources of the WWW to create a meaningful learning environment (Khan, 1997). However, there is too much instruction developed on the Web without appropriate guidelines. There is no single standard that describes how courses should be created or distributed over the Web. Indeed, a quality education is often sacrificed in favour of quantity, when a society becomes industrialized and technology driven (Oo, 2001). Lecturers should help themselves and their students to determine what is and what is not quality information.

There are many necessary conditions for successful Web-based instruction, which can be categorized into four main areas namely: pedagogical, social, managerial and technical. This research concentrates mainly on the pedagogical aspects, which involve the role of lecturers and their duties as educational facilitators in the learning organization.

#### RATIONALE

The key process for improving the quality of teaching and learning is instructional design (Braden, 1996). Instructional design (ID) has grown

to provide lecturers with rational and effective means for planning, implementing and evaluating the delivery of instruction. Before lecturers prepare instruction, select instructional procedures or subject matter or material, it is important to be able to state clearly just what they intend the results of their instruction to be. A clear statement of objectives will provide a sound basis for choosing methods and materials and for selecting the means for assessing whether the instruction has been successful. It keeps the lecturers focused on the learning process.

Lecturers' goal orientations and the way they teach students have a major impact on students' achievement. These give students a clear understanding of the learning task. Effective lecturers provide direction towards attainment of selected objectives. Clearly written objectives allow both lecturer and student to measure whether a goal has been met. Learning outcomes drive the instructional strategy, instructional delivery and assessment (Grady, 1991). Innovative strategies should be formed to gain optimum teaching-learning results (Wong, 2001). The only problem is that not many lecturers are aware of this. Each individual should play an effective role in developing and implementing Web-based learning.

Developing effective Web-based courses requires a systems approach and integrating instructional design principles (Howard and Terry, 1997). The systems approach provides the developer a framework to design the instructional material. Incorporating instructional design principles ensures that the courseware is developed with the learners in mind.

Ritchie and Hoffman (1997) asserted that Web pages, when properly structured, can guide students through a series of instructional activities that present information, afford practice and provide feedback to inform students of their strengths, weaknesses and suggestions for enrichment or remediation. The design of a Web-based classroom must draw on technical, educational, artistic and design factors, according to personal preferences. Only with these instructional design principles the Web can be transformed from its function as an informational