Ten+ Years of Online Research: Results and Reflections

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Theoretical Perspectives and Principles

Learner-Centered Learning Principles
From American Psychological Association, 1993

Cognitive and Metacognitive Factors
1. Nature of the learning process
2. Goals of the learning process
3. Construction of knowledge
4. Strategic thinking
5. Thinking about thinking
6. Context of learning

Developmental and Social Factors
10. Developmental influences on learning
11. Social influences on learning

Motivational and Affective Factors
7. Motivational and emotional influences
8. Intrinsic motivation to learn
9. Effects of motivation on effort

Constructivistic Teaching Principles (Brooks, 1990)
1. Build on student prior knowledge.
2. Make learning relevant.
3. Give students choice in learning activity.
4. Student autonomy & active learning encouraged
5. Use of raw data sources & interactive materials
6. Encourage student dialogue
7. Seek elaboration on responses and justification
8. Pose contradictions to original hypothesis
9. Ask open-ended questions & allow wait time
10. Encourage reflection on experiences

Sociocultural Ideas (Bonk & Cunningham, 1998)

1. Shared Space and Build Intersubjectivity
2. Social Dialogue on Authentic Problems (mind is in social interactions and extends beyond skin)
3. Mentoring and Teleapprenticeships
4. Scaffolding and Electronic Assistance in ZPD
5. Group Processing and Reflection
6. Collaboration and Negotiation in ZPD
7. Choice and Challenge
8. Community of Learning with Experts & Peers
9. Portfolio Assessment and Feedback
10. Assisted Learning (e.g., task structuring)
11. Reciprocal Teaching & Peer Collaboration

Premise #1:
Importance of Social Interaction (Vygotsky, Wertsch, etc.)

- Social interaction develops new patterns of thought and strategic behaviors.
Premise #2. Mind is Distributed in Society

- Mind is in society—individual-in-social-action; mind extends beyond the skin (Vygotsky, Wertsch, etc.).

Distributed Intelligence (in a learning community)

- Student higher-order mental functioning has its' roots in social relations. The mind, therefore, is distributed in society, and, extends beyond one's skin. Since knowledge is negotiated by members of a community of practice, the classroom should be organized to guide student learning toward membership in a learning community.

Distributed Intelligence (in a learning community)

- Participation in such a classroom is no longer didactic or transmissive, but a sophisticated instructional conversation.

Distributed Intelligence (in a learning community)

- While technology is vital here, it is but one resource of a learning community; other resources that should also be utilized include: experts, mentors, peers, curriculum/textbooks, teachers, self-reflection, assessment, parents, and the funds of capital within one's local community.

Premise #3. Learning Precedes Development

- Learning precedes development—so must nudge, prompt, provoke it, rouse it to life, etc.

Premise #4: Cognitive Apprenticeship

- Learners should be acculturated into an established community of practice. This is done through guided participation, scaffolding, and a gradual transfer of responsibility for the learning from the more experienced partner to the learner.
Guided Learning Model (Rogoff, 1990)

Cognitive Apprenticeship
- Collins, Brown, and Newman (1989) detail six teaching methods in an ideal cognitive apprenticeship: (1) modeling, (2) coaching, (3) scaffolding and fading, (4) articulation, (5) reflection, and (6) exploration.

Tele-apprenticeship
- As a result of advances in technology tools, there are myriad online learning environments that are mediated by experts, peers, mentors, teachers, etc. to help learners and teachers build and share knowledge through access to specialized expertise and information.

Premise #5:
Zone of Proximal Development
A range of tasks too difficult for child to manage alone, but which can be achieved through interaction with another person (adult or more capable peer)

Premise #6:
Scaffolding in one’s ZPD
(Robert Slavin, 1993)

Types of Scaffolding
- Social Acknowledgement
- Questioning
- Direct Instruction
- Modeling/Examples
- Feedback/Praise
- Cognitive Task Structurin
- Cognitive Elaborations/Explanations
- Push to Explore
- Fostering Reflections/Self Awareness
- Encouraging Articulation/Dialogue Prompting
- General Advice/Scaffolding/Suggestions
- Management
Premise #7: Assisted Learning
- There are a range of techniques for teachers to assist in the learning process (e.g., modeling, coaching, scaffolding and fading, questioning, directly instructing, task structuring, management and feedback, and pushing students to explore, reflect, and articulate ideas).

Premise #8: Learning Resources
- The cultural and intellectual capital within one’s teaching and learning environment. Includes peers, textbooks and the curriculum, technology tools, teachers, expert guests, community leaders, tests, self-reflection, etc.

Resources in a Learning Environment
- Teachers
- Peers
- Curriculum/Textbooks
- Technology/Tools
- Experts/Community
- Assessment/Testing
- Self Reflection
- Parents

Premise #9: Authentic Problems
- A learning experience or task which realistically mimics or approximates real world situations. They tend to be more engaging for learners.

Premise #10: Unit of Analysis
- Unit of analysis is the activity or word meaning.

Premise #11: Internalization
- Development moves from external to internal (appears twice).
Premise #12: Intersubjectivity

- Refers to a temporary shared collective reality among individuals. Conferencing and collaborative technologies can foster such shared space or situational understanding between learning participants which can help them negotiate meaning, design new knowledge, and perceive multiple problem solving perspectives.

Frameworks and Models

Nature and Nurture: An Interactional Model

- Technology
- Pedagogy
- People, Society, Culture, etc.

The Web Integration Continuum (Bonk et al., 2000)

Level 1: Course Marketing/Syllabi via the Web
Level 2: Web Resource for Student Exploration
Level 3: Publish Student-Gen Web Resources
Level 4: Course Resources on the Web
Level 5: Repurpose Web Resources for Others
Level 6: Web Component is Substantive & Graded
Level 7: Graded Activities Extend Beyond Class
Level 8: Entire Web Course for Resident Students
Level 9: Entire Web Course for Offsite Students
Level 10: Course within Programmatic Initiative

10 Stories for 10+ Years

1. 1993-1994: Peace, dude, hop off the return key, save me some stress."
2. 1995: What if Vygotsky had lived to 100...
3. 1996: Do not ride your bike to work.
4. 1997: Look out for the Russians...
5. 1998: Do you believe in the power of sharing?
6. 1999-2000: Do you want to be target practice?
7. 2001: You were in, but you were never there.
8. 2002-2005: Who needs a TICKIT?
9. 2003-2006: Where is Disneyland?
10. 2004-2006: Data at your fingertips.
Story #1 (1994): "Peace, dude, hop off the return key, save me some stress."

