Multiplayer Game Design and Development
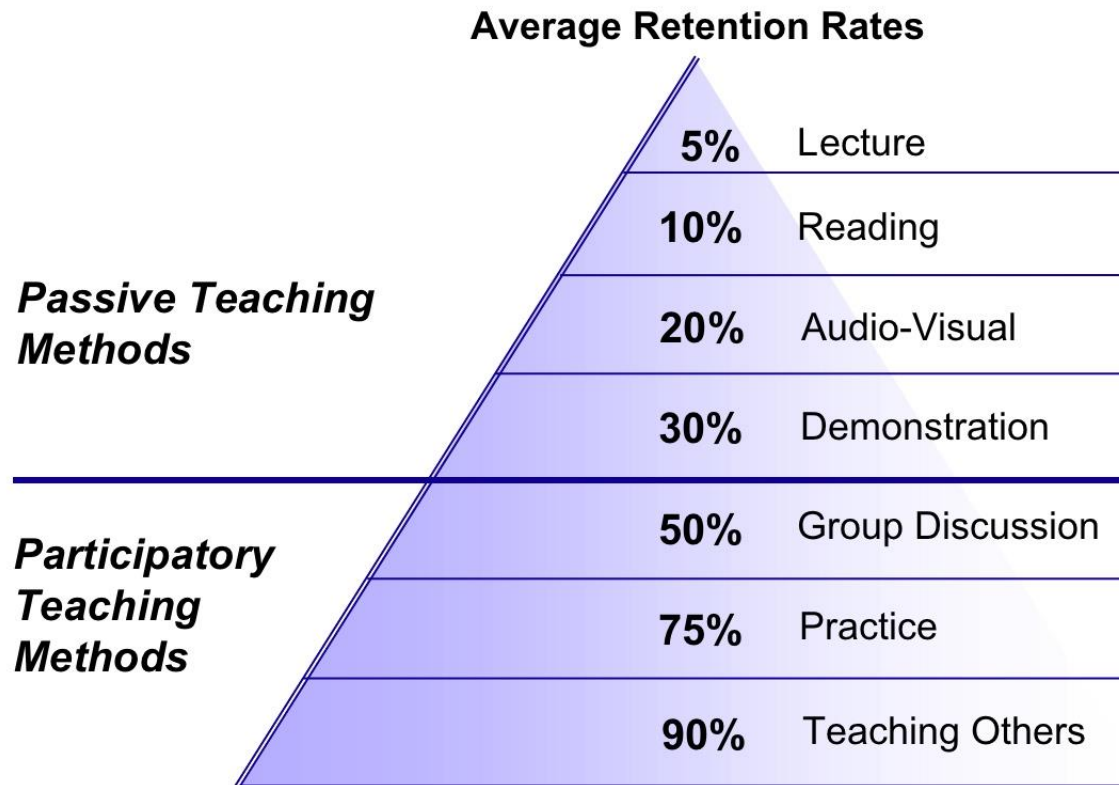# CSC 631/831

Lecture 1

Spring 2016

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Course Objective

- The whole class works together to build a working Multiplayer Online game, from design through development to launching. This requires teams of Game Concept Design, Artwork Support, Game Client Development, Game Server Development, Game Network Protocol Development, Database Development, Game Contents Development, and Launching Preparation team. Each student has to belong to one or two teams and will work on his/her part of the MMORPG game throughout the whole semester.

- Throughout the course, basics of technologies to develop multiplayer game will be introduced. Topics include 3D graphics, game engine, network programming for multiplayer architecture (Game client & Game Server, Protocol Design), and other related issues of game development.

- Most importantly, this class is VERY LARGE PROJECT-LEAD Course! You will work within a team and across teams. You have to be proactive, responsible, dependable, and self-motivated.

