

Distributed Tutored Video Instruction: Experiments Comparing Face-to-Face with Virtual Collaborative Learning

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Introduction by Randall B. Smith

This project was a vision of former Sun Labs Director Bert Sutherland. He had been impressed by the "Tutored Video Instruction" (TVI) studies of his longtime friend Jim Gibbons, a Stanford professor and, later, Dean of Stanford's School of Engineering. Gibbons showed that students can achieve higher grades if, rather than attending lecture, they study a videotape of the lecture with a small group of fellow students and a facilitator (or "tutor"). This perhaps surprising result suggests that physical and temporal co-presence with the lecturer is not required for student learning. In fact, perhaps the lecturer's presence interferes: after all, students can pause a videotape and discuss the material in a less intimidating setting than is afforded by the conventional lecture hall.

Bert Sutherland wondered if perhaps the entire TVI group could be "virtualized" — spread out across a network. A distributed group could communicate via networked video and audio, and the lecture videotape stream could be sent over the net as well. Would "Distributed Tutored Video Instruction" (DTVI) be as effective as TVI?

The resulting comparative study is to our knowledge the largest effort ever to compare virtual with co-present small group collaborative learning. Dozens of faculty and researchers at Sun, SERA learning technologies, and two universities were involved in carrying out this series of experiments, which involved over 1000 students.

To begin the tests, John Dutra fabricated a kind of "closed circuit TV" scheme that enabled nine video images to be composited onto each computer screen. While not truly "networked" video and audio (there was no IP traffic involved), the technology enabled a reasonable simulation of the distributed study group setting, and preliminary experiments were underway. Later, Randy Smith brought a screen-sharing technology called "Kansas" to the task. This enabled true IP networked video and audio, as well as shared tools for collaborative note taking, shared web publishing, instructor comments and even remote session debugging (researchers at Sun could "visit" the sessions at remote universities to help fix technical glitches).

The results are encouraging for our networked future. Both TVI and DTVI outperformed conventional lecture as measured by student course grades. Furthermore, the TVI and DTVI grades were statistically identical. The collaborative learning boost apparently does survive a group's transition to video.

PUBLICATIONS:

Sipusic, M.J., Pannoni, R.L., Smith, R.B., Dutra, J., Gibbons, J.F., and Sutherland, W.R., "Virtual Collaborative Learning: A Comparison between Face-to-Face Tutored Video Instruction (TVI) and Distributed Tutored Video instruction (DTVl)," Sun Microsystems Laboratories Technical Report SMLI-TR-99-72.

<http://www.sun.com/research/techrep/1999/abstract-72.html>

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http://sll.stanford.edu/CSCL99/papers/tuesday/Randall_Smith_558.pdf

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