A supportive Framework to Enhance Student's Motivation for E- Learning

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Abstract: E-Learning is a rapid humanizing as a cost-effective education paradigm and providing the best ways to the institutions to expand their educational programs to provide easy access to a large set of student populations. Student motivation to learn electronically has a key concerning issue with e-learning system. Learners' performance progress and success based on e-learner's motivation level and type. It's very crucial to detect and improve the motivational aspect of an e-learning course at any level. With this research we focus on student's motivational approach and used student motivation as a basic parameter to model an intelligent e-learning supportive framework for the e-learners. In addition, additional modules are added to the standard intelligent tutoring framework system to make one to one communication i.e. of the learner and tutor. Mainly three strategies namely learning, motivation and tutoring further based on several key aspects have been incorporated in the proposed model, with the inclusion of two additional modules named as, student current level module and student motivation module in the basic ITS models. The modules of the proposed system are such as interface module, Student current level module, student motivation module, tutoring module, student performance module and expert module. Student module is termed as student performance module in the proposed framework, for maintaining the continuous track of learner's performance while keeping him/her engaged with the learning activity and the tutor.

Keywords: E-Learning, Intelligent E-Learning, Intelligent Tutoring Systems, Student motivation

I. INTRODUCTION

E-learning, as learning and/or teaching tool is now rapidly advancing education paradigm and has become the most popular learning environments in the information age[1,2,3,4]. It covers Web-based learning, Internet-based training, advanced distributing learning, and online learning [5]. As an alternative to traditional Learning, it is providing the benefit to student, instructor and organization in public and private sector [2].

It is a novel education system that is able to solve the problems between the large amount of social demands and the lack of educational resources [6]. Intelligent e-learning is providing great opportunities to fulfill the learning needs of the learners that belong to different cultures by making use of AI techniques. It is a novel mechanism to solve the learner's problems regarding his/her education by providing proper feed back and suggestions to raise his/her knowledge level. Student/learner motivation is an important issue concerning an intelligent e-learning system. This paper is focusing on how to make the interaction and communication between the learner and the tutor more effective, by equal participation of learner and tutor in an e-learning environment for enhanced learner's motivation. The model presented in this paper is based on some modifications in the standard ITS model to customize the system according to the learner's motivational needs. Work has already been done on the same issue, but researcher modeled the system according to her own perception as being the learner and tried to present it in a different dimension for a free e-learning environment.

II. INTELLIGENT TUTORING SYSTEMS

Intelligent Tutoring Systems (ITS) are computer-based instructional tools that depend on artificial intelligence techniques to fulfill a student's learning needs [7]. The goal of ITS, is to support one-on-one instruction automatically and cost effectively by enabling participants to show their skills by performing the tasks within highly interactive learning environments [3, 7, 8]. It is educational software containing an AI component. The purpose of this software is to monitor students' work, provide feedback and hints to the student and the software can make assumptions about strengths and weaknesses of the student by collecting information about a student's performance, and provide suggestions to improve it further [9]. The Main objective of using ITS for e-learning systems is to increase student performance and motivation as it incorporates built-in expert systems in order to monitor the performance of a learner and to personalize instruction on the basis of adaptation to learners' learning style, current knowledge level, and appropriate teaching strategies in e-Learning systems [3].

In the recent years, with the improvement of network technologies and hardware supports, distance education has been provided to students all over the world. Students are able to study anytime and anywhere through the internet. Instructors are able to teach students without being in classroom [10]. The objective of intelligent e-learning systems is to provide highly structured lessons under an automated control. Within the e-learning framework, the intelligence of the system often appears in the form of adaptive sequencing or personalization of the course material, adaptive guidance for navigation, or interactive

problem solving support. All of these methods work the best in well-structured domains, and depends heavily on a fixed collection of pre-made course material [11]. Many educational institutions are now taking advantage of the opportunities provided by e-learning to advance their programs and attract student population that belong to different cultures. E-learning is also known as distance education, online learning, virtual classes, interactive learning and Web-based education in the literature. E-learning provides new ways to institutions to expand access to education at an acceptable cost and support a large set of student population. An enterprise-wide e-learning support system, called Web Interact System (WebIS) that provides a platform that uses an existing interactivity model to dynamically measure the interactivity of learners [12].