Taxonomy: Level of Collaborative Tool
(Bonk, Medury, & Reynolds, 1994)
Level 0: Stand Alone Tools
Level 1: E-mail and Delayed Messaging Tools
Level 2: Remote Access/Delayed Collab Tools
Level 3: RT Dialoguing and Idea Gen Tools
Level 4: RT Collaboration (text only)
Level 5: Cooperative Hypermedia
Level 6: Tools That Don't Fit Nicely

Web Conferencing Tools
- VaxNOTES
- NiceNet
- WebCrossing
- Sitescape Forum
- COW
- FirstClass
- WebCT, Blackboard, Virtual U, etc.

Research on Electronic Cases
1. RT vs. Delayed Collab
   - Groups Preset by Major
   - Tchr Generated Cases
   - Local/Univ. Networks
   - Limited Instructor Mentoring
2. Web-Based Conference
   - Grps Formed on Interest
   - Student Gen. Cases
   - World Wide Web
   - Extensive Instructor and Peer Mentoring

Study #1: 1993/1994
(Bonk, Hansen, Grabner, Lazar, & Mirabelli, 1998)
- Two Semester: VAXNotes vs. Connect
- Two Conditions: (1) Real-time vs. (2) Delayed
- Subjects = 65 secondary ed majors
  (5 grps: PE, Foreign Language, Social Studies, English, Math)
- Mentors = limited instructor commenting
- Procedures:
  - (1) Respond to 4 cases in small groups
  - (2) Respond to peer comments

Research Questions: Study #1
1. What social interactions occur in real-time & delayed?
2. How code electronic social interaction patterns?
3. How do case size & complexity affect grp processing?
4. Do RT or delayed foster > discuss depth & quality?
5. Do shared experiences stimulate grp intersubjectivity?
Some Findings From Study #1

- Delayed Collab > Elaboration
  - 1,787 words/interaction vs. 266 words/interaction
- RT Collab > Responses
  - 5.1 comments/person/case vs. 3.3 comments/person
- Low off-task behaviors (about 10%)
- Rich data, but hard to code
- Students excited to write & publish ideas
- Minimal q's and feedback
- Interaction inc. over time; common zones
- Some student domination

Example of real-time dialogue:

- How might he deal with these students? Well, he might flunk them. He might make them sit in the corner until they can get the problem correct...I don't know. (Um...hello...Jaime where is your valuable insight to these problems?) (October 26, 1993, Time: 11:19:37, Ellen Lister, Grp 5).

Example of Delayed Dialogue:

Joyce's new system offers a wide variety of assessment forms. These different forms complement the diverse learning and test taking abilities of her students. Joyce seems to cover the two goals of classroom assessment with her final exam—to increase learning and increase motivation. Students will increase their learning because they will not just remember information to regurgitate on an exam, but instead they will store these items in their long-term memory and later may be able to make a general transfer. Joyce will increase student motivation because she has deviated from the normal assessment method expected by her students. Joyce's test will probably be both reliable and valid considering that she implemented three different forms of tests. Joyce's test also might reduce test anxiety. If her students know what to expect on the test (they even wrote the questions) they more than likely will be less anxious on exam day... (January 31, 1994, Time: 10:28, Sarah Fenway, Language Group.)

Larry

- Entertaining,
- Creative and controversial,
- Indirectly intimidating,
- One who set own agenda,
- Very articulate and witty.

Sample of Larry's Comments....

- "Peace, dude, hop off the return key, save me some stress."
- "I am currently preparing my anti-groupwork support group."
- "I've noticed several people writing and saying that they would have done this or that brilliant or intuitive thing. I personally am brilliant or intuitive and I think other could use a little humility. This Karen's made some mistakes, but we all make mistakes, and when (dare I say), we are in her shoes, we should expect to make some of the same ones that confound her."
Story #2 (1995): What if Vygotsky had lived to 100...?

Sample Projects
1. Peer scaffolded support with technology.
2. Critical thinking with tech supports.
3. PBL situations and role play
4. Scaffolded learning from the Arctic.
5. Forms of online e-mail assistance.
6. Bring experts to teach at any time.
7. Online case learning and exam preparation.
8. Alternating class and online activities.
9. Roles in electronic discussions.
10. Structure electronic role play.

Patterns of Knowledge Construction in Electronic Discussion (Zhu, 1998)

Adventure Learning
Purpose: engage in adventurous study of the global environment.
(c.g., Telepresence or virtual fieldtrips, ask an expert forum, cross-classroom collaboration, debate forums, online communities, MayaQuest, the Jason Project)

Adventure Learning Findings (Bonk & Sugar, 1998)
Aspects within Aspects (Cooney, 1998)

Implications: Build Courses Based on Sociocultural Principles (Bonk, 1998)

Story #3 (1996): Do not ride your bike to work.


Three Basic Levels:
1. Conference (public or private)
2. Topic (e.g., special education)
3. Conversation (e.g., reading rewards)

How did people react to COW?

