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A PROPOSED MODEL FOR PERSONALIZATION OF E-LEARNING SYSTEM

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ABSTRACT

Learning is a cognitive process which differs from student to student. Each student has different style in learning process. Most of the E-Learning systems do not consider the individual aspects of the students. To make it suitable for the different students with the different needs, it should be personalized. This article identifies the heterogeneity factors of the student group and proposes a model for personalizing the E-Learning system to enable the requirements of the users.

Keywords: Virtual Learning Environment, E-Learning System, Personalization

1. INTRODUCTION

E-earning system replaces the old fashioned and predetermined learning with a customized and demand based system. E-Learning system has more advantages than conventional learning. The Conventional learning supports only one learning style in which a teacher handles the class for the students in a class room and all the students receive the same materials without considering the personal needs and characteristics of the students. The advantages of the E-Learning system are

i. Individual care is given for the students
ii. It is not syllabus oriented
iii. It does not depend on the environment
iv. It is not restricted to the knowledge of the faculty
v. It is available at any time

Through E-Learning system has many features over conventional learning system; most of the E-Learning systems disregard the individual aspects of the students.

2. METHODOLOGY

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The personalization of the E-Learning system can be made after identifying the three factors such as learning style of the students, personal view of the students and the knowledge level of the students on particular domain.

2.1 Identifying the learning style of the learners

According to Felder – Silverman Learning style methodology [1], the learning styles of the students are categorized into five dimensions as

- *Active and Reflective* – Depends upon processing dimension
- *Sensing and Intuitive* – Depending upon perception dimension
- *Visual and Verbal* – Depending upon the understanding dimension
- *Sequential and Global* – Depending upon sequence of understanding dimension
- *Inductive and Deductive* – Depending upon organization dimension

The heterogeneous groups of students are classified on the basis of the characteristics such as Multiple Intelligences, Proficiency stages and cultural dimensions.

2.1.1 Differentiating the student group on their Intelligences

According to Gardner's Multiple Intelligences theory [2], learning styles of students are classified into eight categories in addition to the existing categories identified by Felder – Silverman. They are

a. *Logical / Mathematical Intelligence* – Ability of performing the logical (comparisons) and mathematical calculation (Computations)
b. *Spatial Intelligence* – Ability of visualizing the learning content and making the maps mentally (Not openly shown)
c. *Linguistic Intelligence* – Ability of communicating with words
d. *Kinesthetic Intelligence* – Ability of using his / her body and hands to understand the learning
e. *Interpersonal Intelligence* – Ability of understanding other people and communicating with other people constantly
f. *Intrapersonal Intelligence* – Ability of understanding himself / herself (Self belief)
g. *Rhythmic Intelligence* – Ability of understanding by means of singing , playing and composing
h. *Naturalistic Intelligence* – Ability of remembering and classifying the patterns with the real world natural.

All persons have all eight intelligences and ratio of the presence of the intelligences among them only differ. Once the intelligences of the students are identified, the personalized system can motivate them and gives more attention to the weak intelligence of the students.

2.1.2 Differentiating the student group on their Proficiency

According to Dreyfus [3], the heterogeneity of the students group on their proficiency, the learners are illustrated in five stages. They are

a. *Novice Stage* – Begging stage requiring models ,rules and prescriptions
b. *Advanced beginner* – It is the next level from the novice stage in which the learner recognizes based on the explanation
c. *Competence* – Chooses the plans to reach the goal

d. *Proficiency* – The quality of state of being proficient; advance in the acquisition of any art, science, or knowledge; progression in knowledge; improvement; adeptness;
e. *Expertise* - refers to the mechanisms underlying the superior achievement of an expert, i.e. "one who has acquired special skill in or knowledge of a particular subjects through professional training and practical experience"

2.1.3 Differentiating the student group on their cultural Dimensions

Students are also grouped according to the cultural dimensions. According to Hotstede's theory [4], cultural dimensions are classified into five categories. They are

a. *Individualism* – Degree to which how the individuals are grouped
b. *Masculinity* – Distribution of roles between genders
c. *Long tem orientation* – Thrift and perseverance
d. *Power distance Index* – To which extent less powerful members do their task
e. *Uncertainty Avoidance Index* – How well the social uncertainty and ambiguity are avoided

In personalizing the E-Learning system, all heterogeneity factors are to be identified and can be put into 2 or 3 dimensional matrix for the further analysis.

