

Is Student Collocation a Factor in Distance Learning?

Internet2 Fall Member Meeting

New Orleans, LA 2008

Craig Locatis¹, Eta Berner², Glenn Hammack³, Steve Smith², Richard Maisiak²

**¹National Library of Medicine, ²University of Alabama at Birmingham, ³University of Texas Medical
Branch at Galveston**

Distance Education Research

- Simonson, M. (2002). In case you're asked: The effectiveness of distance education. *Quarterly Review of Distance Education*, 3(4), vii.
- Hanson, D., Maushak, N., Schlosser, C. & Anderson, N. (1997). *Distance education: A review of the literature, 2nd Ed.*, Washington, DC: Association for Communications and Technology.
- Ruiz, J., Mintzer, M., & Leipzig, R. (2006). The impact of e-learning in medical education. *Academic Medicine*. 81(3), 207-212.
- Machtimes, K. & Asher, W. (2000). A meta-analysis of the effectiveness of telecourses in distance education. *American Journal of Distance Education*, 14(1), 27-45.
- Bernard, R., Abrami, P., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., Wallett, P., Fiset, M., & Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research*, 74(3), 379-439.
- Locatis, C., Vega, A., Bhagwat, M., Liu, W. & Conde, J. (2008). A virtual computer lab for biomedical technology education. *BMC Medical Education*, 8(12).
- Locatis, C., Gaines, C., Liu, W., Gill, M., Carney, J., Foster, J., McCall, V. & Woods, M. (2006). A blended training approach for using videoconferencing for distance education. *Journal of the Medical Library Association*, 9(4), 464-468.

DE Research

- Generally NSD in outcomes between distance and classroom
- Students appreciate the time/place convenience of distance education
- Students prefer classroom instruction to distance with opportunities to interact in real time with teachers and peers
- Attrition is higher in distance (poor self-learning skills, distractions, isolation)

DE Research (Con't)

- Opportunities to communicate in distance positively affect achievement and attitudes (sense of social presence)
- Asynchronous communication allows more time to interact
- More time theoretically allows more interaction, participation by more students, and thought in constructing responses
- Loss of immediacy, spontaneity, and continuity

DE Research (Con't)

- Students value use of video in synchronous and asynchronous distance education
- Video with 2 way interaction better than 1 way video alone
- Synchronous videoconferencing studies compare a classroom group with remote group (s); classroom groups have slightly better achievement and attitudes possibly due to more attention to students physically present

Educational Research Motivation

- Need not be entirely synchronous or asynchronous
- Many recommend blended approaches combining distance education with in person contact
- Is it possible to attain some of the benefits of classroom interaction entirely virtually, with instructors and students at different end points via 2-way interactive video?

Technical Motivation

- Evolution of Internet services to include streaming video and interactive video conferencing over IP
- Improved network and video quality (less packet loss, better codecs)
- Increasing network capacity and infrastructure build out (broadband to homes)
- Videoconferencing more feasible for groups AND individuals

Goal: Collocation effects on:

