

Using Virtual Classroom Tools In Distance Learning: Can The Classroom Be Re-created At A Distance?

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Abstract

The educational environment is growing to include not only the traditional physical classroom, but also a virtual space on the Internet. For some students, there is no longer a need to spend hours in typical classrooms, entire degrees can be completed using web-based software. This paper discusses current state-of-the-art Virtual Classroom Software (VCS) and outlines Saint Francis University's Center of Excellence for Remote and Medically Under-Served Areas' (CERMUSA) advances using VCS.

Background

The 21st century is upon us and, although we aren't moving around in flying cars, as 1950's science fiction had hypothesized, technology is changing the way we function in our day-to-day lives. Society has made computer technology mainstream and there are few homes without computer access. The Pew Internet and American Life Project has tracked the growth of Internet use in the United States. "Some 59% of American adults had Internet access at the end of 2002, up from about 50% in 2000" (Spooner, 2005).

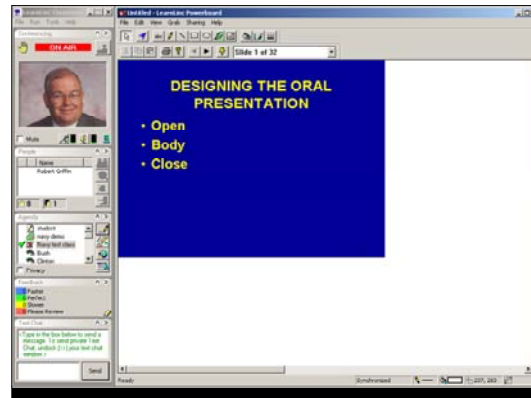
Technology has not only affected our homes, but also our education. College degrees are offered that virtually eliminate the long hours once spent in the classroom. From the comfort of home, some students can log-on to courses and receive classroom lectures via the Internet. One recent example involves training business people. According to CNN, "Donald Trump announced his plans to create an online university for entrepreneurs and working professionals looking to refine their skills in marketing, starting a business and, of course, real estate. The average course would involve six to eight hours of online training and include supplemental work offline with DVDs, CDs, and textbooks" (Ellis, 2005).

One tool that is being used to accomplish this new distance learning is Virtual Classroom Software (VCS). VCS is a program that simulates a real classroom environment in the Internet world. VCS offers similar advantages to a classroom, but offers the added bonus of allowing you to participate from any computer, whether from home, campus computer lab, or local library. With a VCS tool, if you can connect to the Internet, you can be in a VCS classroom.

What Is VCS?

A VCS tool is accessed from a computer that is connected to the Internet. An example of a typical VCS screen is shown in Figure 1.

Figure 1
A Typical VCS Screen



A VCS has several features which are common to most VCS tools. A good VCS will have the following features:

- Participant list
- Whiteboard
- Application sharing capability
- Duplex audio
- Shared web browser
- One-way video
- Text chat
- Polling/Interaction tool
- Recording capability for delayed viewing
- Ease of use

The way these assets are combined and used differs from VCS to VCS, but all these features are fundamental to basic VCS software.

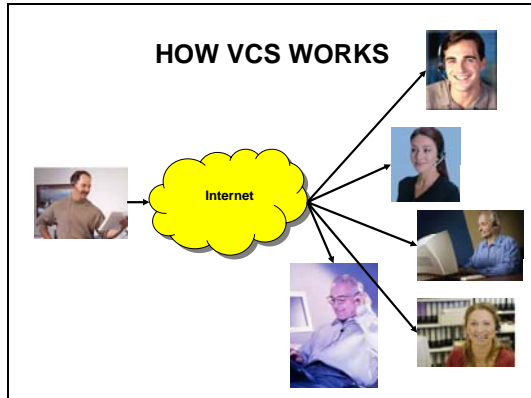
In 2002, Saint Francis University's Center of Excellence for Remote and Medically Under-Served Areas (CERMUSA) completed a matrix of VCS tools looking at the different features that were available from various companies. From this matrix, CERMUSA purchased iLinc's LearnLinc software, which offered features that were desirable at the time and was also reasonably priced. After continual use of LearnLinc and upgrading to the current version, CERMUSA felt there had been enough development with VCS to again

look at these tools to see which one would best meet the needs of the students and instructors. The goal was to determine which VCS provides the best simulated classroom experience.

How Is A VCS Used?

A VCS is easy to use. A diagram of the connection is shown in Figure 2.

Figure 2
How A VCS Works



VCS requires all users to connect to the Internet. The VCS is hosted on a server located somewhere in the Internet cloud. Some servers are owned by the VCS user while others are hosted by VCS developers.

