**Adaptive Online Lecture Model: A New Perspective of e-Learning 2.0 Paradigm**

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**ABSTRACT**

This paper presents a proposed Pedagogical, and Architectural specifications models of utilizing Web 2.0 features to present an "Adaptive Online Lecture Model". In order to present an Adaptive Online Lecture Model, different Web 2.0 technologies will be utilized, so instructor can make decisions immediately based on students' feedback via the resources they like and utilize; Web 2.0 technologies. Proposed model tends to help instructors interact~~s~~ closely with students; reach to students easily via Web 2.0 technologies.

**1. INTRODUCTION**

Different Learning Paradigms can be presented by different educators as a result of utilizing several types of Information and Communication Technology "ICT" in the Learning Process to overcome time and place challenges, and to enhance the learning process. The three abstract Learning Delivery Models are: Traditional, Distance, and Hybrid Learning. Hybrid Learning attempts to maintain the best of Traditional Learning and provides the hopes and objectives of Distance Learning in a model that maintains the Learning Process on the right road. The widespread of Web 2.0 resulted in the appearance of the acronym “e-Learning 2.0”. Web 2.0 is a big resource that changed the way everyone thinks about, utilizes the Internet, and greatly will touch the coming generations; the generations that instructors are currently delivering education to. Other big challenges to consider in learning nowadays are the growing numbers of students that is hardly met by growing numbers of instructors. One of the ICT utilization in learning main objectives was to overcome those challenge. This has led to a form of Synchronous Distance Learning Model that utilizes online communications methods to deliver learning via online meeting methods. Those meetings are challenged by spaces and miles between instructors and students that might prevent proper ways of communication between both. E-learning 2.0 has lighted a new torch over processes and roles in acquiring knowledge. A heterogeneous community of teachers and learners can dialectically share and improve their knowledge, lit up by Web 2.0 facilities and massive multimedia employment. This trend has a particularly strong impact on e-learning, finally offering new tools and methodologies to effectively work as in an on line community of practice, articulated and promoted by people. The traditional way pursued by e-learning has been overcome by the wide use of Web 2.0 applications, from blog to podcast, from wiki to media sharing. From the accessibility point of view, e-learning 2.0 and its related novel Internet technologies represent a pitfall challenge (Ferretti et al., 2008).

Students access different online resources during the online meetings conducted with instructors, either via   her/his cell / smart phone and Tablet/Mobile PC. Instructor can assign tasks to students, and they immediately start working on them. Instructors can share the presentations from their laptops with the attendees. Instructors are not just telling students some information and giving them some assignments, they are ensuring that they can retrieve the information, understand, apply the information to become  "knowledge". Though current online meeting applications provide abovementioned capabilities, they suffer real-time communication shortages between instructors and students. Students might not be involved enough in the learning process with the instructor might be missing some important prerequisites for understanding certain topic, might need repetition of some parts while instructor can’t define those requirements due to distances between them. This is not the case of course when students and instructors are at the same place; because instructors can feel students immediately, and start asking them “What is wrong?” and “Is there something unclear?” questions. Even with the existence of web cams, students can easily fool them by starting them and starring at the monitors; only God knows what they starring at!

## 1.1 CURRENT ONLINE LECTURE MODEL “PROBLEM DEFINITION”

Students login to online meeting system instructors are already waiting, started the class, shared the files, presenting lecture~~s~~, defining assignments, defining labs to be followed later, take questions, and leave. They wait for assignments before due time, mark them, repeat the scenario for another meeting/lecture, and so on. This model is the same exactly of the Traditional Learning Model; the model used to work fine when the number of students used to exceed by more than hundreds the number of professors, but it is not working the same quiet fine as it used to. This system, is too much stable: students know the courses they are going to attend, they have question banks, and different academic resources available today. This system has stabilized to the extent that under some circumstances it is killing innovation and preventing students and professors from “Knowledge”. One of the reasons that affect this model efficiency is the lack of connection between students and instructors. With this huge number of students, there are doubts about the instructor's capability to connect with everyone individually. Of course this is a matter that differs with experience and varies from instructor to another; however it is till a matter to question.

This lecture model might be acceptable in countries with acceptable student-teacher ratio. However, based on the Arab Knowledge Report (2009), higher education in the Arab region suffers a considerable shortage of teachers. In 2005, the student-teacher ratio was 25:1, compared to the global average of 16:1. The Arab student teacher ratio is the highest among all regions of the world, including sub-Saharan Africa. The shortage is more severe in some countries than in others. The student-teacher ratio is at least double the global average in Yemen, Egypt, Algeria, and Palestine, and one-and-a-half times the global average in Jordan, Bahrain, Mauritania, Libya, the UAE, and Saudi Arabia. Hopefully proposed Adaptive Online Lecture Model will enhance the ~~lecture~~ learning experience and might help to overcome such a challenge; especially in Arab region.

