

E-learning Multi-Learning Style One Size Can Fit All

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ABSTRACT

In recent years we have witnessed an increasingly heightened awareness of the potential benefits of adaptively in e-learning. This has been mainly driven by the realization that the ideal of individualized learning (i.e., learning tailored to the specific requirements and preferences of the individual) cannot be achieved, especially at a “massive” scale, using traditional approaches. Although there are many learning style models, theories, and methodology that have been used for a long time in education, none of them have adequately covered all learning aspects such as personality, emotional issues, scale differences, and preferences. Many researchers have derived and used some elements from these models in an e-learning system but these seem insufficient to overcome some e-learning difficulties. In e-learning when the learning style of the student is not compatible with the teaching style of the teacher; difficulties in academic achievement can result. Therefore, knowing what is the preferred learning style and favorite study environment supporting emotional intelligence and guaranteeing the success of learning and teaching process, is critical. This paper highlights problems and issues may affect the success of e-learning process. Adaptive prototype system is also presented to overcome problems and improve e-learning environment by adapting to the learner in different aspects.

KEYWORDS

E-learning, multi learning style, and adaptive e-learning system.

1 INTRODUCTION

Nowadays, the main concern in e-learning is improving the learning process and many research papers indicate that this is possibly done through an adaptive system [1]. The purpose of adaptive system is to encourage the student to enroll into e-

learning, gain through the latest educational techniques, and assist him/her by providing for each student a convenient environment. A learning environment is considered adaptive if it is capable of: monitoring the activities of its users; interpreting these on the basis of domain-specific models; inferring user requirements and preferences out of the interpreted activities, appropriately representing these in associated models; and, finally, acting upon the available knowledge on its users and the subject matter at hand, to dynamically facilitate the learning process [2].

There are many issues and problems arise in e-learning environment increase the responsibility of e-learning adaptive system toward improve the quality of e-learning process. Most researches agreed that e-learning system should be able to adapt to different learning style. There are many e-learning projects implemented different learning style models to extract the user model and number of learning strategies that have been derived from these models and transferred into an e-learning environment by using multimedia representations [3]. Many attempts have made to improve the adaptive system by using different methods such as artificial intelligence techniques for extracting user modeling and overcoming the difficulties. However, such system lacks the ability in building student personality by motivation, increasing self-confidence, or reducing shyness. Therefore, most of the researches focus on the student modeling and how the system can automatically deal with different students. Moreover, many researches indicate that the key to getting and keeping students actively involved in learning lies in understanding learning style preferences, which can positively or negatively influence a student's performance. It has also been shown that adjusting teaching materials to meet the needs of a variety of learning styles benefits all students [4].

This paper highlights that e-learning problems fall in four main issues as presented in below following sections.

2 PREFERRED LEARNING STYLE

Although the similarity between the traditional and distance learning in terms of teaching and learning, but it is technically totally different due to the absence of human spirit interaction. The main problem in user modeling is how to represent and update user knowledge in the system, especially with regard to the uncertainty in user knowledge estimation. The problem is not about classification but about representation of the knowledge it self [5]. Research work indicates that the key to getting and keeping students actively involved in learning lies in understanding learning style preferences, which can positively or negatively influence a student's performance. It has also been shown that adjusting teaching materials to meet the needs of a variety of learning styles benefits all students [4]. Form studying the available learning style such as Kolb, 4MAT system, multiple inelegance and others are not capable to cope with learner through e-learning process. So for example Kolb's theory has not satisfied some of the writers. It has been stated that learning includes purposes, goals, intentions, choice and decision making is not clear where these elements fit into the learning cycle. Others proposed that there are at least three kinds of learning and that we have different learning styles for each. In addition, Kolb's contributions cannot be underestimated [6]. Others models concern about the learner in general prospective by looking into the music, light, or models classifying the learner based on the physical brain. Currently there is no learning style clearly can extract the preferred learning style for e-learning environment.

