Chapter XIII

A 3-Dimensional Framework for Evaluating Multimedia Educational Software

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ABSTRACT
This chapter introduces a three-dimensional framework aimed at evaluating multimedia educational software. It argues that the current means of evaluations is highly dispersed and ailed with “no significant result” findings mainly due to the evaluation techniques used and not the systems themselves. The framework proposed combines the two approaches currently followed in three dimensions of evaluations which are: system architecture, educational impact and affective measures. System architecture studies the design of the system itself and the technologies it takes advantage of. Educational impact concerns the differences between student levels prior and following exposure to the system. Affective measures concern student motivation issues when using the system. The goal is to provide a solid framework that is general enough to evaluate all types of multimedia educational systems.
INTRODUCTION

Multimedia systems invaded the educational world without allowing educators enough time to formulate proper evaluative techniques to assess their usefulness. The attractive nature of these systems, that allowed them to waltz into our lives, may eventually wear off and raise the necessary question: Are they capable of delivering what they promise? This chapter analyzes several approaches to evaluate multimedia and utilizes them as a basis of a new framework. The evaluation procedure proposed here emphasizes the participation of all parties involved in the evaluation process, such as educators, technical experts and the target learners. Background information is first collected about the system content and its technical performance, in addition to finding a method through which the effect of the CBI on students' learning outcome is measured. The collected evaluation information then is analyzed in rigorous detail to determine the suitability of the CBI under analysis as a teaching medium. A three-dimensional framework is proposed such that its dimensions are: system architecture, educational impact and affective measures. System architecture analyzes the system components, how they work together and their design. Issues such as speed of display of information and logical bugs are evaluated along this measure. Educational impact measures the effectiveness of the system when compared to a benchmark classroom lecture. Issues such as types of knowledge gained are measured through pre- and post-testing of students. Affective measures are evaluated through a written survey along with system architecture questions. Issues such as how students regard the system and whether they are willing to learn on such a system are addressed. A case study of a multimedia data structures tutoring package (DAST) is evaluated within this three-dimensional framework to show its applicability as an effective evaluation method of multimedia tutoring systems.

TRADITIONAL EVALUATION PROCEDURES

Computer-based instruction provides educators with a powerful technological tool to aid them in reaching their teaching objectives. Recent advancements in multimedia made it possible to incorporate sound and animation into the same presentation, clearly providing more means for information transfer than classroom whiteboards and textbooks. This tool may even aid in reinforcing student learning as well as overcoming traditional problems that commonly exist with the traditional approaches. However, many researchers—including Beatte (1994), Reiser and Kegelmann (1994)—believe that educational software must be evaluated to ensure its teaching benefits on the learners before being approved for use. Questions such as “Do the students like the software?” and “Who’s using it?” are inadequate as a measure of effectiveness. What is being emphasized is the most fundamental evaluative question: “What’s being learned by the students?” A good evaluation must
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