

Best Practices for On-line Delivery

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Outline

- A brief overview of CS5744: Software Design & Quality
- Course design comes first:
 - Learning goals
 - Activities and assignments
 - Choosing communication support
 - Keeping students involved
- Your audience's habits
- Your first week's assignment
- Develop a rigid weekly schedule
- Writing for the web

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What is this course?

- Designed CS 5744: Software Design & Quality in 1999
- Now fully matured, went international in 2004
- 100% on-line course:
 - Paperless, all electronic
 - No face-to-face meetings
 - Weekly Centra meetings (synchronous)
- Discussion-based class with some group projects

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CS 5744: Software Design & Quality

- Graduate MIT course with software engineering prerequisite
- Teaches:
 - Advanced software design
 - Critiquing/analyzing designs
 - Quality assessment
 - Practices that improve quality
- Learn by doing, "over the shoulder", through analysis/reflection, and via group projects

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5744 Learning Activities

- Weekly reading assignments with questions to turn in
- Participation for grade
- Four writing intensive assignments
 - Two individual
 - Two small group
- Centered on a high-level group design created for one project, analyzed and built on for others

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Formative Evaluation

- Students surveyed twice using Flashlight inventory
- Students rated this course **higher** than others they have taken for:
 - Discussing topics with other students
 - Applying info outside of class
 - Enjoying studying
 - Better able to communicate/understand
- 100% satisfied or very satisfied

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Student Impressions

- "This is one of the best classes I have ever had."
- "From all the readings, homework assignments, and group projects, I have been much better equipped with relevant knowledge and experience."
- "It didn't always feel like we were watching the class, rather for the most part I felt involved in the lectures."
- "The drop-box feature, the way information and announcements were posted were all excellent. He definitely took a lot of time in making this web-form of communication efficient."

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Student Negatives

- **Communication was not as easy or effective:** with students at other sites, with professor, and during class
- Textbook desirable
- Non-native English speakers

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Issues for Asynchronous/On-Line Delivery

- Some learning activities require:
 - Fluid, effortless communication
 - Face-to-face interaction
 - Simultaneous presence
- Even when delivery can be on-line, the nature of grading/managing the course can still limit capacity (for 5744, 30-50 students max)

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Its All About Course Design

- **Course** design comes before **web** design
- Overall pedagogical design is the **most influential factor**, next to the instructor
- Back to the basics:
 - Learning goals
 - Student activities and assignments
 - What communication/interaction is needed?
 - Keeping students involved

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Course Learning Goals

- First, write down a **clear, complete set** of learning objectives
- For your own use
- It is important to let these goals drive your later choices:
 - Activities and assignments
 - On-line communications mechanisms
 - Web site features

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Example From SD&Q: Learning Goals

- Students should be able to:
 - Analyze a software design:
 - Identify strengths and weaknesses
 - Critique the design
 - Compare and contrast quality assessment techniques
 - Apply at least one quality assessment technique:
 - Develop a test plan

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Student Activities & Assignments

- Ask yourself: What do students **need to do** to learn this material?
- Think about **translating learning goals** into specific activities or assignments (not all need be for credit)
- Besides homework or reading:
 - Writing, individual projects, group projects, presentations, discussions, Q&A, debates ...
- Grade assessment will naturally follow

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Example From SD&Q: Activities

- Weekly discussions similar to a literature class
- Two written critiques of designs by others
- One small group design project:
 - Visible to all on web
 - Includes reflection/self-assessment activities
- One small group test planning project:
 - Based on work of others
 - Includes reflection/self-assessment activities

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Choosing Communications Tools

- Examine the activities you are planning
- What interactions/communication **are most needed** to carry out these activities?
 - Student ↔ instructor
 - Peer ↔ peer
 - Student ↔ material
- Pick tools that **support** your activities

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Example From SD&Q: Communication

- Almost exclusively:
 - Web site
 - Centra
 - E-mail
 - Digital drop box
 - Group support tools from Blackboard

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Keeping Students Involved

- What makes the on-line experience worthwhile for them?
- What brings them back to the site regularly?
- What keeps them engaged in activities?
- The activities you set up for your class can make a huge difference

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Example From SD&Q: Involvement

- Student **investment and ownership**: students were able to choose the subject of 3 out of 4 major assignments
- Student submissions for major assignments were placed (anonymously) on the web site for **others to view**
- Students had to **work with** and **critique** the work of their peers
- Weekly discussions involved everyone

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The First Week

- Plan to devote Week 1 to getting students settled on-line
- Start off with an **assignment** due during the first week:
 - Read syllabus, get text book(s)
 - Download/install proper software
 - Get headset mike (if using Centra)
 - Attend a "test" meeting to work out kinks

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A Strict (Weekly) Schedule

- Devise and stick to a rigid weekly schedule that dictates when:
 - New assignments are posted
 - Weekly meetings are held (if any)
 - Assignments are due
 - On-line office hours are held (if used)
 - Instructor responds to discussion boards
- This **establishes a habit**, and keeps students **coming back** to the web site regularly

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Writing for the Web

- People **rarely read** Web pages word by word
- Instead, they **scan the page**
- Want the facts, and to find them as easy as possible
- Meaningful subheadings, inverted pyramid, reduced word count, ...
- See Nielsen's many excellent tips at <http://www.useit.com/papers/>

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Lessons Learned from Comparing On-line Courses Across Disciplines

- **Common themes**
 - Creating a community of learners
 - Supporting asynchronous communication
 - Holding synchronous meetings
 - Providing social support
- **Breaking stereotypes**
 - Techno-phobia, communication barriers, computer access, preferred tools

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