The Efficacy of Multimedia Engineering Courses Offered at a Distance

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Ingredients for Success in Noise Control Engineering Course

- Course Content
- Presentation of Material to Students
- Participation of Students in Course
- Communication
  - Instructor-to-Student
  - Student-to-Student

Course Content

- Presented through PDF files on CD-ROM
- Two Supplemental Textbooks
- Resource Notebook
  - Instructions on installing software
  - Individual Learning Activities
  - Collaborative Learning Activities
  - Instructions on using FirstClass e-mail server

Approach to Course

- Balance between theory, practice and useable guidelines
- Underpin “cookbook” solutions with fundamental concepts - when & why ‘cookbook’ solutions work or don’t work and provide direction to students when cookbook solution does not apply

Course Presentation

- Course content on CD-ROM presented in standard web browser
- Content Indexed in PDF files - allows for ease of reviewing material
- Sound files - recording of noise and vibration
- Animations - show behavior of acoustics and vibration phenomena

Students

- Motivation for taking NCE courses
  - Graduate course credit
  - Preparation for Institute of Noise Control Engineering Certification Exam
  - Improve on-the-job Skills
- Most current students appear to be taking courses primarily to improve skills
- All students are working full time with families

Students

- Students are located all over US
- Students in these courses
  - Higher motivation than in-residence students
  - But, more distractions (e.g. family and career) then in-residence

Student Participation

- Require continual student participation to keep them involved
- Study Questions
  - Post Before and After reading lessons
  - Focuses students on key concepts
  - Comments by instructor on After answers - correct misconceptions

Student Participation

- Individual Learning Activities
  - Written Problems - post to instructor for comments and corrections - Instructor available for assistance
  - Virtual experiments - Application of on-line virtual instruments (e.g. sound level meter and narrowband analyzer) to recordings of noise and vibration
- Collaborative Learning Activities

Types of Students Participating

- President of small consulting firm - BS in Interior Design - 20 years ago - needs better understanding of basics
- Faculty at large state university - Fluid mechanics - Learn more acoustics, vibration and noise control
- Recently hired by consulting firm - wants to increase technical skills
- Engineer at large muffler manufacturer

Collaborative Learning Activities

- Teams of 3 to 4 students with Team Leader
- Work on Open-ended Realistic Problems
- Five Steps
  - Problem definition and goals
  - Brainstorming of possible solution
  - Evaluation of solutions
  - Plan of attack
  - Final Report

Collaborative Learning con’t

- Instructor follows progress - comments only at end of each step
- Examples of Problems, with recordings of noise and vibration, and descriptions of equipment
  - Industrial noise
  - Consumer product

Communications

- Important with students at distance - no face-to-face contact (even via video) - all via computer
- Requires quick feedback by instructor - daily response - more one-on-one time with students than with in-residence courses
- Communications via FirstClass e-mail server

Summary

- Experimental in developing and delivering high-quality graduate-level courses at a distance via computer network - a success
- In revisions for second offering, need to
  - Include more animations in lesson material
  - Improve interactive animations
  - Improve virtual instrumentation and experiments

Summary con’t

- Cohort bases for these courses did not work well - students worked at different paces (different work and family commitments) - Go to individual learning with CLA Teams formed when group of students are ready
- Requires instructor to champion courses over the long haul

Summary con't

- Need to build in several mechanisms for continuous communication to keep students involved - Success with Before and After study question format
- Need to take advantage of computer technology (e.g. animations and virtual experiments) - partly make up for absent instructor and avoid "scrolling" textbook