All parties, prior to the initial connection, are usually required to download a software *kernel* that allows them to be recognized and connect to the host server. This kernel is supplied by the VCS.

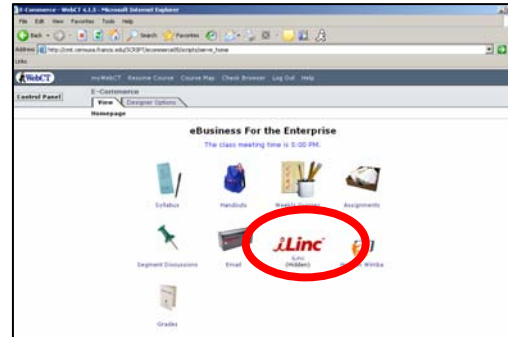
Students in a VCS classroom typically wear a headphone equipped with a microphone, which allows hands free communication. Although less desirable, some students use the computer's built-in speaker and microphone.

Figure 3
Typical User Of A VCS Tool



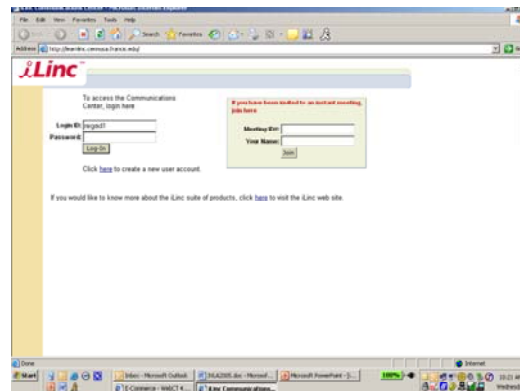
In order to integrate the VCS into a course, an Internet link is provided within existing courses. At CERMUSA, students and faculty routinely use WebCT (a course management tool) to support classes. When using WebCT, a VCS link is embedded on the course home page so that students can immediately connect with the VCS. An example screen shot is shown in Figure 4.

Figure 4
A VCS Link Within WebCT



The student simply clicks the link and they are connected to the appropriate VCS. By clicking on the link shown in Figure 4, the student will spawn the webpage shown in Figure 5.

Figure 5
A VCS Entry Page



Limitations Of VCS Tools

There are some minor limitations of VCS. While a dial-up connection to the Internet will work with most VCS tools, some features will be sluggish or inoperable with a slow connection. Use of web camera video is one of those features that will work better with a broadband connection to the Internet. Audio too, can be sluggish with a dial-up connection. All of these limitations are minor and do not limit a student from participating in a VCS classroom.

Research Study – Phase One

CERMUSA undertook a research study to determine which VCS tool was the most advanced tool available. What the research team wanted to do was to see how the iLinc tool, which was being used, compared to the array of VCS tools that became available since the original purchase of iLinc in 2002. CERMUSA prepared for three phases of evaluation for this study and currently has completed two of the three phases.

The research prototype called *The Comparison of Web-Based Distance Learning Environments* began in September 2004, by forming a small focus group consisting of Saint Francis University and CERMUSA employees.

In Phase One of the experiment, 15 different VCS tools were examined in a four month period ranging from January until April 2005.

The following is an outline of the VCS tools and the dates when the software was evaluated:

- January 2005
 - iLinc
 - Click-to-Meet
- February
 - INSORS
 - Question Mark
 - Macro Media Breeze
 - Horizon Wimba
- March
 - Marratech
 - Elluminate
 - Centra
 - Tegrity
- April
 - WebEx
 - B-Live
 - Polycom Web Office
 - MS Live Meeting
 - Lotus Sametime

Each VCS tool was demonstrated by a company representative and the focus group evaluated each tool individually based on several different criteria:

- Ease of Use
- Audio
- Video
- Whiteboard
- Power Point
- Shared Web Browser
- Team/Group Collaboration
- Application Sharing
- Interface Intuitive

Each evaluator was asked to complete a survey to determine what experience they had with VCS. Then,

each VCS tool was demonstrated using an online connection. After each product demonstration, the participants were asked to complete a brief one page survey evaluating the product. Participation varied for each evaluation due to schedules and other commitments of the evaluators; each VCS tool was evaluated by at least five evaluators during this phase of the research.

During this phase of the evaluation, some products were deemed to be true VCS tools while some were judged to be component tools, but were not intended to be full service VCS tools.