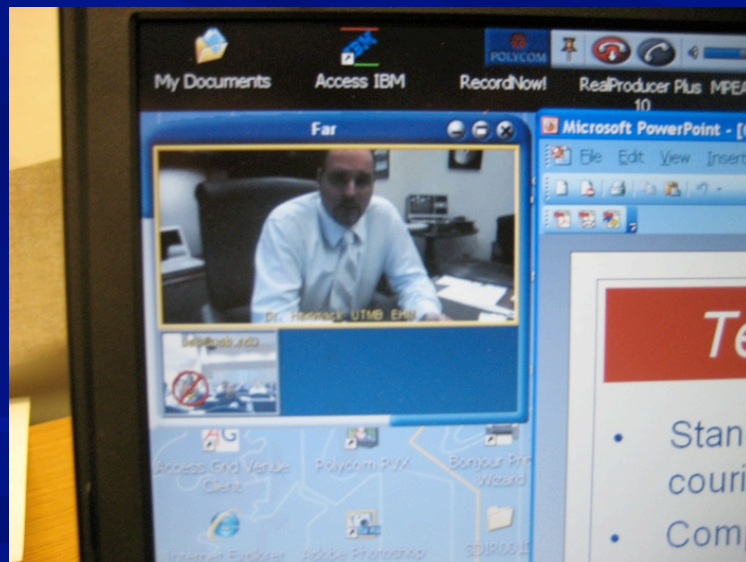
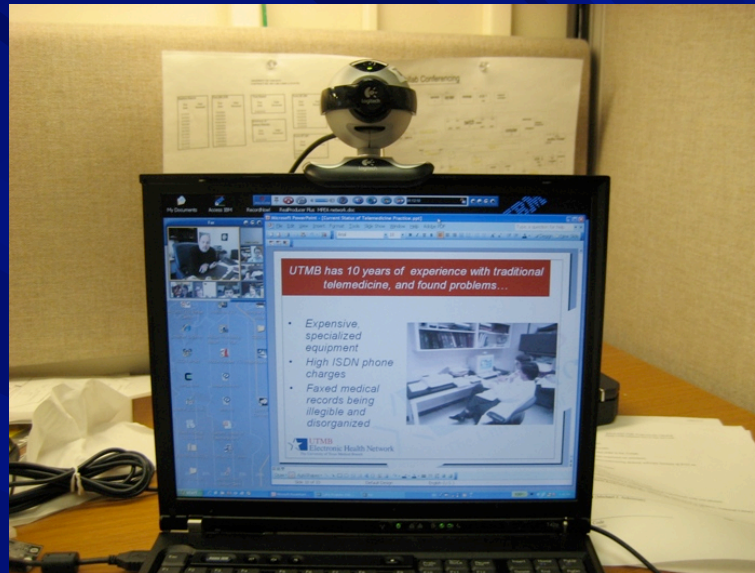
- Learning outcomes and performance**
- Perceptions of instructional quality**
- Patterns of interaction**

When education is provided:

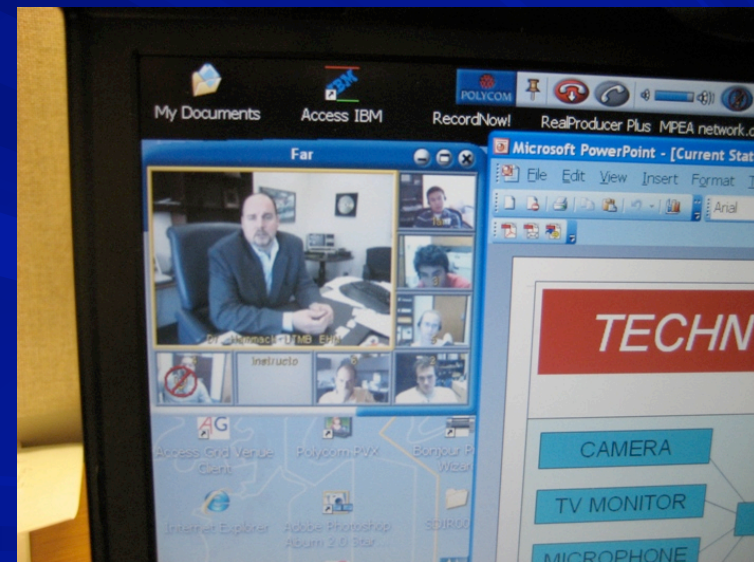
- Synchronously with interactive videoconference technology
- When the instructor is always at a distance (not with some students present at the instructor's site)
- With some students physically collocated and others dispersed

Study Design

- Students randomly assigned to collocated and dispersed conditions, 3 sessions in each condition of 7 students
- Distant lecture on telemedicine, Q&A, collaborative search activity on telemedicine web site
- Exam on lecture and web site, evaluation of teaching and technology



Collocated



Dispersed

Sample Test Questions

According to the glossary for health care professionals on the Telemedicine Information Exchange website, which word is defined as the following?

“The use of audio, video, and other telecommunications and electronic information processing technologies for the transmission of information and data relevant to the diagnosis and treatment of medical conditions, or to provide health services or aid health care personnel at distant sites.”