Purpose of COW Project

- Students in field experiences write cases
- Teachers and students from around the world provide electronic mentoring
- Authentic cases and mentoring transform learning environment
- Helps preservice teachers understand the role of technology in education
Problems Solved By COW

- Student isolation in field experiences
- Lack of community/dialogue among teacher education participants
- Disconnectedness between class and field experience
- Limited reflective practices of novice teachers
- Need for appreciation of multiple perspectives
Quantitative Methods

Average results for prior to TITLE (TITLE):
• Participants per semester: 130 (>300)
• Cases per semester: 230 (624)
• Cases per student: 1.75 (same 1.80)
• Average responses per case: 4.5 (3.9)
• Average words per case: 100-140 (198)

Frequent Case Topics

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<thead>
<tr>
<th>Topic</th>
<th>Number of Cases</th>
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<tr>
<td>Management</td>
<td>312</td>
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<tr>
<td>Motivation</td>
<td>185</td>
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<tr>
<td>Instructional Approaches</td>
<td>178</td>
</tr>
<tr>
<td>Individual Differences (special education and gifted)</td>
<td>152</td>
</tr>
<tr>
<td>Hot Topics (e.g., teacher burnout, violence in school, corporal punishment, and drugs and alcohol)</td>
<td>83</td>
</tr>
<tr>
<td>Development (physical, cognitive, and social/ emotional)</td>
<td>70</td>
</tr>
<tr>
<td>Behaviorism and Social Learning Theory</td>
<td>57</td>
</tr>
</tbody>
</table>

Types of Heavy Scaffolding:
1. Social Acknowledgement
2. Questioning
3. Clarifying
4. Feedback
5. Scaffolding
6. Cognitive Task Structuring
7. Cognitive Elaborations/Explanations
8. Peer to Peer
9. Peer to Scaffolding/Self Awareness
10. Encouraging Articulations/Dialogue Prompts
11. General Advice/Scaffolding/ Suggestions
12. Management

Bonk, Angeli, Malikowski, & Supplee, 2001

Transcript Results

A. Peer Content Talk
31% Social Acknowledgments
60% Unsupported Claims and Opinions
7% Justified Claims
2% Dialogue Extension Q's and Stmts

B. Mentor Scaffolding
24% Feedback, Praise, and Social
24% General Advice and Suggestions
20% Scaffolding and Socratic Questioning
16% Providing Examples and Models
8% Low Level Questioning
8% Direct Instruction & Explanations/Elab

Study #3. Fall, 1997

Overall Major Findings

• COW enhanced student learning
  – provided a link between classroom and field; connected to textbook concepts
  – encouraged learning about technology
• COW extended student learning
  – students got feedback from multiple sources and outside their community
  – students saw international perspective
• COW transformed student learning
  – students took ownership for learning
  – students co-constructed knowledge base

Bonk, Malikowski, Supplee, & Angeli, 1998
Qualitative Themes Continued...

- Students were attracted to cases that...
  - had interesting titles
  - were on familiar topics
  - were on controversial topics
  - they had opinions about
- Peer feedback was appreciated but not deep
- Mentor feedback was apprec. & motivating

Study: COW, Spring 1998
(Bonk, Malikowski, Suppée, & Dennen, 2000)

- Two Month Conference (One Condition)
  - 3 discussion areas (IU, Finland, and Cultural Immersions)
- Subjects = 110 students
  (80 US and 30 Finnish students)
- Mentors = 2 Al's, 1 supervisor, 4 coop tchers, 3 conference moderators.
- Videoconferences + Web Conferences

Finnish Cases Were Longer and more Reflective and Often Co-Authored...

Let's consider a math class in an elementary school as an example. Often a teacher teaches the new subject area and after that pupils practice counting those exercises. When a pupil has finished s/he receives extra exercises, or s/he is asked to do some work in other subjects but s/he is not allowed to continue further in the math book. Should the pupil be allowed to continue further on her/his own if s/he wants to? There is a danger that if s/he continues s/he will make more mistakes than if s/he waits until the teacher has taught the next step in the subject area. However, is it dangerous to do mistakes? Do teachers suppose that outside school there is always someone to tell what to do and how to do it in a right way?

Marya Ford Washington states in her summary: "It is painful to consider that a good portion of America's gifted and talented students spend most of their elementary and middle school careers learning to be average. It is even more painful to admit that they usually succeed." The same seems to apply to Finland. How could we solve this problem? Maarit & Matja

Vertical Mentoring Examples

9. Author: Jerry Coche (Mentor)
Date: Mar. 11 1:46 PM 1998
To shift from teacher centered classrooms to child centered classrooms and learning takes time, patience and a commitment to the idea that students are responsible for their own learning. Even in this age of enlightenment(?), we think that a quiet, teacher controlled classroom shows learning, while research shows that active, talking, sharing of learning experiences with peers is more productive. Be patient, it takes a long time to have students change to being responsible for their own.

Horizontal Finnish Mentoring

12. Author: Leena Date: Mar. 30 11:52 AM 1998
This is something I feel very close to. I have been trying struggle with finding ways to be a teacher in a new way, trying to think everything from the students' perspective, to challenge my own old traditions of teaching and try to seek ways which the I could find ways of studying things together with the students. What really puzzles me is that these different "projects" have had such extremely different lives.....What I really don't know yet is how to be a proper support of these processes for students... - Leena

Justified Statement (Finnish)

3. Author: Kirsi
Date: Mar. 6 8:11 AM 1998
Why not let the student study math further by himself and the teacher could help him whenever the teacher has time. At least some of the math study books are so designed that one page has examples that teach you how to solve the problem and then on the next page there are exercises. I personally hate being said 'wait' since when I'm interested in something I want to go on and learn more and not wait. This way I think the child learns to be responsible of his own learning. If I quote dear mr Vygotsky here again, the teacher should be sensitive to see where the child's proximate zone of development is and to help him 'over' it. The teacher's task is not to try to keep the child on the level he has reached but to help him learn more if he is interested...
Unjustified Statements (US)

24. Author: Katherine
Date: Apr. 27 3:12 AM 1998

I agree with you that technology is definitely taking a large part in the classroom and will move us in the future with all the technological advances that will be to come but I don't believe that it could actually take over the role of a teacher...but in my opinion will never take over the role of a teacher.

25. Author: Jason
Date: Apr. 28 1:47 PM 1998

I feel technology will never over take the role of the teacher...I feel however, this is just help on teachers out and is just another way for us to explain new work to the children. No matter how advanced technology gets it will never be able to...

26. Author: Daniel
Date: Apr. 29 11 AM 1998

I believe that the role of the teacher is being changed by computers, but the computer will never totally replace the teacher...I believe that the computers will eventually make teaching easier for us and that most of the children's work will be done on computers. But I believe that there will always be the need for the teacher.