The results from Phase One testing produced eight VCS tools that were taken to Phase Two testing. The following tools were Phase One finalists (listed in alphabetical order):

- Centra
- Click-to-Meet
- Horizon Wimba
- iLinc
- MacroMedia Breeze
- Marratech
- Microsoft Live Meeting
- WebEx

Research Study - Phase Two

Phase Two testing evaluated the top eight VCS tools from the first round of evaluations. This testing took place at Naval Medical Education and Training Command in Bethesda, Maryland.

All evaluators were Navy personnel (both military and civilian employees) who were assembled in the same room and used the same type of headset, camera, and laptop computer in the evaluation. Testing and evaluation took place between June 13 to 15, 2005. The first day of the visit was used for setup and testing of the VCS tools. The eight demonstrations took place over the next two days.

Similar to the first phase of testing, participants were asked to complete a survey prior to each demonstration and complete a product review after each demonstration. Additionally, this time participants were asked to complete a post survey. The post survey was used to evaluate the overall experiences of the evaluators and determine if their opinions changed from the preliminary survey.

Results

The specific results of the research are detailed in the attached appendixes (Appendix A – D). As expected, each product had its particular strengths and weaknesses.

Three VCS tools stood out above the field as solid competitors following Phase Two of the study. These tools were (listed in alphabetical order):

- Horizon Wimba
- iLinc
- Microsoft Live Meeting

These VCS tools will be evaluated further during Phase Three of the research study at CERMUSA.

It should be noted that while the plan was to select the top three VCS tools, an additional vendor was included as a finalist; that VCS was Macromedia Breeze. This tool was added because it received a great deal of praise from outside reviewers, but did not fare well in CERMUSA's prototype testing. Macromedia Breeze finished a distant fourth in the research, but was brought along for further testing because the national press for this product has been strong.

Final Results

Based on the original criteria, how did the final three selections fare? Figure 6 indicates the basic features included in the top ranked finalists.

Figure 6
Features Of The Top 3 Rated Products

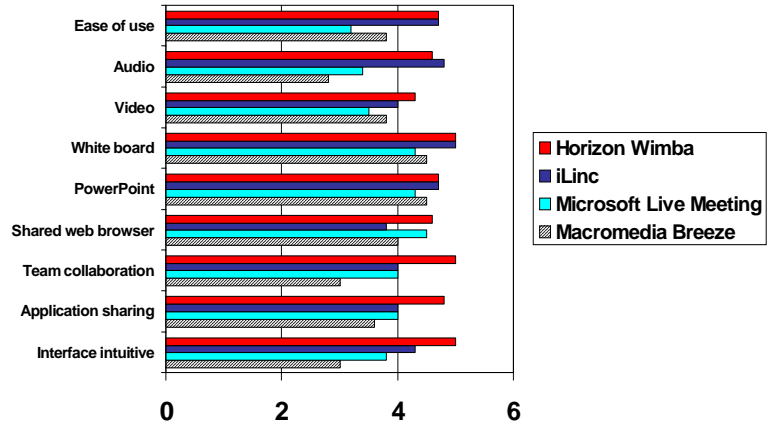
Product	Horizon Wimba	iLinc	Microsoft Live Meeting
Participants list	X	X	X
Whiteboard	X	X	X
Application sharing	X	X	X
Full duplex audio	X	X	X*
Shared web browser	X	X	X
Easy to use	X	X	X
One way video		X	
Text chat	X	X	X
Polling/ Interaction tool	X	X	X
Recording capability for delayed viewing	X	X	X

*Feature available too late for testing

Because the iLinc product was selected prior to the experiment described in this paper, it was determined to use this product as a benchmark product to which each of the finalist products could be compared. While the team was prepared to dispose of the iLinc tool if it did not compare well, it did make it into the top three. The rating of iLinc and the other top rated products is shown in Figure 7.

Figure 7
All VCS Products Compared

Cost Of Competing Products



During the scope of the research, the team decided to not allow cost to be a decision factor until the final stages of the evaluation process. Consequently, cost was only considered after the final three products were selected at the end of Phase Two of the prototype. Each of the products fell within acceptable purchase limits for the VCS tools. The list educational prices for the products are shown in Figure 8.

Figure 8
Cost Of Top Three Rated Products

Product	Educational Price* US \$	Pricing Notes
Horizon Wimba	\$19,500	• This price includes all hardware needed to host server locally
iLinc	\$46,500 + 18% maintenance fee Total = \$54,870	• Priced for 30 seats
Microsoft Live Meeting	\$23,000	• Currently this product can only be remotely hosted

* Prices vary

VCS pricing must be looked at in comprehensive detail prior to purchase. Some products are sold with caveats and must be investigated carefully prior to purchase. Such arrangements come with limitations which must be completely explored before they are purchased.