With the popularity of e-learning, various teaching software, tools and e-learning platforms have constantly appeared. An Integrated Framework for E-learning systems, which characterizes the reliability, the flexibility and the platform-independence, is proposed. It solves the problems faced while integrating the heterogeneous e-learning systems, such as the heterogeneity, the interoperation and the scalability [6]. An intelligent tutoring system, the FLUTE system is based on students' systematic introduction into the system's domain, in accordance with both the logical structure of the domain and individual background knowledge and learning capabilities of each student. [13]. A good student assessment algorithm has been proposed that need to be brought out to judge students' performance [10].

A general framework has been proposed for adaptive e-learning systems, for two problems i.e. keeping motivation for learning of a student and difficulties in constructing course materials by teachers and the role of information visualization has been discussed in adaptive e-learning systems [14].

III. STUDENT MOTIVATION AND MODELS IN THE E-LEARNING SYSTEM

Motivation of students using intelligent tutoring systems (ITSs), and how a student's motivation affects the way he or she interacts with the software is capturing great interest. Tutoring systems have become highly effective in monitoring what skills a student possesses and providing help in the choice of exercises to a student's skills [15]. There is a community based intelligent e-learning system, to enhance the learner's performance level by providing correct diagnoses on the basis of student performance and adequate feedback. Teacher character is equipped with face to face communication function, to make feel the learner that the teacher is humane to make the learning environment more interactive [16]. The importance of motivation is mentioned as the basic success factor of learning program.

The ARCS motivational model systematically helps the instructions design in online learning systems. ARCS model is based on four components, can motivate learners in e-learning applications and valid enough to be applied in various kinds of e-learning strategies plus helpful to improve e-learning programs [17].

Self-efficacy has been acknowledged as an accurate predictor concerning the motivational state of students and their learning effectiveness. It is defined as "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" [18]. The purpose of an integrated e-learning system development is to enhance students academic motivation by determining current level of student learning [19] .The e-learning instructor plays a crucial role in maintaining students motivational level by planning structures and facilitating interpersonal events [20]. Student modeling is the main issue in E-learning. It is the analysis of student behavior and prediction of his/her future behavior and learning performance. In fact, the most prevailing issue in the e-learning environment these days is that monitoring students' learning behaviors is not an easy practice [21]. In the area of ITS, the student model is one of the components to be included in an educational system. In the 1992 Woolf [Woolf 1992] identifies four major components in ITS architecture: the student model, the pedagogical module, the domain knowledge module, and the communication module.

In an ITS the student model stores information, specifically to individual learner: it is related to "how" and "what" the student learns or his/her errors, and the student model plays an important role in planning the training path, as well as supplying information to the pedagogical module of the ITS [21]. There is Computer Assisted Language Learning (CALL) course designers whose purpose is to develop efficient courses, based on strong student motivation, to make learners capable of facing quick changes in their professional Environment [22].

IV. OBJECTIVE OF THIS STUDY

It has been identified that one-to-one teaching or small group tutoring is more efficient than the teaching in a class with the size of 25 to 30 students as it improves student's academic performance [16]. Learning efficiency can be improved by teaching the learner at his own level, if a teacher provides one-to-one tutoring in e-learning. Main objective of this study is to allow one-to-one tutoring by equal participation of both, learner and tutor for enhanced learner's motivation and hence a free e-learning environment. Enhanced student motivation could be achieved by not only tutoring the learner at his own level and motivate him accordingly, but providing him with an e-learning environment in which learner could share his problems, queries , ideas and his feedback regarding the study material and tutor's method of teaching and communication with the leaner as well.