Indicators for the Quality of Students' Dialogue
(Angeli, Valanides, & Bonk, 2003)

<table>
<thead>
<tr>
<th>ID</th>
<th>Indicators</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Social acknowledgement/ Sharing/ Feedback</td>
<td>Hello, good to hear from you...I agree, good point, great idea</td>
</tr>
<tr>
<td>2</td>
<td>Unsupported statements (advice)</td>
<td>I think you should try this...This is what I would do...</td>
</tr>
<tr>
<td>3</td>
<td>Questioning for clarification and mutual dialogue</td>
<td>Could you give me more info? Yes! Can you explain what you mean by...?</td>
</tr>
<tr>
<td>4</td>
<td>Critical thinking, Reasoned thinking, judgment</td>
<td>I disagree with X, because in class we discussed...I saw the following disadvantages to this approach...</td>
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</tbody>
</table>

Caseweb Visions

- Intros, Expert Commentaries, Reviews
- Expanded and Shrunken Case Views
- Hyperlink Options
- Conceptual Labels—chapters, themes, ideas
- Role Taking Options
- Mentoring Scaffolds/Questions
- Forced Counterpoints
- Sample Mentor and Peer Feedback
- Case Comparison Statistics

Story #4 (1997): Look out for the Russians...

Spring of '97 (FirstClass)
Content Analysis of Online Discussion in Ed Psych
(Hara, Bonk, & Angeli, 2001, Instructional Science)

Purpose and Questions of this Study
- To understand how graduate students interact online?
- What are inter patterns with starter-wrapper roles?
- What is role of instructor in weekly interactions?
- How extensive is social, cog, metacog commenting?
- How in-depth would online discussions get?
- And can conferencing deepen class discussions?
Dimensions of Learning Process (Henri, 1992)

1. Participation (rate, timing, duration of messages)
2. Interactivity (explicit interaction, implicit interaction, & independent comment)
3. Social Events (stmts unrelated to content)
4. Cognitive Events (e.g., clarifications, inferencing, judgment, & strategies)
5. Metacognitive Events (e.g., both metacognitive knowledge—person, and task, and strategy and well as metacognitive skill—evaluation, planning, regulation, and self-awareness)

Graduate Course Findings

• Participation
  + Most participated once/week
  + Student-centered & depend on starter
  + Posts more interactive over time
  + Lengthy & Cognitively Deep
    • Ave post: 300 words & over 18 sentences
    • From 33 words to over 1000 words
    – Some just satisfied course requirements

Findings Continued (see Henri, 1992)

• Social (in 26.7% of units coded)
  – social cues decreased as semester progressed
  – messages gradually became less formal
  – became more embedded within statement

• Cognitive (in 81.7% of units)
  – More inferences & judgments than elem clarifications and in-depth clarifications
  – Cog Deep: 33% surface; 59% deep; 12 both

• Metacognitive (in 56% of units)
  – More reflections on exper & self-awareness
  – Some planning, eval, & regulation & self q'ing

Cognitive Skills Displayed in Online Conferencing

Metacognitive Skills Displayed in Online Conferencing

Surface vs. Deep Posts (Henri, 1992)

Surface Processing
• making judgments without justification,
• stating that one shares ideas or opinions already stated,
• repeating what has been said
• asking irrelevant questions
• i.e., fragmented, narrow, and somewhat trite.

In-depth Processing
• linked facts and ideas,
• offered new elements of information,
• discussed advantages and disadvantages of a situation,
• made judgments that were supported by examples and/or justification,
• i.e., more integrated, weighty, and refreshing.
**Recommendations**

- Structure online discussions  
  - e.g., get them to use subject line better.
- When done, have them print out transcripts!  
  - Can take the class with them when done!
- Realize that different conferencing software and features serve different instructional purposes

**Story #5 (1999): Do you believe in the power of sharing?**
1999 Study of the World Lecture Hall Matrix of Web Interactions
(Cummings, Bonk, & Jacobs, 2002)

Instructor to Student: syllabus, notes, feedback
to Instructor: Course resources, syllabi, notes
to Practitioner: Tutorials, articles, listservs
Student to Student: Intros, sample work, debates
to Instructor: Voting, tests, papers, evals.
to Practitioner: Web links, resumes
Practitioner to Student: Internships, jobs, fieldtrips
to Instructor: Opinion surveys, fbdk, listservs
to Practitioner: Forums, listservs

<table>
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<tr>
<th>Table 2</th>
<th>Percent of online syllabi with different options for communication from among instructors, students, and practitioners</th>
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</thead>
<tbody>
<tr>
<td>To students</td>
<td>To instructor</td>
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<tr>
<td>From instructor</td>
<td>Assignment schedule (30%)</td>
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<tr>
<td></td>
<td>Class notes (10%)</td>
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<tr>
<td></td>
<td>Lecture notes/PowerPoint slides (40%)</td>
</tr>
<tr>
<td></td>
<td>Web links (5%)</td>
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<tr>
<td>Free materials</td>
<td>Post or publish current sample work (10%)</td>
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<tr>
<td></td>
<td>White-paper discussions or classroom conferences (10%)</td>
</tr>
<tr>
<td></td>
<td>Outside of course discussions (10%)</td>
</tr>
<tr>
<td></td>
<td>Printed syllabus (10%)</td>
</tr>
</tbody>
</table>

| From practitioners/pragmatics | Alpha (9%) | Course feedback (5%) | Virtual professional development community (5%) |
| Virtual feedback (3%) |

Story #6 (2000): Do you want to be target practice?

Online Officer Training Program (2000-2003)

- Evaluated social interaction, problem solving, online mentoring, and social interaction environment of Army officer training program; focus on instructional design, blended learning.