Research Study Future Plans - Phase Three

Phase Three testing is planned for the top three VCS tools. The experimental design will implement and test three VCS platforms in order to evaluate the value of the tools in a live teaching situation. The future prototype calls for each of the top three VCS tools to be used during a course. CERMUSA's research plan is to use one VCS tool for five weeks during the semester. The VCS tool will then be evaluated. The second VCS tool will then be used during the second five weeks, followed by the use of the third tool. Testing will be divided into five-week evaluation sessions for a total of a 15-week semester class. The order in which the three tools are to be used will be randomly assigned.

Cognitive and affective results from each of the tools will be analyzed in order to evaluate the VCS tools. This prototype is scheduled to take place from September 2005 to August 2006.

VCS tools will continue to develop. Testing must continue to ensure that the best tools are being used to teach students.

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Appendix A iLinc LearnLinc

iLinc offers various products to fit different collaboration needs. There are four different products that iLinc can be adapted to:

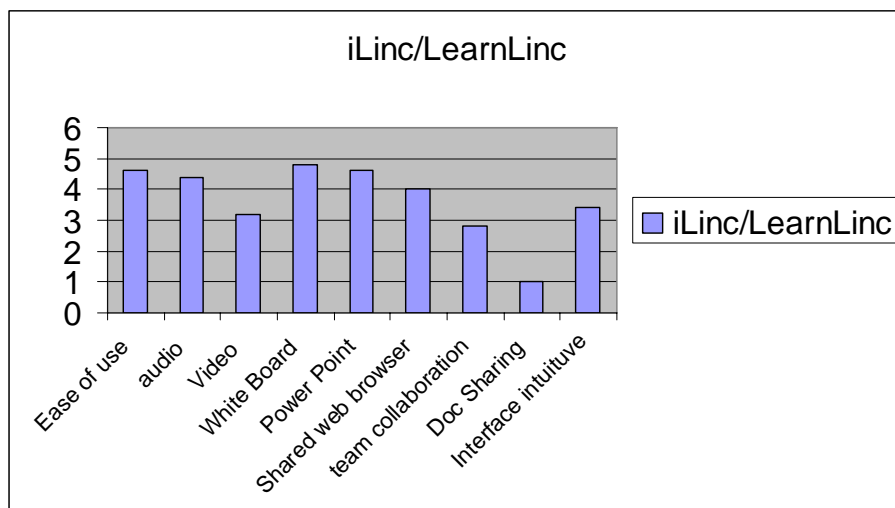
- MeetingLinc – for small collaborative settings
- LearnLinc – best for learning environment (CERMUSA's benchmark)
- ConferenceLinc – provides a one-to-many environment
- SupportLinc – provides an environment for service and support

LearnLinc offers the following features:

- Hand raising
- Speaker indicator
- Conferencing window display (still or motion video)
- Network bandwidth monitors
- Class attendance list
- Feedback
- Text chat
- Application sharing
- Power Point display
- Whiteboard
- Shared web browser

In Figure A1, note the ranking of LearnLinc. Note that in the overall evaluation, LearnLinc did fairly well. However, it did rank below average on video, team calibration, and document sharing.

Figure A1



Appendix B Macromedia Breeze

Macromedia Breeze is one of the newest VCS. Macromedia Breeze has three different functions:

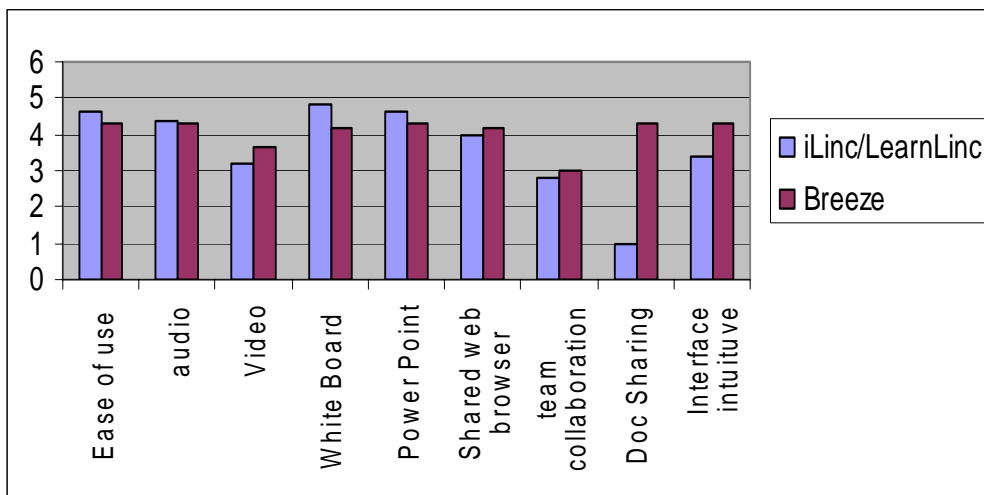
- Breeze presentation platform – converts PowerPoint presentation to simpler flash presentation.
- Breeze training – offers course management assessment and tracking tools.
- Breeze Live – allows users to show live or recorded video and audio, screen sharing, and application sharing (Figure B1).