3 COURSE CONTENTS PRESENTAION

Pedagogical elements are an attempt to define structures or units of educational material. Pedagogical elements such as: Instructional design, social-constructivist, cognitive

perspective, emotional perspective, behavioural perspective and contextual perspective. However, pedagogical approaches make it easy to create content, but lacks flexibility, richness and downstream functionality. On the other hand, complex pedagogical approaches can be difficult to setup and slow to develop [7]. Several educational hypermedia systems that adapt to learning styles have been developed over the past few years. But it still remains unclear what aspects of a learning style profile are worth modeling and which is the most effective approach for particular style [3; 8]. The most notably problems in hypermedia systems especially when used for education are navigation difficulties, the user gets lost, lack of direction, and unable to integrate information into their own knowledge structures. These problems have been suggested that this is caused by "cognitive overload" [3; 9; 10].

4 INTELLIGENT TUTORING SYSTEMS

In traditional classroom system, a teacher can monitor and react accordingly based on what he/she sees of his/her students' reaction. However, an e-learning environment requires student to be more independent. As such the system should be able to adapt to the preferred learning style of each student, which is difficult to implement due to the lack of the available adaptive system.

5 E-LEARNING STUDENTS

Importance and need of specifications and standards are well known to all of us in different spheres. Everyone who has ever tried to develop and work with hardware and software understands the important role standards play in facilitating the integration and maintenance of digital system components and data resources. They can be very useful in allowing developers the opportunity to create learning resources that might otherwise require extensive programming skills. Few thousands of courses are being offered on the net. However most of these courses are not having good quality. There is need for standards to define the framework for on-line learning. Standards are desirable for interoperability, convenience, flexibility, and efficiency in the design, delivery,

and administration. They provide consistent on-line dimension for all courses being designed so that all authors/ faculty are able to customize the on-line materials with minimal lead-time. Standards also impose a certain order on chaos resulted due to proprietary products from different vendors [11]. More over, most vocabularies proposed for many of the different elements within the e-learning standardization process have reduced value space set that does not properly cope with adaptation needs. Thus, it results difficult for an adaptation engine to fully understand issues like student’s previously acquired knowledge or their preferred learning style. [12]

6 ADAPTAION SOLUTIONS

From the above issues three questions are raised to be the main concern for this paper to be discussed and to produce adaptive system to improve the e-learning process.

- Will students learn better and cognitive overload controlled if material/course content developed in different ways based on different learning style?
- What is the impact of using SCORM standard in developing course content and integrated with different learning style?
- Do the uncertainty reduced from the student modeling and the student pattern identified by using the research e-learning model?

Adaptation has been defined as providing a different response based on different characteristics of the receivers of the response [2]. This paper attempts to present a solution for the above e-learning issues by developing a system adapts to learner in three ways:

6.1 Adaptation by The Instructional Design

This is by providing different course contents, activities to the learner based on preferred learning style approaches. Start by using e-learning model as shown in Table 1 [13]. This e-learning style model is a matrix (16*5). The 16 elements are the rows which represents what is/are the types of the

learner’s e-learning style. The 5 elements are the chosen five learning style approaches. Using this matrix the system can extract the preferred approach for learner. To get that what type of learner s/he is from table 2 must be determined and then from table 1 search for the column which has similar types. Moreover, the course content will be developed, adapted and presented to student in different ways such as: sequential based learning, Game based learning, Problem based learning, Inquiry based learning, and Mind maps.

Table 1: E-Learning Style Model

	Sequential	Mind map	Problem based	Inquiry based	Gaming
1.			Type1	Type1	Type1
2.			Type2	Type2	Type2
3.	Type3		Type3	Type3	
4.	Type4			Type4	
5.				Type5	Type5
6.	Type6		Type6		
7.	Type7				Type7
8.	Type8	Type8			
9.		Type9	Type9	Type9	Type9
10.		Type10		Type10	
11.	Type11	Type11			
12.		Type12		Type12	
13.	Type13	Type13		Type13	Type13
14.			Type14		Type14
15.		Type15			Type15
16.	Type16				

Table 2: Learning style approach

Learning type	Description
Type1	I learn by trying things out, focus on the outer world of people.
Type2	I considered risk taker, learn by trial and error, rely on hunches rather than logic to solve problems. I dislike strict procedures, like variety and unstructured settings and open-ended problems.
Type3	I Learn by thinking things through, working alone.
Type4	I tend to gain understanding in linear steps, following logical stepwise paths.
Type5	I tend to learn in large jumps, absorbing materials almost randomly without seeing connections.
Type6	I focus on facts and procedures, and often like solving problems.
Type7	I make decisions Based on logic and rules.
Type8	I am interested in detailed and facts, value logic and order, require facts, focus on concepts and the ideas, and excel at integrating knowledge and creating theories.
Type9	I am imaginative oriented toward theories and meanings, and prefer discovering possibilities and relationships.
Type10	I make decisions Based on personal and humanistic considerations.
Type11	I set and follow agendas, seek closure even with incomplete data.
Type12	I adapt to changing circumstances, resist closure to obtain more data.
Type13	I prefer visual representations with pictures, diagrams, flowcharts, etc.
Type14	I prefer presentations that proceed from the specific to the general.
Type15	I prefer presentations that go from the general to the specific.
Type16	I prefer learning by hearing other’s explanations, explaining and analyzing language usage.