The Learning Pyramid*

Average Retention Rates

Passive Teaching Methods

Participatory Teaching Methods

5%	Lecture
10%	Reading
20%	Audio-Visual
30%	Demonstration
50%	Group Discussion
75%	Practice
90%	Teaching Others

*Adapted from National Training Laboratories. Bethel, Maine

So, you need to teach your team members through group seminar or meetings! If you are too busy to participate in at least 2 hour group meeting/seminar outside the class time, then reconsider taking this class.

Project-based Learning

Project-based learning (PBL) is an instructional approach that is gaining increasing interest within the engineering education community. The benefits of PBL include **enhanced student participation in the learning process (****active learning and self-learning****), enhanced communication skills, addressing of a wider set of learning styles, and promotion of critical and proactive thinking.** PBL also facilitates the development of many of the "soft skills" demanded from engineering graduates, as embodied in the ABET EC 2000.

Active Learning:
Self-directed Learning and Independent Work

- Are you a self-motivated problem solver?
  - o Do you need very detailed instruction to solve a given problem?

- Soft Skills
  - o Communication Skills
  - o Teamwork and Collaboration
  - o Adaptability
    - ▪ To succeed in most organizations, you need to have a passion for learning and the ability to continue to grow and stretch your skills to adapt to the changing needs of the organization
  - o Problem Solving
  - o Critical Observation
  - o Conflict Resolution

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So, what will you learn during a semester?

- Game Design, Development and Deployment issues
  - From game design to launching!

- Software Engineering issues including QA
  - The whole class works like a small company, so you will learn the basics of game development as well as software engineering issues

- 2D & 2.5D graphics
  - Game Engine Scripting (3D camera manipulation, character control, collision, effective rendering, shading, menu/2D interface) – Unity3D Game Engine

So, what will you learn during a semester?

- Network programming
  - o Extend single player to multiplayer
  - o Socket programming, client/server architecture, Protocol, latency issues, etc.

- Data Base System
  - o Building DB and developing efficient querying DB

- Modeling and Animation for artwork part

- Game Content (Foodweb research)

- Web service (using computational research component)

Attendance & Extra Credit

- **Attendance is very important** as we discuss the progress and trouble shooting at each class, therefore it is enforced by checking it every class.

    o If you miss more than 3 classes, you will lose 10% of total grade. If you miss more than 6 classes, then you will lose 20% of total grade. I you miss more than 9 classes, I consider that you have no intention to pass this class.

- Extra credit will be given for your help on class. If you contribute your ideas actively and help out other teams, then you will receive an extra credit. Team leaders will receive an extra credit, as a role model.

You belong to one of the technical teams below

- Game Design Team

- UI Design Team

- Game Client Development Team

- Game Server Development Team
  - o Game Network Protocol Development

- Data Base Design and Development

- Game Contents Development

- Integration and Testing team

- IT support team

Game Concept Design Team

- Game Concept Design for given topic – educational and fun

- Study Game Design Principles
  - Easy to play, but difficult to master

- Survey on similar games

- Should consider the time constraints - utilize the existing codes

- Collect ideas from everyone, consult with me, finalize the design

- Write a document – by 4th week

Game Client Team

- While Game Concept is finalized, study Game Engine, scripting, 3D graphics, and the existing codes from SVN.

- Following the game concept, develop the code – biggest group and needs sub teams

- Update the log bi-weekly

- Complete a working version by the end of April.

- Option of Mobile components

Game Server Team

- While Game Concept is finalized, study the existing codes from SVN.

- Following the game concept, develop the code.

- Develop Game Protocol (work closely with client network team)

- Update the log bi-weekly

- Complete a working version by end of April.

DB Design and Develop Team

- While Game Concept is finalized, study efficient DB design principles and DB server like MySQL.

- Following the game concept, design the efficient DB schema and deploy the DB

- Create sample data sets

- Update the log bi-weekly

- Complete a working version for test by April. 30th

Educational Game Contents Team

- While Game Concept is developed, actively get involved for game contents design.

- Need to work with related domain experts.

- Actively interact with Game Concept Design and Art Support Team.