V. MODEL FOR INTELLIGENT E-LEARNING WITH STUDENT MOTIVATIONAL APPROACH

The standard ITS consist of the following components [16].

a. ***Expert Module***: All the knowledge to be taught by the specialist teacher is stored.

b. **Student Module:** To find out the current intellectual level of the student, while he/she interacts with the system

c. **Tutoring Module:** Provides the strategy or information on how to instruct the student.

d. **Interface Module:** It allows the tutoring system and learner to talk mutually

A. *Proposed Model:*

Proposed model is based on, how a student can be motivated and encouraged before starting the normal Learner-tutor communication and keep this motivation level up throughout the communication, by keeping continuous track of learner's performance . Main objective of the proposed model is to allow highly interactive e-learning environment, by equal participation of a learner and tutor for enhanced learner's motivation. Three strategies are to be incorporated in the proposed model for achieving this objective, Learning strategy, tutoring strategy, and motivation strategy.
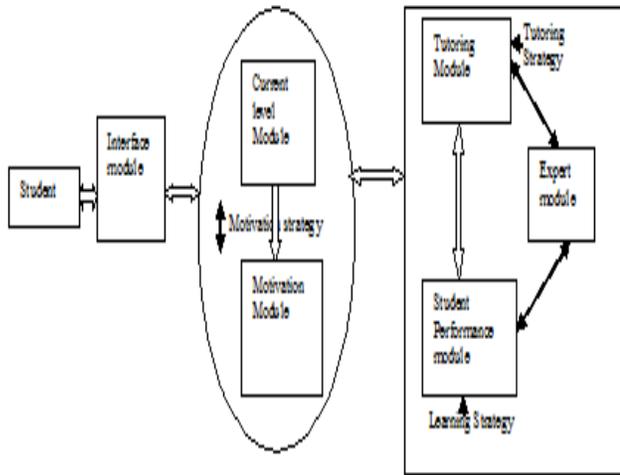

Figure 1: E-learning model based on enhanced student motivation on the basis of standard ITS model [16]

a. *Learning strategy***:** Learning strategy will be incorporated in student performance module. It involves
   i. Specifying the key points of a topic during the lecture/class
   ii. Highlight the points need to be clarified
   iii. Questioning
   iv. Discussion
   v. Self Exploration of ideas , examples and scenarios in support of topic
   vi. Feedback
   vii. Self assessment

b. *Motivation strategy:* Motivation strategy will be incorporated in Student current level module and motivation module. Motivation strategy involves

Assign grades for student current level ………. before starting the course, perform student analysis and assign him a grade on the basis of his interests, objectives, motivational state and ability to progress. Also notify the learner about his grade on the basis of learner's previous performance,

whenever he/she crosses the interface module and alert about all the mistakes and errors done in assignment or quiz.
   i. In motivation module , notify the learner about his /her existing weaknesses and strengths
   ii. Specify different performance levels , (on the basis of student's questioning , discussion, quiz and assignment results) , against which grades will be assigned to the learners
   iii. Specify the strategy for motivation against different grades on the basis of student performance. This strategy could be a self-defined procedure by the tutor according to his perception based on student's analysis or it could be based on motivation models or strategy that already exists in literature like ARCS Model. This strategy will cover lecture delivery (design and presentation), questioning, discussion, feedback and learner's assessment process to keep engaged the learner with learning and to raise his/her current level of motivation. Or in other words motivational strategy selected and discussed by the learner and tutor will be practically implemented while tutoring and learning.
   iv. Give the examples of other learners (grades achieved , strategy adopted and performance progress) for students encouragement on the basis of their performance

Specify different reasons in view of different scenarios on the basis of which student performance could be raised or lowered to/from a certain level

Tutoring strategy will be incorporated in tutoring module. The core aspects of this module are
   i. Presentation of e-learning content on the basis of learner's analysis i.e. Learner interest in the particular subject/course, objective, motivational state, and selected motivational strategy for the learner by the tutor
   ii. Start with simple definitions and examples and proceed toward complex scenarios
   iii. Use text, graphics , animations ,audio and video
   iv. Assign the tasks based on student current performance and which could enhance his ability to progress further
   v. Give useful hints and allow the students to search out the related material for tasks completion. Provide him/her an easy access to pre-designed e-portals containing useful material regarding different topics of the course.
   vi. Questioning
   vii. Discussion
   viii. Quiz and assignment after every class
   ix. Feedback
   x. Learner's assessment

Four key aspects of the proposed model to be practiced by both parties i.e. learner and tutor for making one-to-one communication more effective, to allow true performance judgement of the learner and his/her motivation accordingly are
   i. Questioning

ii. Discussion
iii. Feedback
iv. Learner's assessment

B. Modules of proposed Model:

Here we will define each module of our proposed model in terms of the core concept of our idea.

