

Preface

Whether in traditional or e-learning, it is important to consider what to learn, how to learn, and how well students have learned. Since there are various types of students with different learning preferences, learning styles, and learning abilities, it is not easy to provide the best learning approach for a specific student. Designing learning contents for different students is very time-consuming and tedious for teachers. No matter how the learning process is carried out, both teachers and students must be satisfied with students' learning performance.

Therefore, it is important to provide helpful teaching and learning guidance for teachers and students. In order to achieve this, we proposed a fine-grained outcome-based learning path model, which allows teachers to explicitly formulate learning activities as the learning units of a learning path. This allows teachers to formulate the assessment criteria related to the subject-specific knowledge and skills as well as generic skills, so that the pedagogy could be defined and properly incorporated. Apart from defining the pedagogical approaches, we also need to provide tailored learning contents of the courses, so that different types of students can better learn the knowledge according to their own learning abilities, knowledge backgrounds, etc. On the other hand, those learning contents should be well structured, so that students can understand them. To achieve this, we have proposed a learning path generation method based on Association Link Network to automatically identify the relationships among different Web resources. This method makes use of the Web resources that can be freely obtained from the Web to form well-structured learning resources with proper sequences for delivery. Although the learning path defines what to learn and how to learn, we still needed to monitor student learning progress in order to determine proper learning contents and learning activities in an e-learning system. To address the problem, we proposed the use of student progress indicators based on Fuzzy Cognitive Map to analyze both performance and non-performance attributes and their causal relationships. The aim is to help teachers to improve their teaching approaches and help students to reflect their strengths and weaknesses in learning. This monograph focuses on the intelligent tutoring e-learning system, which provides an intelligent approach to design and delivery learning activities in a learning path. Many experiments and

comparative studies on both teachers and students have been carried out in order to evaluate the research of this monograph. The results show that our research can effectively help teachers to generate high-quality learning paths, help students to improve their learning performance, and offer both teachers and students a better understanding on student learning progress.

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