- Update the log bi-weekly

- Complete a working version for test by Apr. 30th

Game Test Team

- Once Game Concept is developed, start working on the test plan.

- In case of server, test scalability.

- Update the log bi-weekly

- Develop full test scenario by Apr. 12th and start testing.

- Give feedbacks to other development teams

Art Work Support Team

- While Game Concept is developed, actively get involved for game contents design.

- We are not artists. We need to use available free models, converted into readable formats.
  - One volunteer artist with excellent industry experience might help us during this semester.
  - You need to be creative to bring in good artistic effects in to the game.

- Update the log bi-weekly.

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Tech Support Team

- Setting up SVN, IDE and other tools to improve the productivity

- Help each team's technical issues

DeBugger Project – Fall 2009

- **Currently being used in CSC 210 class**
- Client : http://thecity.sfsu.edu/~gng/deBugger20110817.exe
- Youtube : SFSU Debugger
- Web site : http://thecity.sfsu.edu/~debugger/signin.php
- Documentation : http://thecity.sfsu.edu/~debugger/download_documentation.php

DeBugger Game

- Persistent Virtual World with many mini games

- Each player can increase the level, money, game items and personal space as they achieve

How about Ecosystem Nurturing game?

- Food Web visualization Video from Youtube.

- Population Dynamics Mathematical model used for Nature publication, available via web services.

- Foodwebs.org

- http://ibbiofoodweb.wikispaces.com/

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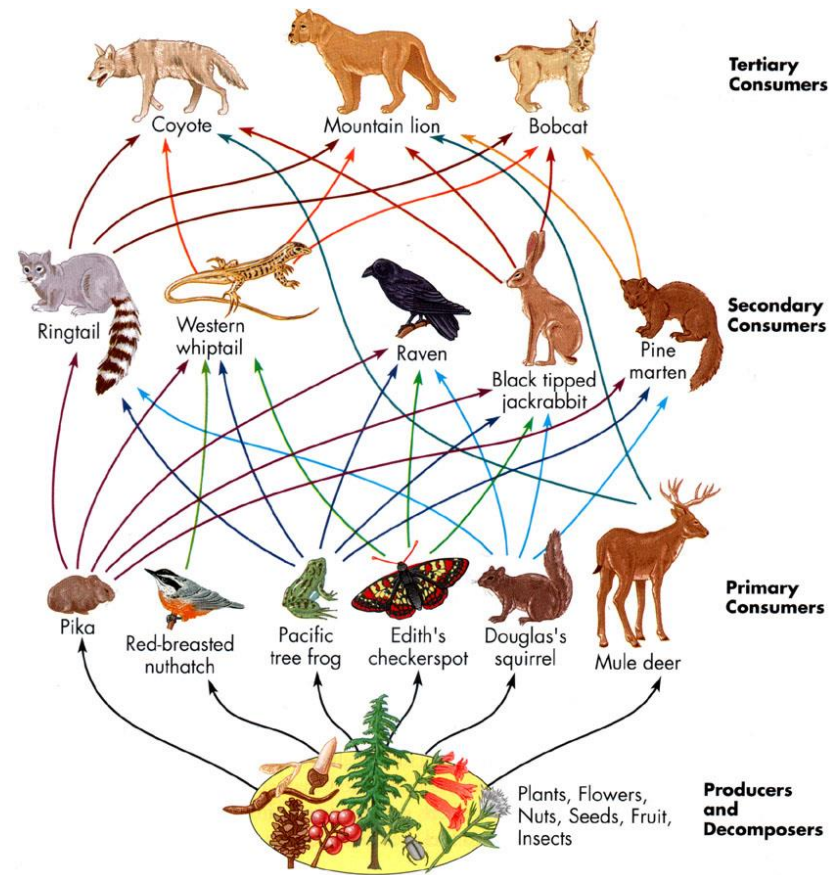
Energy Transfer in the Okavango Delta Food Web
By Christy Ng