Interface module: All the teaching and leaning is done through interface module.

a. **Student's Current Level Module:** After entering the interface module, next module is "student current level module". This module is added to first perform the student analysis on the basis of his/her interest, objectives, motivational state and ability to progress further in the relevant field or subject by using the built-in quiz. On the basis of quiz result student or learner will be assigned a grade called as "current grade" of the learner. On the basis of assigned grade the tutor will adopt the suitable motivation strategy for learner's further motivation and raise his/her performance level. Whenever student crosses the interface module, he or she will be informed about his current grades on the basis of his performance progress. Student will be informed about his mistakes in assignment or quiz as well as his weaknesses and strengths for his motivation accordingly.

b. **Student Motivation Module:** This module involves the motivation strategy and added to provide a student with planned procedure to motivate him to raise his/her current performance level. Tutor will inform the learner about different cases and situations with reasoning that could cause student performance to be raised to/or lowered from a certain level. Both learner and tutor could discuss about the strategy selected by the tutor in the light of learner's strength and weaknesses to raise learner self-confidence and satisfaction level while communicating with the tutor.

c. **Student Performance Module:** Based on the learning strategy, in this module, student will be allowed to ask the queries and perform discussions with the tutor about the topic. Moreover student will be asked to generate examples, ideas and different scenarios by themselves and share it with the tutor to clarify their viewpoints and make themselves sure about complete understanding of the topic. This module is named as student performance module, as it is aimed at keeping continuous track of learner's performance and raising it further, by continually engaging him/her with the learning activity and the tutor. Leaner could give feedback about his /her satisfaction level regarding the topic delivery (method of teaching/tutoring), understanding of the topic and overall communication with the tutor. Self assessment will allow the learner to predict about his future performance progress on the basis of this feedback and upon receiving the learner's assessment he or she could draw the final conclusion about his understanding of topic/course and future progress he/she must be targeted to achieve.

d. **Tutoring Module:** Based on tutoring strategy, backed by motivation module, this module will allow the normal course of sharing knowledge and instructions between the learner and tutor and involves questioning, discussion, providing feedback to the learner and perform learner's assessment, plus the application of motivation strategy selected by the tutor for enhancing the learner's current motivation level. Simply the motivation strategy should cover lecture design and presentation, questioning, discussion, feedback and learner's assessment process by the tutor. After delivering the lecture, tutor will allow the learner to ask questions he or she is confused about. Both learner and tutor will discuss about the questions one by one, and sideways tutor will analyze the satisfaction level of the student on the basis of discussion, asked questions, depending on their simplicity, complexity and relevancy to the topic. Both learner and tutor will share their feedback on the basis of whole discussion. Tutor's feedback will be based on student's understanding of the topic, and learner's feedback will be based on his/her satisfaction from the tutor's method of topic delivery, topic understanding and overall communication. On the basis of this feedback process, tutor will get a clear picture of student's satisfaction level regarding the discussed topic and confidence level upon the tutor. Tutor will ask the leaner to perform self assessment about future performance progress he/she could achieve on the basis of feedback i.e. of both learner and tutor. After this a short quiz will be given to the learner based on the discussed topic and tutor will prepare the learner's assessment report on the basis of quiz results and inform the learner about current progress and assign a performance level. For final assessment, student will be given one more chance on the basis of assignment or quiz. Next time when the student will enter into "current level module" he will be informed about the grades by automatic checking of the assignment or quiz and will be motivated accordingly through student motivation module.

e. **Expert Module:** It will consist of all the knowledge required to make the communication possible between the learner and tutor or it contains the knowledge on a particular subject that is required by the specialized tutor to teach the learner according to his/her learning needs.

VI. CONCLUSION & FUTURE WORK

Student motivation is capturing great interest in ITS modeling. This paper is focusing on enhanced student motivation while delivering education through an e-learning system. A model is proposed on the basis of basic ITS model, with the addition of two modules to determine the student current knowledge level and motivate him/her accordingly and keep this motivation level up throughout the normal tutor–learner communication. Three strategies namely, learning, tutoring, and motivation have been

suggested to be incorporated in the proposed model for equal participation of learner and tutor to achieve the objective of enhanced student motivation. Future work involves the practical implementation of this model to take the results and analyze its applications.

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