Online Officer Training Program Team

1. Dr. Robert Wisher, DOD and ARI
2. Dr. Tatana Olson, was at SRI/Purdue, now at Navy as Aviation Experimental Psychologist, Pensacola (wants to be first female fighter pilot)
3. Dr. Kara Orvis, was at ARI, Optima, Boston.
4. Dr. Ji-Yeon Lee, University of South Carolina (now at Inha University in Korea)
5. me

Study #1: Synchronous Chat Analysis (explored learner online problem solving)


Three Phases of AC3-DL

I. Asynchronous Phase: 240 hours of instruction or 1 year to complete; must score 70% or better on each gate exam

II. Synchronous Phase: 60 hours of asynchronous and 120 hours of synchronous; Virtual Tactical Operations Center (VTOC) (7 rooms; 15 people/extension (chat, avatars, audio conferencing)

III. Residential Phase: 120 hours of training in 2 weeks at Fort Knox

Previously Reported Results

Sanders & Burnside (2001); Sanders & Guyer (2001)

- Completed coursework in less time than correspondence course.
- Positive attitudes
- Covered add'l content not in correspondence
- More likely to make decisions
- Develop greater sense of team identity
- Greater planfulness, confidence, tactical proficiency, and leadership skills.
- Problems encountered: time, drill time conflicts, tech problems, family responsibilities, no compensation

Study #1. Overall frequency of social, mechanical, and on-task interactions across chat categories (6,601 chats).
(Nota: conducted focus groups, interviews, q'ers, chat transcript analyses, document analyses

Overall frequency of interactions across chat categories (6,601 chats).
On-Task Problem Solving
Mayer & Wittrock (1996); Sternberg (1997)
• "Terrain does not allow for effective maneuver of your element"
• "Harder to detect a liquid agent in rain"
• "Rain can also degrade optics on weapon systems"
• "Remember in the BDE OPORD—the BDE CMDR wants this to occur at about this time"

Social Interactions
• "Kids are great we made breakfast for Mom (wife)"
• "Did you go out for a run last night?"
• "Tell her I said happy mothers day"
• "3 miles in 24 mins all hills"
• "If God had meant for us to run, he wouldn’t have given us tanks"

Study #2 Reflections on Blended
• Some Keys: feedback, smaller modules, need instructor facilitation, use basic tech, move from async to sync, better orientation sessions
• Enjoyed the course, excellent technologies
• Favored sync over asynchronous
• All noted ways to address high attrition
• Perceived training transfer, active learning
• Learned to work as a team
• High individual and collective efficacy

• Exploring the educational and training potential of massive multiplayer online games and mapping out a research agenda in this area for the Advanced Distributed Learning Lab within the Department of Defense.

Massive Multiplayer Online Gaming (MMOG) Team
1. Dr. Vanessa Dennen, Florida State
2. me
3. With help from Dr. Robert (Bob) Wisher

Publications: Massive Multiplayer Online Gaming (MMOG)
### Cross-Cultural Comparisons of Online Collaboration Among Pre-Service Teachers in Finland, Korea, and the US


### Sample & Data Sources

- In Spring 1998:
  - Finland: 30 students and 5 instructors
  - USA: 88 students and 7 instructors
- In Fall 1998:
  - Korea: 21 students and 1 instructor
- A content analysis using Curtis & Lawson’s coding scheme to describe utterances in online collaboration.
  - Post collaboration questionnaire, interviews, video conference

### Online Collaboration Behaviors by Categories

<table>
<thead>
<tr>
<th>Behavior Categories</th>
<th>Codes</th>
<th>Description</th>
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<tr>
<td>Planning</td>
<td>GS</td>
<td>Group Skills</td>
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<td>Planning</td>
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<td>Planning</td>
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<td>Help Giving</td>
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<td>Controlling</td>
<td>FBG</td>
<td>Feedback Giving</td>
</tr>
<tr>
<td>Controlling</td>
<td>RJ</td>
<td>Exchanging Resources and Information</td>
</tr>
<tr>
<td>Controlling</td>
<td>SK</td>
<td>Sharing Knowledge</td>
</tr>
<tr>
<td>Controlling</td>
<td>CH</td>
<td>Challenging Others</td>
</tr>
<tr>
<td>Controlling</td>
<td>EX</td>
<td>Explaining or Elaborating</td>
</tr>
<tr>
<td>Reaching Input</td>
<td>HeS</td>
<td>Helping Seeking</td>
</tr>
<tr>
<td>Reaching Input</td>
<td>FRS</td>
<td>Feedback Seeking</td>
</tr>
<tr>
<td>Reaching Input</td>
<td>E</td>
<td>Expressing Efforts</td>
</tr>
<tr>
<td>Reflective/ Monitoring</td>
<td>ME</td>
<td>Monitoring Efforts</td>
</tr>
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<td>Reflective/ Monitoring</td>
<td>RM</td>
<td>Reflective on Mediation</td>
</tr>
<tr>
<td>Social Interactions</td>
<td>SI</td>
<td>Social Interactions</td>
</tr>
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<table>
<thead>
<tr>
<th>Behavior Categories</th>
<th>Finland</th>
<th>U.S.</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Contributing</td>
<td>80.8</td>
<td>76.6</td>
<td>78.7</td>
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<td>Seeking Input</td>
<td>12.7</td>
<td>21.0</td>
<td>16.8</td>
</tr>
<tr>
<td>Reflective/ Monitoring</td>
<td>6.1</td>
<td>2.2</td>
<td>4.2</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>0.4</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Online Collaboration Analysis (Korea)

<table>
<thead>
<tr>
<th>Behavior Categories</th>
<th>Korea</th>
<th>Code Rank</th>
<th>Code Percent</th>
</tr>
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<tbody>
<tr>
<td>Planning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CN</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>DA</td>
<td>2.1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BRG</td>
<td>2.2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>4.6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CK</td>
<td>2.3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>SX</td>
<td>3.2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Seeking Input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BE</td>
<td>2.00</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>BAI</td>
<td>6.00</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CM</td>
<td>3.00</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>S8</td>
<td>2.10</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Influence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KM</td>
<td>1.10</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>RS</td>
<td>2.20</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Related Interests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>0.95</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13.0</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

- Sharing Knowledge
- Advocating efforts
- Social Interaction

Findings from the Quantitative Analysis

- Low participation rate of instructors across all the groups.
- A majority of utterances fell into the "contributing" category.
- Differences in the intercultural participation levels across cultures.