6.2 Adaptation of The Interaction

This deals with learner while interacting with the system. It has been stated that the use of neural networks is offering a potentially attractive way of surmounting the difficulty of recognizing unclear or complex patterns [14]. Therefore, the neural network will be used for extract the learner

preference and construct the student model. The parameters of the neural network will change based on course assessment test and a progress report for different learning style the learner attempted.

6.3 Adaptation of The Presentation

This adaptation deals with presenting the course contents in different view, activity and different hierarchy based on each learning style methodology so for example mind map approach represent the course visually as shown in Figure 1, gamming learning based approach the learner will learn the subject in gamming form as shown in Figure2 or sequencing as shown in Figure3. Figure 4 represents problem based learning and Figure 5 represents the inquiry based learning. Multimedia (animation, video, audio) will be enhanced for presenting each learning style, which will be based on some criteria such as the learner’s preference and the nature of the course content.

6.4 Adaptation and Learning Standards.

This adaptation is to confirm that the system environment such as course content and course management system is developed based on SCORM standard [15].



Figure 2: Gaming

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To begin with, let us describe a person who writes programs. That person is called a programmer. Like a composer who composes music, a programmer writes programs to produce program applications.

Let us now look in details the meaning of a program. A program is essentially a sequence of coded instructions fed into computer that is written by a programmer. These instructions would then enable the computer to perform specified logical and arithmetical operations on data.

Programs require both logical and arithmetical operation on data to function. Logical operation enables the process of decision-making whereas the arithmetical operation enables the calculation process inside a program.

Figure 3: Sequencing

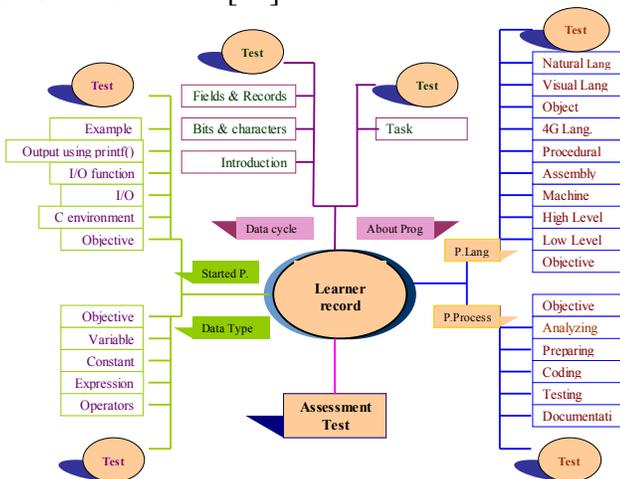


Figure 1: Mind map

Figure 4: Problem based

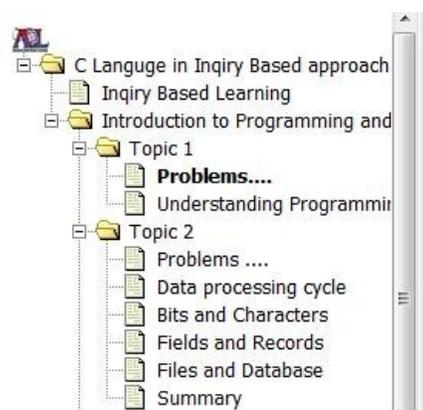


Figure 5: Inquiry based

7 CONCLUSIONS

In e-learning an adaptive system allows for adaptation of the content to the user accessing it to improve the learning process. However, dealing with different student with different behavior is still the critical issue for most researches. This paper concluded that most of e-learning problems fall in four main issues such as: preferred learning style, course content presentation, intelligent tutoring system, and e-learning standards. The solution to improve e-learning process is also presented.

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