- A. Telematics
- B. Telepresence
- C. Telemedicine
- D. Teleconferencing

One of the earliest telemedicine sites was:

- A. LAX to UCLA Hospital
- B. Logan airport to Mass General Hospital
- C. USS Holland to Camp Pendleton Military Hospital
- D. Carnival Cruise Ship to UTMB Hospital

Technology/Instruction Forms

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I felt I could easily communicate with other students in this session.	-2	-1	0	1	2
2. I liked using the Internet to communicate with other students during the videoconference (leave blank if you did not use the Internet for communication).	-2	-1	0	1	2
3. I prefer meeting with other students even if the instructor is not physically present.	-2	-1	0	1	2
4. I prefer communicating virtually by video conference to using email or other forms of written communication.	-2	-1	0	1	2
Evaluation of the Presentation					
During this presentation the presenter generally....	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. explained the purpose of the presentation clearly and concisely.	-2	-1	0	1	2
2. explained how content applied to participants.	-2	-1	0	1	2
3. presented well organized material.	-2	-1	0	1	2
4. stayed on subject.	-2	-1	0	1	2
5. used appropriate visual aids (i.e. slides, web browser).	-2	-1	0	1	2
6. expressed respect for participants.	-2	-1	0	1	2
7. encouraged participation and interaction.	-2	-1	0	1	2
8. encouraged further learning.	-2	-1	0	1	2
9. motivated participants to follow up on their own.	-2	-1	0	1	2
10. was effective overall.	-2	-1	0	1	2

Test Results

	Mean	SD	Percent
Collocated Multiple Choice Test	13.75	2.10	80%
Dispersed Multiple Choice Test	14.10	1.34	82%

(Maximum score = 17).

Cronbach's alpha = .42 Significance = .53 = NSD

Technology Ratings

Item	Co-located Mean	SD	Dispersed Mean	SD
1. Communicate with other students	.95	.71	.90	1.22
2. Using Internet to communicate	*	*	.95	.89
3. Prefer meeting with students	.79	1.18	.90	1.04
4. Prefer video to written communication	.58	1.02	.33	1.06

Item	t	df	Significance (2-tailed)	Standard Error Difference
1. Communicate with other students	.13	38.00	.89	.32
2. Using Internet to communicate	*	*	*	*
3. Prefer meeting with students	-.33	38.00	.75	.35
4. Prefer video to written communication	.74	38.00	.46	.33

* Not rated by co-located students and not analyzed.

Cronbach's alpha = .50

No significant differences

Instruction Ratings

Item	Co-located Mean	SD	Dispersed Mean	SD
1. Purpose	1.20	.95	1.38	.59
2. Application	1.20	.77	1.10	.89
3. Organization	1.50	.61	1.52	.60
4. Stayed on Subject	1.50	.61	1.67	.48
5. Visual Aids	1.50	.61	1.38	.97
6. Respect	1.30	.80	1.57	.60
7. Interaction	.40	1.05	1.19	.87
8. Further Learning	.60	.99	.43	1.08
9. Motivation	.30	1.17	-.10	1.14
10. Overall	1.25	.79	1.24	.70

Item	t	df	Significance (2-tailed)	Standard Error Difference
1. Purpose	-.74	39.00	.47	.25
2. Application	.40	39.00	.69	.26
3. Organization	-.13	39.00	.90	.19
4. Stayed on Subject	-.98	39.00	.34	.17
5. Visual Aids	.47	39.00	.34	.17
6. Respect	-1.23	39.00	.22	.22
7. Interaction	-2.63	39.00	.01*	.30
8. Further Learning	.53	39.00	.60	.32
9. Motivation	1.10	39.00	.28	.36
10. Overall	.05	39.00	.96	.23

Cronbach's alpha = .88 Interaction significantly higher for dispersed <.01

Questions Observed

- No pattern: technology reliability, privacy, and training
- Questions asked per session:
 - low = 2 for 1 collocated
 - high = 6 for 1 dispersed
 - all others (collocated and dispersed) = 4

Interactions Observed

- Collocated sessions: 7, 3, 4 = 14 total
- Dispersed sessions: 5, 22, 12 = 39 total
- Possible undercount of collocated
- Dispersed still higher

Explanation

- Evaluation came at end; assessed the entire session, including collaboration
- Dispersed students had to interact with everyone; all were privy to communication
- Collocated students interacted only with those next to them
- One collocated session divided the search questions and worked independently

Conclusions

- Transactional distance as a factor in distance education, may operate in classrooms also
- Dispersed collaboration may have been harder if there were more students or students had to share control of a single desktop