Differences in Reflection Behaviors (monitoring effects)

- A Finnish case on student motivation (ME)
  "As a result of this discussion so far, we have made some conclusions dealing with students' motivation to learn. We agree that it is impossible to motivate students deliberately. There is not any specific act that can be used to increase students' motivation. According to McCombs, almost everything that teachers do in the classroom has a motivational influence on students... Intrinsic motivation and self-regulation strategies are also important and these can be supported by successful external supports...."

Differences in Feedback Seeking & Giving

- A U.S. case on disciplinary problems (FBS)
  "One day I come into teach the class and one of the twenty students is very quiet. He seemed alright at the time of teaching, but towards the end he just starts crying for no reason... The questions that were raised in my head were: 1. How involved should I get? 2. Should I call the family and tell them what happened? 3. Should I tell the other teachers and see what we all can do?"

Differences in Social Interaction Behaviors

- Social Interactions Among Korean students
  - Well, like a cup of coffee, may this new thing be relaxing (I am praying now). It must be the beginning, so I am happy now. I wonder whether someone would reply to me. I am a little bit nervous 'cause I am not so familiar with Web conferencing.
  - Sister Sunny, take care of yourself, and I hope your health will be good soon. I'm not accustomed to Web conference, either, but it is a good chance to participate. Please, cheer up!
  - Thank you for your interest in my health, but I'm all right now. Just before, my long message to you has gone by my slight mistake, so I am sad (crying). And, sorry for my late reply to you.

Communication Styles & Culture

- Low context communication
  - Focuses on explicit verbal message
  - U.S. Finland, and most of the Western cultures
- High context communication
  - Emphasizes how intention or meaning is conveyed through the context (e.g., social roles, positions, etc.)
  - Korea and most of the Asian cultures
- Importance of social interaction in the high context communication culture
Findings from the Qualitative Analysis

- U.S. students more action-oriented and pragmatic in seeking results or giving solutions.
- Finnish students were more group focused as well as reflective and theoretically driven.
- Korean students were more socially and contextually driven.

Implications

- Instructors have a key role in facilitating effective cross-cultural communication (e.g., social interaction activities for students from high context cultures).
- Instructional designers and software developers need to build learning tools that address learner needs from different cultures (usability tests in different cultures).
- Online learners need prior examples or case transcripts highlighting cultural differences in communication styles.

Story #8 (2002-2005):
Who needs a ticket?

The Pedagogical TICKIT: Teacher Institute for Curriculum Knowledge about the Integration of Technology
Curt Bonk
Lee Ehman
Emily Hixon
Lisa Yamagata-Lynch
John Keller
Indiana University

TICKIT
(1998 to 2003 and to present)

- Five year investigation of the implementation of the Teacher Institute for Curriculum Knowledge about the Integration of Technology which annually trains 25 teachers from 5 rural Indiana schools; exploring long-term impact of inservice technology integration program.

TICKIT Team

1. Dr. Lee Ehman, IU, C&I Dept.
2. Dr. John Keller, IUPUI
3. Dr. Emily Hixon, IU Northwest
4. Dr. Lisa Yamagata, Univ of Northern Illinois
5. Timothy Hew, IU, IST Dept.
6. me

TICKIT Program Features

- Teachers in rural schools
- Inservice teacher education
- Cohorts of 4-6 teachers per school
- Six hours of graduate credit
- Blended model (e.g., on-line and site-based interactions)
- Action research
- Academic Year Duration
**TICKIT Goals**
- Knowledge, skill, & confidence
- Thoughtful integration of technology
- Leadership cadres in schools
- Link schools and university
- Help schools capitalize on their technology investments

**Goal Statement**

"Obviously, I’m technologically in the Dark Ages. My students are so computer savvy that I feel I must at least attempt to catch up with them." — Debbie White, North Gibson, summer 2002

**TICKIT Teachers**

**TICKIT Model**

**Online Interaction**

**Typical TICKIT Training and Projects**

- Includes class, department, or school website.
- Write: Electronic newsletters, book reviews.
- Tools: Photoshop, Inspiration, PowerPoint.
- Telecom: e-mail with foreign key pals.
- Digitizing: using camera, scanning, digitizing.
- Videoconferencing: connecting classes.
- Web Course: HighWired.com, MyClass.net, Lightspan.com, eBoard.com
Critical Friend Post Example

"Beverly: Before I forget, I want to thank you again for your invaluable help at the ICE conference. I get used to using a particular piece of equipment or program, and it's hard for me to adapt quickly. You saved the day. One thing I have learned from using technology is that we need to depend upon each other for support. We are all in this boat together."

Findings: Summary

- Feedback, praise, social interaction most frequent
- Critical friends provide peer support, help, social support
- Reading reactions & debates more content focus
- Critical friend postings perceived more beneficial
- Reading reactions & debates "just another task"
- Justification: 77% claims unsupported; 29% referenced classroom & other experience
- Depth: ~80% surface level
- Off Task: 4% total; most in critical friend activity

Research Question: Study #2

Do teachers who have been through the TICKIT program differ from teachers who have not on dimensions of computer integration?
TICKIT Results

<table>
<thead>
<tr>
<th>Factors</th>
<th>Means</th>
<th>95% CI</th>
<th>t-value</th>
<th>p-value</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Integration</td>
<td>39.25</td>
<td>8.66</td>
<td>7.66</td>
<td>.000***</td>
<td>1.81</td>
</tr>
<tr>
<td>Technology Limitations</td>
<td>13.45</td>
<td>15.79</td>
<td>-2.36</td>
<td>.02**</td>
<td>.63</td>
</tr>
<tr>
<td>Technology Resistance</td>
<td>8.32</td>
<td>7.15</td>
<td>-2.14</td>
<td>.04**</td>
<td>.50</td>
</tr>
<tr>
<td>Computer Proficiency</td>
<td>12.38</td>
<td>12.40</td>
<td>5.126</td>
<td>.000***</td>
<td>1.23</td>
</tr>
</tbody>
</table>

