Course Design for the Web-based Classroom

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Abstract

The implementation of an asynchronous, four-course certificate program, delivered completely via the web, has required innovative techniques. The design has focused on what must be done to meet the goals of the courses as well as the needs of the students. It has been necessary to rethink traditional instruction methods and try new ideas. Because of this, instructional conventions have been ignored. In this unique educational environment, classes go beyond basic content to facilitate student success. Each semester, the design of the classes is evaluated and revised to reflect both successful and unsatisfactory outcomes.

Students who participate in these courses are located throughout the country and access the material anywhere, anytime. Instructors find that class is "never over." Questions and assignments are submitted all times of the day and, mainly, over weekends. Both students and instructors do not fit traditional college molds. Learning styles vary when content is presented via the web. *Inquiry based learning*, for both student and educator will be explained. This brings challenges and obstacles, which will be discussed.

This paper will present information gathered after ten course offerings. Details will include the current course teaching techniques as well as the revisions they have undergone. Assessment tools employed in this environment will be identified. Information from student surveys, testing and security methods and overall goals of the web-based certificate itself will also be detailed.

I. Introduction

This paper presents the qualitative results of ten web-based course offerings in the Biomedical Electronics Technology program in the Electrical Engineering Technology department. This on-line teaching environment has distinctive issues. The most important focal points concerning distance teaching are:

- distance education typically requires more preparation time than traditional classroom teaching
- distance educators need to pay more attention to student motivation and feelings than in a traditional setting
- the effectiveness of a distance educator is closely tied to their mastery of the particular media/technology involved
- there are a number of different kinds of interaction possible in the context of distance learning
- distance education incorporates all forms of interaction [1]
- education via the web requires different teaching skills than the traditional classroom.

With these points in mind, it is important to identify these differences and make allowances in the course design to successfully meet the objectives of the class. The instructor must focus on not only what can be done, but what must be done to meet the needs of the students. There are many educational models available for guidance. Gagne's design for lessons includes the following steps or events: 1) gain student attention, 2) inform learners of objectives, 3) stimulate recall of prior learning, 4) present stimulus, 5) provide learning guides, 6) elicit performance, 7) provide feedback, 8) assess performance, and 9) enhance retention and transfer [2]. The web-based classroom instructor must use innovative techniques to accomplish Gagne's steps. By pre-planning how each event can occur, the instructor can be very successful in distance education.

II. Content Presentation

Those who teach via the Internet will agree that the amount of time invested in a class prior to its beginning is tremendous. One area of concentration is the provision of information to the students, which normally could be obtained elsewhere. Before the class begins, issues must be addressed with detail. Expectations must be outlined. Topics in this area include: university integrity, academic schedules, grading, syllabus design, tips for success (including time management), contact information for the instructor, technical assistance sources, and positive outcome identification [3].

To begin the lengthy task of content design, the instructor must "look closely at the content to be delivered, the characteristics and capabilities of the audience to be served and the proposed learning outcomes, and then make a decision about how to design the course." [4] Simply placing black text on a white page will not meet the desired educational objectives. The instructor must carefully consider the various media available and decide what will work well for the students. Video or synchronous activity may not be useful for some types of students. Adequate technical expertise and support are essential for the successful use of delivery technologies.

When the technical questions have been answered and the format selected, the content must be presented with consideration given to the type of learning that takes place at a distance. While student-centric, it is also inquiry based. *Inquiry-based learning* is "a complex process…when individuals attempt to convert information and data into useful knowledge. Useful application of inquiry learning involves several factors: a context for questions, a framework for questions, a focus for questions, and different levels of questions. Well-designed inquiry learning produces knowledge formation that can be widely applied." [5] This is the style of learning which evolves in the web-based classroom. "Inquiry learning is a new technique to many teachers. No longer is the teacher "the sage on the stage" - the deliverer of a fixed body of information; she becomes the facilitator of discovery learning for her students, through progressive discourse." [6] Certainly, this is very different than the traditional talk and chalk classroom.

To facilitate this give-and-take between student and instructor, obstacles, such as brief assignments and links, are placed within the content to force communication. Questions are designed to involve the synthesis of the material presented to solve a problem. The response of the student can be shaped with successive emails between the instructor and student to elicit the desired knowledge objective.

The Internet can also provide numerous sources of supplementary material for a course. Links to tutorials for background as well as sites for additional exploration offer both the weak and strong student ancillary information. Supplementary material can also provide examples of the course concepts in practice. This enrichment can prevent the dryness often associated with pure theory.

III. Student Participation

There must be inquiry if there is to be inquiry-based learning. The exchange between student and instructor expands the course material but also serves a second purpose. Instructors must reduce the social isolation "arising from the need to create a learning community, often accepted as a given in the traditional classroom, the social schema of a course promotes student interaction with the instructor and with other learners." The instructor must "foster an environment where students feel themselves to be members of a learning community because multimedia offers students a variety of opportunities for interaction with other learners and with the instructor." [7] This is such a unique role for an engineering professor! However, the learning environment influences student satisfaction and retention – key concepts for the learning institution of today.

Some communication tools that can be incorporated into the course include:

- initial ice-breaking activities, including introductory information and jokes
- requirement of student responses to posted discussion threads
- encouragement of informal student talk (outside of the view of the instructor), especially about shared experiences
- assignments which require students to work in groups

IV. Assessment Tools

The web-based tool has a variety of tools available for assessment of student comprehension. Certainly, well-designed tests, administered via the web have a fundamental place. Included, however, are non-traditional tools such as course tracking statistics, which can include the elapsed time logged into the course web pages, number of email and forum (bulletin board) postings, and ratings of feedback provided to other course participants.

Student identification and security is a constant issue for the distance education course. This has been a problem since classes have been offered "off-campus." Some technology can assist in detective work of security. Tracking students as they log into a course and travel throughout its framework is useful long before an exam is given. A second factor is in adequate assessment design to require several types of problem solution as well as speed. Of course, a simple web-cam can identify whoever is at the computer and for a very reasonable cost.

As for the course itself, an essential tool is a survey of participants. This is necessary to evaluate course presentation techniques as well as empower the students to influence the course design. Sample questions include those that examine study habits, use of the course content, evaluation of the communication with the instructor, self-assessment of learning via the web, and satisfaction with support services (admissions, bursar, etc.). In addition, the course content should be continually updated and revised based on student feedback. The instructor should

continually seek input from experts in the field for the most up-to-date information and examples.

V. Conclusion

Without a doubt, instruction via the web requires new skills for the instructor and student. Course design takes on new definitions with the use of technology and new learning styles. Both students and instructors do not fit the traditional classroom mold, exciting and challenging simultaneously! However, there are many wonderful resources available for successful presentation and participant reception.

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