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### A Model for Computer Supported Learning in Undergraduate Education

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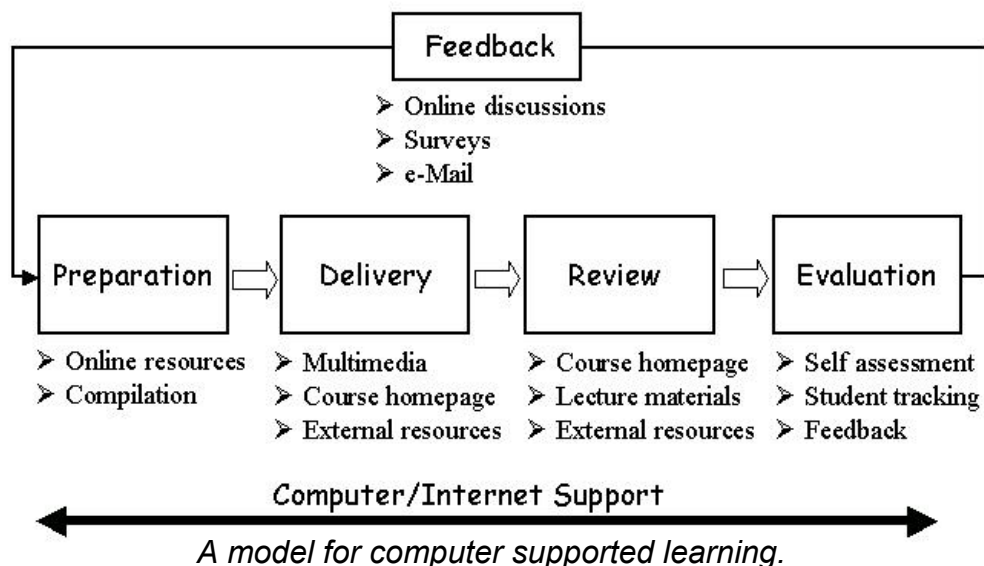
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## A Model for Computer Supported Learning in Undergraduate Education

*Dr. Lotfi K. Gaafar, Mechanical Engineering Department*

Reflecting on an earlier observation by Dr. Herb Thompson (Department of Economics) that most of us had to teach ourselves how to teach\*, I realized early on in my career that the best way to describe my role as a teacher is that of a learning facilitator. Sometimes that entails leading the way, and other times it requires pointing directions and getting out of the way.

My role as a facilitator is implemented through a model that exploits modern technology while retaining the valuable features of face-to-face delivery and class/office interactions. The model is based on a philosophy with a key theme that the learning process is more effective when class discussions are enriched with various sources of knowledge, and when everything discussed in a class session is available for review outside the class. The computer, the Internet, and a strong course website play a key role in supporting this philosophy which I like to call computer aided lecturing and review (CALR). In CALR, the teaching/learning process is viewed as a continuous cycle comprising the steps of preparation, delivery, review, and evaluation. Evaluation provides feedback to preparation, and so the cycle continues. This cycle is depicted in the figure below along with possible computer/Internet support for all of its steps.



For the preparation step, the Internet offers an abundance of sources that allow an instructor to enrich the learning experience. As an example, Massachusetts Institute of Technology (MIT) launched an initiative in 2001 to openly share MIT course materials to create a worldwide web of knowledge. To date, MIT has published about 500 courses as part of its OCW program (<http://ocw.mit.edu>). Many other resources are available on the Internet ranging from java applets that explain various concepts using interactive animations to complete course materials to websites dedicated to a complete knowledge area. Depending on the nature of a course and copyright considerations, instructors may adopt part of the material in the course or allow students to access the material through an external link.

\* New Chalk Talk, Vol. 2, No. 7.

With the aid of a computer, lectures draw on various multimedia resources to enhance the delivery/comprehension process. Advantages of multimedia based lecturing and the use of a computer to coordinate the lecture delivery include:

- Utilizing a variety of educational resources on the computer including video and animation. Because computers allow random access to digital media, they are more effective than VCRs.
- Promoting the understanding of complex relationships through the gradual and dynamic generation of scientific plots. I use this feature a lot in topics that require extensive data manipulation.
- Expediting the solution of examples.
- Deriving lectures from the course website to facilitate the review process afterwards. Depending on the implementation approach, access to the course website may or may not require an online connection. This issue will be discussed in a later issue of the newsletter.
- With modern capabilities (e.g., the smart classroom in Falaki 212B), the entire lecture may be recorded and saved as a computer file for later reviews. Such a file may include all materials presented during a lecture along with any handwritten or oral comments that went along with them.

As more classrooms at AUC get equipped with an Internet connection, we may add the following advantages:

- Accessing a wealth of knowledge sources to enrich the lecture.
- Allowing the instructor to guide the students' exploration of external resources; setting them on the right track for self/lifelong-learning.

The 'review' aspect of CALR is where e-Learning is heavily utilized. All lecture materials are posted on a course website with extra resources that depend on the nature of each course. Advantages of the course website as articulated by students include:

- Improving access and flexibility: Students can access course materials from school or at home and cover the materials at their own pace in any sequence they prefer.
- By not having to extensively record information during the lecture, students are able to focus on understanding and active participation.
- Saving class time associated with distribution of handout materials.
- Ability to test their comprehension of the subject through the use of partially solved examples, with extra help provided when needed. (For an example, see <http://www.aucegypt.edu/gaafar/UNESCO/index.htm>)
- Support of self-learning through the availability of external links to more detailed materials including videos and animations.
- A comprehensive website that is ready at the beginning of a semester allows students to gain a clear view of the entire course right from the start.

The presented model addresses all "seven principles for good practice in undergraduate education" (Chickering and Gamson 1987) including: student-faculty contact, cooperation among students, active learning, feedback, time on task, high expectations, and respect for diverse talents and ways of learning.

It is clear that the course website plays a central role in the teaching/learning model discussed above. In the following issue of the newsletter, we will look at the design of such a website.

## **Sources**

Chickering, A.W, and Gamson, Z.F. (1987) "Seven Principles for Good Practice in Undergraduate Education." AAHE Bulletin, 39 (7), 3-7.

*Share with us your experiences by contributing to the New Chalk Talk series, or by simply sending comments/suggestions to [aellozy@aucegypt.edu](mailto:aellozy@aucegypt.edu)*