Relative Impact

<table>
<thead>
<tr>
<th>Source of Influence</th>
<th>95% CI</th>
<th>t-value</th>
<th>p-value</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Order</td>
<td>13.45</td>
<td>15.79</td>
<td>-2.36</td>
<td>.02**</td>
</tr>
<tr>
<td>Attendance Impact</td>
<td>8.32</td>
<td>7.15</td>
<td>-2.14</td>
<td>.04**</td>
</tr>
<tr>
<td>Classroom Teaching</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Outside</td>
<td>8.32</td>
<td>7.15</td>
<td>-2.14</td>
<td>.04**</td>
</tr>
<tr>
<td>Computer technology</td>
<td>13.45</td>
<td>15.79</td>
<td>-2.36</td>
<td>.02**</td>
</tr>
<tr>
<td>Online course</td>
<td>12.38</td>
<td>12.40</td>
<td>5.126</td>
<td>.000***</td>
</tr>
</tbody>
</table>

TICKIT Teacher Voices

"This class was very helpful. I gained a lot of confidence as a technology user from this class."

"The door is now open. I will continue to try to find technological ways to teach them."

"This was the best program I have ever been involved with as a teacher."

Story #9 (2003): Where is Disneyland?
Online Learning Survey Research (2001-2006)

Myth #1.
College instructors are loyal.

Myth #2.
Young instructors will jump on this.
Myth #3.
College instructors will flock to sophisticated technologies.

Myth #4.
College faculty just need a little more training to teach on the Web.

Myth #5.
Shhh...If you don't say anything, college instructor will just do this for free.

Trend 1: Enrollments Growth in Certificates and Short Programs

Trend 2: Course Quality Issues Become Pervasive (need for quality control police)

Trend 3: Technology Outpaces Theory
Kevin Kluse, November 2003, CLO, Tech Trends Impacting E-Learning
Present State and Future of E-Learning and Blended Learning (2000-Present)

- In process of analyzing new directions in e-learning and blended learning in both higher education and corporate settings in the UK, USA, China, Taiwan, and Korea via survey research (Note: my previous studies explored current state of online learning in higher educ and corporate settings).

Present and Future of E-Learning and Blended Learning Team

1. Dr. KJ Kim (now at Portland State)
2. YaTing Teng, Univ of Illinois
3. Su Jin Son, Univ of Illinois
4. Tingting Zeng, Roehampton Univ, UK
5. Eun Jung Oh, Univ of Georgia
6. Jingli Cheng, Indiana University
7. Chris Essex, IU, IST Dept.
8. me

Using Blended?

7. Is your organization using blended learning as part of its employee training? (US, UK, Korea, Taiwan)

- No, it is not something that we have considered.
- No, but we are considering using it.
- Yes, we have recently started using it.
- Yes, we have been using it for more than 2 years now.
- Not sure. What is blended learning?

Skills Taught Blended

Skills Areas Taught Through E-Learning (US, UK, Korea, Taiwan)

Government Support Online

Government support? (US, UK, Korea, Taiwan)

Major Issue for Blended

Most Significant Issue or Problem of BL (US, UK, Korea, Taiwan)
Instructional Strategies Online

Which strategies will be more widely used in ILT?
(2004, UK, Korea, Taiwan)

Story #10 (2004-2006):
Data at your fingertips...
Research on the Online MBA Program,
Kelley Direct (KD), at Indiana Univ
- 12 students in 1999 to 1,000 in 2004
- fully online; 1 week summer residencies
- Use regular on-ground instructors
- Data Collected: Surveys, focus groups, content
analysis, interviews, document review, etc.

Online MBA Program
(Dec. 2003-Present)
- Exploring many aspects of Kelley Direct
  online MBA program at IU—the only top 20
  MBA program that is fully online (includes
  research on virtual teaching, case-based
  learning, student and faculty perceptions,
  asynchronous discussions, instructor roles,
  technology use, time management, etc.).
  (Supervised 8-9 people on this project—work
  includes student and faculty interviews,
  focus groups, surveys, content analyses,
  etc.)

Online MBA Program Team
1. Dr. Rich Madjuka, IU, KD Bus School
2. Dr. Seung-hee Lee, IU, KD Bus School
3. Dr. Xiaojing Liu, IU, KD Bus School
4. Buda Su, IU, IST and KD Bus School
5. Dr. I.J Kim, Portland State University
6. Shijsan Liu, IU, IST Dept.
7. Dr. Min Shi, University in China
9. Dr. Minyoung Doo, James Madison University
10. Alyssa Wise, IU, Learning Sciences
11. Pam Fuhrmann, IU, Ed Psych Dept.
13. Me

Exploring Four Dimensions of Online
Instructor Roles: A Program Level Case
Study (Liu, Bonk, Madjuka, Lee, & Su, 2005)

Problems within Roles
- Lack program wide faculty interaction (P)
- Lack facilitation skills (P)
- Concerns about time commitment (P/S)
- Lack skills in weaviong discussion (M)
- Lack awareness of social role (S)
- Lack better technology for social role (S)
- Lack technical skills (T)
- Concern about accessibility issues (T)

Table 2. Summary of Technology Tools and Other Course Resources Used in Online MBA Programs.

<table>
<thead>
<tr>
<th>Technology Tools</th>
<th>Course used</th>
<th>Course not used</th>
<th>Percentage of usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text books</td>
<td>27</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Email</td>
<td>28</td>
<td>1</td>
<td>96%</td>
</tr>
<tr>
<td>Text-based two-way communication/discussion forums: Asynchronous text-based (e.g., discussion forums)</td>
<td>25</td>
<td>2</td>
<td>95%</td>
</tr>
<tr>
<td>-Synchronous text-based (e.g., chat)</td>
<td>12</td>
<td>10</td>
<td>47%</td>
</tr>
<tr>
<td>Interactive whiteboard</td>
<td>18</td>
<td>9</td>
<td>67%</td>
</tr>
<tr>
<td>PowerPoint slides</td>
<td>16</td>
<td>13</td>
<td>54%</td>
</tr>
<tr>
<td>Web pages</td>
<td>13</td>
<td>14</td>
<td>48%</td>
</tr>
<tr>
<td>Audio and video clips</td>
<td>12</td>
<td>13</td>
<td>44%</td>
</tr>
<tr>
<td>Telephone</td>
<td>8</td>
<td>18</td>
<td>30%</td>
</tr>
<tr>
<td>Voice- and visual-based two-way communications (Voice mail, instant messaging, video conf., etc.)</td>
<td>0</td>
<td>27</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Strategies Used for Virtual Teaming**

