Mathematics Tutor: Matching Instruction to Student’s Learning Styles

Nor Azan Mat Zin
Department of Information Science
Faculty of Technology and Information Science
National University of Malaysia. 43600 UKM BANGI
azan@sun1.ftsm.ukm.my

1: Introduction

Computer-aided instruction (CAI) has been around for sometimes and has been proven effective for learning as was reported in various research findings [1, 2]. However, these traditional CAI and multimedia software which are costly to produce have limitations, they cannot be tailored for individual learning since they lacked the ability to adapt to the student’s different learning styles or different academic ability such as relating his incorrect answers to the correct ones. Furthermore, the practice or problems presented in CAI were usually limited to simple drill-and-practice questions after which the student is then given the next module depending on his score in the evaluation of the module. Therefore there is a need for ‘intelligence’ in these systems so that inferences about student’s mastery of topics or tasks and traits such as learning styles can be made in order to dynamically adapt the content or style of instruction. Adaptation of instructional materials to students ability and learning style should facilitate learning.

2: Research Objective

The main objective of this research is to design a model of an intelligent multimedia mathematics tutoring system that can automatically adapt instruction to student’s learning style and ability, for use in Malaysian secondary school. Other related objectives are to develop a learning style diagnostic tool, to develop a pre-test questions to assess students prior knowledge related to the chosen topic and to develop a prototype of the system in order to evaluate the design of the proposed instructional model.

3: Research Questions and Methodology

Following the research objectives mentioned above, the main research question is:

Does matching instruction to student’s learning styles increase his/her performance in the tutored topic?

Related question is, what are the different learning styles of learners in learning mathematical concepts and solving problems?

The research methodology follows the design of instructional courseware as discussed in [3, 4]. User or learner analysis has been completed. Domain percentage of secondary school mathematics syllabus is found to be the most difficult topic for first year students, so this topic is chosen for the content of the courseware.

4: Findings

Currently I’m working on learning styles diagnostic tool for mathematics learning. The tool consists of three parts to assess perceptual and cognitive learning styles and the style of mathematics problem solving. At the same time I’m working on the design of instructional modules based on learning styles characteristics. Framework for the proposed tutoring system is shown in figure 1.

References


Fig.1. Framework for the instructional system