Even in countries with acceptable student-teacher ratio, the current online lecture model doesn’t entitle students to feel a real utilization of new technologies in the learning process. The 2009 21-st Century Campus Report (2009) presents some facts that are important in imaging the current situation, and hopefully will be leading the move to the new model. One of the facts is the different views between instructors and students rate for utilizing technology. Instructors rate their use and understanding of technology as high, but students disagree with that assessment. Students rate faculty lack of tech knowledge as the biggest obstacle to classroom technology integration and see it as a growing problem.

**1.2 PROPOSED ONLINE LECTURE MODEL**

**2. PROPOSED ONLINE ADAPTIVE LECTURE MODEL AS PROCESSES**

Proposed Adaptive Lecture Model different In-Lecture and After-Lecture features needs to be further studied by educational institutions to define the most suitable scenarios for them to implement and deploy. Business Process Modeling Notation (BPMN) is one of the standards widely used to present business processes. Figure 6 presents one of the in-lecture activities of the proposed adaptive lecture model; that is reshaping the lecture based on students’ indirect feedback via Web 2.0 technologies. In proposed model, different activities performed by instructor and student are highlighted in different lanes, besides the necessity for a Real time Application that performs the analysis tasks on students feedback. In this business process, reshaping lectures is a smooth activity that might take place without students’ notifications of the process happened.

Further tasks to that business process can include the instructor’s invocation of an overall feedback on the lecture. Thus, LMS needs to define the different utilized methods that students’ uses to access the LMS, the preferences stored for them to submit the quiz. Figure 7 illustrates the sequence of activities that takes place when instructor initiates such a process. Figure 7 starts from the end point of figure 6, and continues.

Adaptive Lecture Process.tif

*Figure 6: Proposed In-Lecture Informal Feedback activity feature of the Proposed Adaptive Lecture*

**Complete Feedback.tif**

*Figure 7: Proposed Formal In-Lecture Feedback Process of Proposed Adaptive Lecture Model*

**5.2 SOFTWARE ARCHITECTURE TO SUPPORT PROPOSED ADAPTIVE LECTURE MODEL**

**(SOA), Mention the IMS SOA White Paper -> it’s really important.SOA is the model enabler, it is the softwar architecture that will combine different technologies. It is clear that the system needs different technologies, as an example the figure that illustrates the (Initiate Assessment). This activity requires interaction of different kinds of systems with different data, formats, and all this stuff. Talk about SOA in Integration only as you are always directed to do; avoid talking about it outside of integration scope. You can also mention the UMIS and LMS differences, and focus on different data presentations in both systems -> reference ACM eLearn Magazine article.**

Software / Application architecture serves as the blueprint for individual application systems, their interactions, and their relationships to the business processes of the organization. A software application is a computer program or set of programs that uses existing technologies to solve some end-user problem such as the automation of an existing business process. Software architecture can be defined as “the sum of the nontrivial modules, processes, and data of the system, their structure and exact relationships to each other, how they can be and are expected to be extended and modified, and on which technologies they depend, from which one can deduce the exact capabilities and flexibilities of the system, and from which one can form a plan for the implementation or modification of the system” (Hohmann, 2003). Application Architecture defines the form and function of the applications that will be developed to deliver the required functionality of the system (Macaulay, 2004). Integrating current University Management Information Systems (UMISs) that include different components like Student Information Systems (SISs), Library Information Systems, Financial Systems, and other components with the implemented Learning Management Systems (LMSs) has been a challenge that facing educational institutions for a while.

**Initiate Assessment.tif**

*Figure 8: Proposed needed Applications to satisfy Proposed Adaptive Lecture Model functions*

**5.4 INFRA STRUCTURE (IT) ARCHITECTURE TO SUPPORT PROPOSED ADAPTIVE LECTURE MODEL**

Integrating different technologies, applications, infrastructures to serve the learning process is one of the challenges that came to surface as a result of different technologies presented recently. Service Oriented Architecture (SOA) is the ….. [IMS SOA White Paper]

The IT architecture defines the hardware and software building blocks that make up the overall information system of the organization (Albin, 2003). IT architecture includes hardware and software infrastructure including database and middleware technologies. The IT architecture should enable achievement of the business goals using a software infrastructure that supports the procurement, development, and deployment of core mission-critical business applications. The purpose of the IT architecture is to enable a company to manage its IT investment in a way that meets its business needs by providing a foundation upon which data and application architectures can be built.

Cloud Computing, Virtualization, and that stuff of IT Currently Became available lately

Adaptive Lecture.tif

Figure 3: Adaptive Lecture IT Infrastructure

**6. INSTRUCTOR CHALLENGES AND EXPECTED OUTCOMES OF PROPOSED ADAPTIVE LECTURE MODEL**

A real educated student, not just the student mentioned in the 2008 report

In e-Learning 2.0, instructors’ capabilities are challenged by new technologies. Instructors are more information related in the information age compared to the situation in the traditional model. It is not just that instructor needs to be capable of utilizing different technologies to achieve the adaptive lecture model, it is their ability to prepare and manage different scenarios during the lecture, and utilizing different technologies made available to their students. Instructors are challenged by the involvement levels with students. Online access and facilities opened new ways for students to communicate with their instructors, and forced instructors to present minimum level of online support that entitles collaboration and communication activities that wasn’t a necessity before.

**7. CONCLUSION**

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