Core Lecture 5: Technologies for Collaborative and Social Learning
Homo Socialis

  - animation depicts merely shapes
  - yet, observers describe these objects in social terms and construct a social drama around their movements

- **Humans Are By Nature Social Animals**
  - Various social interactions are not just important for us, but necessary

- Implications for Learning?
  - As most cognitive processes learning is enhanced by social interaction

https://www.youtube.com/watch?v=n9TWwG4FWQ
“Collaborative” Learning Theories

• Social Development Theory (Vygotsky)
  ◦ cognitive development of a child stems from social interactions – guided learning within ZPD (zone of proximal development) as a child and a MKO (more knowledgeable other) co-construct knowledge
  ◦ One of the foundations of constructivism

• Social Learning Theory (Bandura)
  ◦ People learn from one another, via observation, imitation, and modeling
  ◦ Bridge between behaviorism (learn by observing behavior and its outcomes) and cognitivism (encompasses attention, memory, and motivation)

• Cognitive Apprenticeship (Collins)
  ◦ Expert teaches a novice through modelling (demonstration), coaching (feedback), scaffolding, articulation (goal setting), reflection (student compares his state with the expert)

• Anchored instruction (Brandsford)
  ◦ use of an “anchor” material (e.g. video) to create a shared experience among learners and a beginning point for further learning on a topic
“Social” Learning Theories

• Communities of Practice (Lave & Wenger)
  ◦ Communities of Practice (CoP) are “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.”
  ◦ Three components are required for a CoP: (1) the domain, (2) the community, and (3) the practice.

• Connectivism (Siemens & Downes)
  ◦ Internet technologies have created new opportunities for people to learn and share information across the World Wide Web and among themselves
  ◦ Much learning can happen across peer networks that take place online
  ◦ A teacher guides students to information and answer key questions as needed
  ◦ Students are encouraged to seek out, learn and share information on their own
  ◦ A connected community around this shared information often results.
PLATO (1)

• PLATO (Programmed Logic for Automatic Teaching Operations)
• Developed starting 1960s in University of Illinois
• First general-purpose CAI/CMI system (grandfather of LMS)
• Used by hundreds of organizations in 1970s-1980s

CAI = computer-assisted/aided instruction
CMI - computer-managed instruction
LMS – learning management system (Moddle, BlackBoard,...)
Many modern concepts in multi-user computing were introduced by PLATO and its extensions:
- forums,
- message boards,
- online testing,
- e-mail,
- chat rooms,
- instant messaging,
- remote screen sharing,
- multiplayer games
- Emoticons 😊
- Online communities
Collaborative and Social Learning

• Group-based learning
  • Support technologies focus on:
    ◦ Optimizing group formation
    ◦ Improving collaboration
    ◦ Fostering participation

• Network effect based learning
  • Support technologies focus on:
    ◦ Maximizing network effect – increasing number of users and individual participation
    ◦ Facilitating access of individual users to right content and right users
Collaborative learning

Collaborative learning is a situation in which two or more people learn or attempt to learn something together. (Findley, 1987)

Collaborative learning is an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product.
Characteristics of Collaborative Learning (1)

- Learning is an active process
- Students assume a degree of responsibility for their own learning
- Teacher is more a facilitator than the ultimate source of knowledge and instruction
  ◦ Guide on a side vs. Sage on a stage
Characteristics of Collaborative Learning (2)

- Learning happens in small-group on meaningful activities
  - Collaborative writing, group projects, joint problem solving, debates, study teams

- Teaching and learning are shared social experiences

- Promotes students’ accountability

- Motivates meaningful learning

- Students have access to their peers knowledge and perspectives
Characteristics of Collaborative Learning (3)

- Students are stimulated to reflect on their assumptions and thought processes
- Deeper cognitive skills are enhanced
- Exposure to diverse viewpoints and peer-challenging promotes critical thinking
- Shared understanding is built up
- Long term retention of the learned material is improved
Characteristics of Collaborative Learning (4)

- Social and team skills are developed through the give-and-take of consensus building
  - Collaboration is not just a vehicle for learning, but also a skill to learn
  - Help to prepare students for the world of work
## Collaborative vs. Cooperative Learning

<table>
<thead>
<tr>
<th>Collaborative</th>
<th>Cooperative</th>
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<tr>
<td>• Focus on the process</td>
<td>• Focus on structure</td>
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<td>• Students divide the task, find necessary materials, etc.</td>
<td>• Teacher structures the activities in advance</td>
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<td>• Students self-organize</td>
<td>• Each student has a role and a part of a common task</td>
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<td>• Teacher might assist if a problem occurs</td>
<td>• Partial progress is evaluated by a teacher</td>
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<td>• Success deepens on individual strengths</td>
<td>• Group success depends on everyone's contribution</td>
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Collaborative learning support technologies