2.2 Identifying personal view of the students

To make any system successful, the personal view of the user must be identified. In the E-Learning systems, student's views of the learning objects and learning activities can be identified before they use them to make it useful to them. Some of the student views are

a. *Pedagogical method* – Pedagogy represents the way of learning. Some of the pedagogical methods are
    i. *Tutorial* – It presents the contents, posing some questions, requesting the students response, analyze the response , collecting the feedback and providing the practice
    ii. *Demonstration* – It gives the detailed demo for the student view a real or lifelike example
    iii. *Discussion* – It provides exchange of ideas and opinions among students and teachers
    iv. *Game based Learning* – It creates the playful environment for the student to gain the knowledge
    v. *Problem Solving* – It places the students in the active role and the student start with limited knowledge, perform experiments and generates the solution
    vi. *Presentation* – It is one way communication controlled by the source in which there is no response
b. *Objective of the learning*

    Based on the type of the learning objective, students can access the learning objects. Different types of learning objectives are available such as Cognitive Learning Objectives, affective Learning Objectives and Psychomotor Learning Objectives
c. *Learning path guidance*

    It will be useful for the students to guide them the workflow of using the learning objects.

d. *Incorporating students to prepare the learning object*

The students in the learning environment not only have the consumer role, but also have the producer role. They may be allowed to share their learning objects for preparing the system.

e. Recommending the learning objects based on feedback from the students

The system can recommend the learning objects based on the behavior and choices of the previous students

f. Media type

The students are allowed to choose the media for the leaning. The media are audio, video, text, number, illustrations etc.

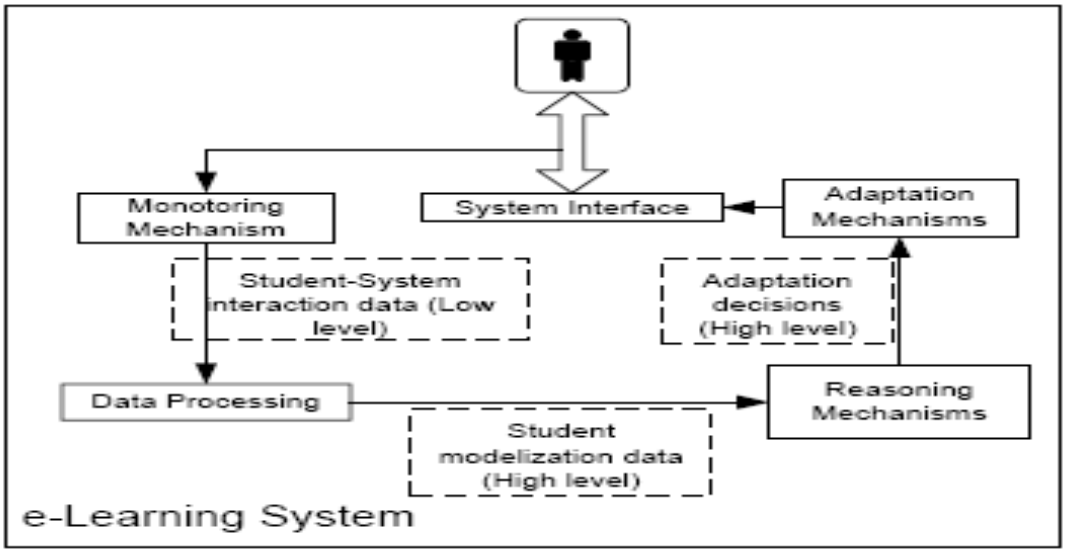
2.3 Identifying the knowledge level of the student

The different group of student needs different content for the required course according to the knowledge level of the student. So a component can be incorporated in the system measure the knowledge level of the student in the specific domain. According to research methods for the Behavioral sciences Fedrick J.Gravetter , Lori – Ann B. Forzan , the best method to measure the knowledge level of the student is to give test and record the numeric value for valuating the test. It is a familiar method that most students accept it without much thought. In the test, basic questions (Multiple choice and True / False questions) are asked on the basis of the concept. For the score, we use the decreasing weight for the sequences of the basics of the topic. The knowledge level of the student is given to the course developer to produce the dynamic content for the students according to their knowledge.

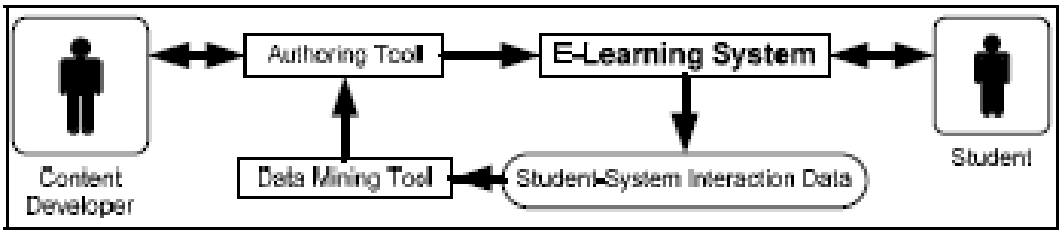
3. ARCHITECTURE FOR THE PROPOSED MODEL

A successful Model which to be developed for personalization has to consider the characteristics using the guideline for SCORM [5] (Sharable Content Object Reference Model). The proposed model should have two components.

The first component is to be used for collecting the information about the users to identify the learning style, user's personal view and knowledge level. It is the **on-line personalization model**. The model can be pictorially represented as follows



The other component measures their requirement in which the input is received from the first model and intimates them to the course content module to prepare the course material on considering the individual aspects of the students. This component is the **off-line personalization model.** The model can be pictorially represented as follows



4. CONCLUSION

This paper deals with the approach of personalizing E-Learning based on the student model. The aspect of this article is on mapping the student knowledge to course concepts and to adapt to contents and navigation structure to a particular student.

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