*From Carabajal, LaPointe, and Gunawardena (2003)*

**Dimensions of virtual teaming**

**Task Dimension**
- Concerns of productivity
- Team formation/management
- Conflict resolution

**Social Dimension**
- A sense of cohesion
- Emotional relationship

**Technological Dimension**
- A workplace to support groupwork
- Types of tools for communication/collaborative effective use of tools

**Strategies for Virtual Teaming (Lee, Bonk, Magjuka, Su, & Liu, in press)**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Strategies</th>
<th>Courses in use (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task</td>
<td>Team change by each assignment</td>
<td>2 (7%)</td>
</tr>
<tr>
<td></td>
<td>Team discussion</td>
<td>23 (85%)</td>
</tr>
<tr>
<td></td>
<td>Team-level deliverables</td>
<td>21 (78%)</td>
</tr>
<tr>
<td></td>
<td>Internal interaction (critique, feedback, idea sharing)</td>
<td>9 (33%)</td>
</tr>
<tr>
<td></td>
<td>Peer evaluation</td>
<td>5 (19%)</td>
</tr>
<tr>
<td></td>
<td>Combination of teamwork and individual work</td>
<td>21 (78%)</td>
</tr>
<tr>
<td>Social</td>
<td>Online coffee house</td>
<td>2 (7%)</td>
</tr>
<tr>
<td></td>
<td>Online introduction forum</td>
<td>2 (7%)</td>
</tr>
<tr>
<td></td>
<td>Personnel profile</td>
<td>27 (100%)</td>
</tr>
<tr>
<td></td>
<td>Other social events</td>
<td>5 (19%)</td>
</tr>
</tbody>
</table>

**Summary of Dimensions of Virtual Teams in Online MBA Courses**

<table>
<thead>
<tr>
<th>Dimensions of virtual teams</th>
<th>Degree(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Dimension</td>
<td>H</td>
</tr>
<tr>
<td>+Use of task techniques for team activity design</td>
<td>H</td>
</tr>
<tr>
<td>+Use of human interaction approach</td>
<td>M</td>
</tr>
<tr>
<td>+Use of social techniques in virtual teams</td>
<td>M</td>
</tr>
<tr>
<td>Social Dimension</td>
<td>M</td>
</tr>
<tr>
<td>+Sharing social presence and cohesion</td>
<td>M</td>
</tr>
<tr>
<td>+Use of text-based (asynchronous tools</td>
<td>H</td>
</tr>
<tr>
<td>+Use of audio-and video-based (asynchronous tools</td>
<td>L</td>
</tr>
<tr>
<td>+Usefulness of collaborative tools</td>
<td>M</td>
</tr>
</tbody>
</table>

(1) H=High, M=Medium, L=Low
Concerns with Community Building (Blended!)

"As for community, I think we're staggering toward one that's driven by the faculty members themselves. The times that we've been in the same room we say to each other, "We've got to get together. We've got to form some kind of group so we can trade ideas." We did get together for a lunch but it was like very unplanned and we can do a lot more with that."

Strength of the Program

- **Flexibility**: 60%; Per 1 student "Flexibility, if it wasn't online I wouldn't be getting an MBA."
- **Excellent faculty**: 34%; Students perceive professors as knowledgeable, various teaching methods, good at providing immediate feedback.
- **High quality curriculum and course content**: 30% felt the program offers a high quality curriculum and course content; case-based instructional method valuable.
- **Reputation (13%): Admin support**: 11%; Quality students: 7%; Diversity of community: 5%
- **Other strengths including its week long in-residence program, relatively low cost, overall program quality, and the possibility to use what is learned directly in the work setting**

Key Barriers to Online Learning

- Lack of human interaction: 33% of respondents think more interactions are needed between student and instructor, and among students.
- Team schedule issue: 18% of the respondents expressed the frustration over time zone differences and difficulty of scheduling sync mtg.
- Lack of sense of community: 11%. A few students felt lonely due to lack of peer support and lack of a strong network of students.
- Lack of interactive technology: 8%; Delayed feedback: 8% Large group size: 7%;
- Other barriers include unclear expectations, not enough time for reading, unequal work load distribution, lengthy discussion forum, and lack of lecture.

Dropping out???

- Only 9% thought about dropping out due to disappointment with course design.
- Also a problem with a lack of community, lack of social presence of instructor, lack of bonding
  - The intention of dropping out of the classes
  - negatively correlated with the learner engagement ($r=-.40$),
  - feeling of being a part of a learning community ($r=-.47$),
  - comfort level of reading messages and materials online ($r=-.48$),
  - and helpfulness of instructor facilitation ($r=-.51$).

One Word to Describe Program

- 70% were positive!
- Common words were excellent, good, exciting, rewarding, effective, satisfied, enlightening, educational, solid, and empowering.
- About 16% think the program is quite challenging (challenging, intense, demanding, adventure, and hard).
- One student wrote "this is the hardest thing I have ever done."
- New, unique, eye-opening, and surprising.

Recommendations for Improvement

- More technology integration: 52%. Video & tele-conferencing, better chat.
- Immediate and detailed feedback
- More human interactions: Over 50%.
- More options, flexibility, elective courses.
- Enhance administrative support: Consulting services, contact options, hot line help.
- Flexibility on Team assignment: Choose teammates.
- Specific recs: More lectures, burned CDs, slide narrations, key take aways, emailing course announcement, and more instructor check up.
Two + 1 (3) Key Research Questions for the Next 2 years?

1. What new sorts of collaborations will knowledge repositories spur? What impact will these have on innovative pedagogy?

2. How will wikis, blogs, podcasts and other technology innovations foster more individualized learning and opportunities for social constructivist teaching practices?

3. What new forms of education will emerge from handheld devices and mobile computing?