• Computer–supported face-to-face group learning
• Computer-supported asynchronous collaborative learning
• Peer-to-peer learning
  ◦ Peer-tutoring
  ◦ Peer-assessment
  ◦ Peer-review
• Argumentation-based learning
Supporting Face-to-Face group learning (1)

- Interactive tabletops
- Various group learning activities
- Collaid – learners collaboratively build concept maps
- Biggest challenge – how to trace contributions of individual learners:
  - Interactions with table tops
  - Verbal communication
  - Non-verbal participation
Supporting Face-to-Face group learning (2)

- Collaid uses several sensors
- ...and Learning Analytics
- ...to inform the teacher of each group dynamics
Supporting asynchronous collaborative learning

- Students work on a course project
- Contribute to an svn repository, ticket tracking system and a project wiki

Interaction Diagram

Wattle Diagram
Peer- tutoring, assessment and review

• Students work in peer-to-peer fashion

• Every peer has a role
  ◦ Tutor-tutee
  ◦ Reviewer-reviewee

• Learning happens in the process of a productive task (both peers learn)

• Pair formation
  ◦ Dynamic, per task
  ◦ Evidence of a learning effect from matching strong students with weak

• Built-in mechanisms for quality assurance
  ◦ Consensus is used to resolve conflicts and assess the quality of assessment
  ◦ “Trustworthiness” is individually accumulated
Argumentation-based learning

- Argumentation is an important skill
  - Many topics are controversial (climate change, genetic science, gun control, migrant crisis, “alternative news”)
  - In fields like politics and law it is one of the essential skills
- Argumentation is a vehicle for deeper learning
- Argumentation pedagogy invites students to make claims and provide supporting evidence
- Example of systems: Belvedere, Cohere, Knowledge Forum
  - Construct and reflect on diagrams of ideas
  - System can assist in shaping up the argument
Social learning support technology

• Use of social information to adapt learners’ experience
  ◦ Social comparison
  ◦ Social navigation

• Use Social Web infrastructure to learn in new ways and new contexts
  ◦ Crowdsources learning
  ◦ Learning on Social Media

• cMOOCs
Social comparison

• System employs some public progress indicators (badges, leaderboards, etc.) to display progress of others compared to the progress of the user

• Strong motivational factor

• Challenges:
  ◦ Motivate meaningful activity (guide in the right direction)
  ◦ Avoid demotivation
Social navigation

User's navigation through an information space is guided and structured by the activities of others

Potential problems:

- Snowball effect – popular items become more popular
- Cold start effect – new items are not noticed
- Popular at the right time?
Crowd-based Learning

- Crowd-based learning involves harnessing the knowledge and expertise of many people in order to answer questions (Quora), address immediate problems (Stackoverflow), or simply help learn something (HelloTalk)
- Scale: everybody is a learner, everybody is a teacher
- “Wisdom of the Crowd” powered by social feedback and reputation takes care of filtering out bad content and bubbling up good one
- Learner is the owner of own learning process
- ePortfolio tools like PebblePad, badge tools OpenBadges and flexible certification systems like degrees.com can help add records of achievement as well as structure the reflection process

Quora  Stack overflow  HelloTalk  iSpot
Learning through social media

• Social media is where the students are
  ◦ They interact, co-create, engage with content and peers
  ◦ How to adopt this momentum for productive learning?

• If pedagogy is successful, social media can give learners:
  ◦ reliable and interesting content,
  ◦ access to expert advice,
  ◦ opportunity to encounter challenges, defend their views
    and to amend their ideas in the face of criticism.

• If pedagogy fails, social media can be the source of:
  ◦ inaccurate information,
  ◦ biased comments
  ◦ hostile responses
cMOOCs vs xMOOCs

• Focus – apply a new Network Effect-driven pedagogy

• Connectivist

• Goal – connect students to each other and foster collaboration, knowledge sharing and co-creation

• Autonomy of learners

• Use of social media

• Participant-driven content

• Distributed communication

• No formal assessment

• Focus – deliver traditional courses at scale

• Instructional

• Goal – teach course material

• Predefined syllabus

• Short video lectures often interrupted by attention-focused quizzes

• Individual homeworks

• Supporting material (slides, textbooks)

• Certificate at the end