Figure B1



Below, note how the group rated Breeze.

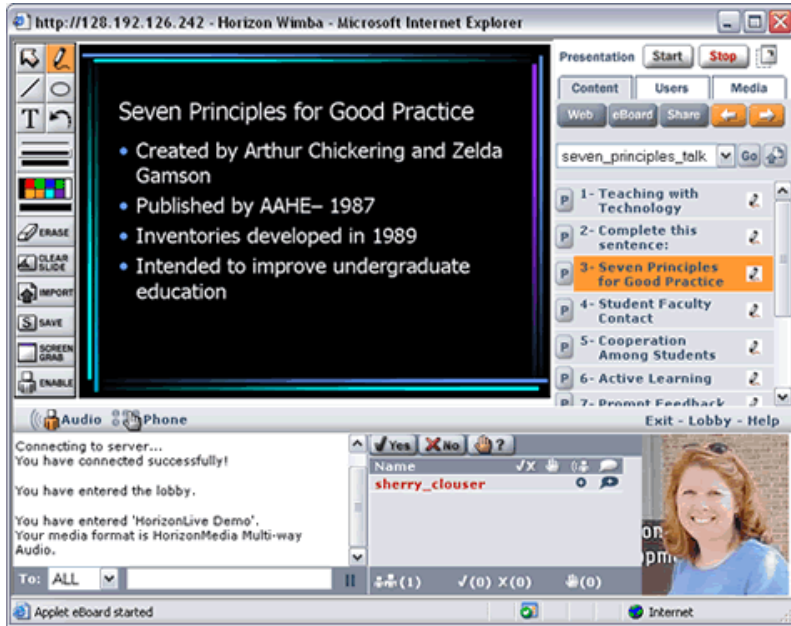
Figure B2



Appendix C Horizon Wimba

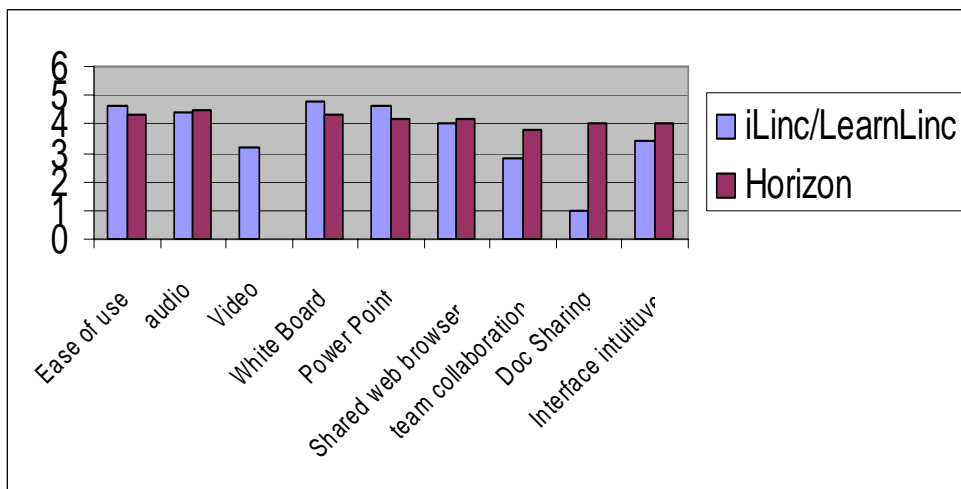
Horizon Live was one of the best programs that was evaluated. It had all the features that make great virtual classroom software. During the demonstration, the video feature was not shown, but the group was told that it was available. Note below, Horizon Live has a very user-friendly layout.

Figure C1



In Figure C2, Horizon Live was just as high or higher in all of the categories against LearnLinc. The only difference is that the video was not ranked, because it was not evaluated.

Figure C2



Appendix D Microsoft Live Meeting

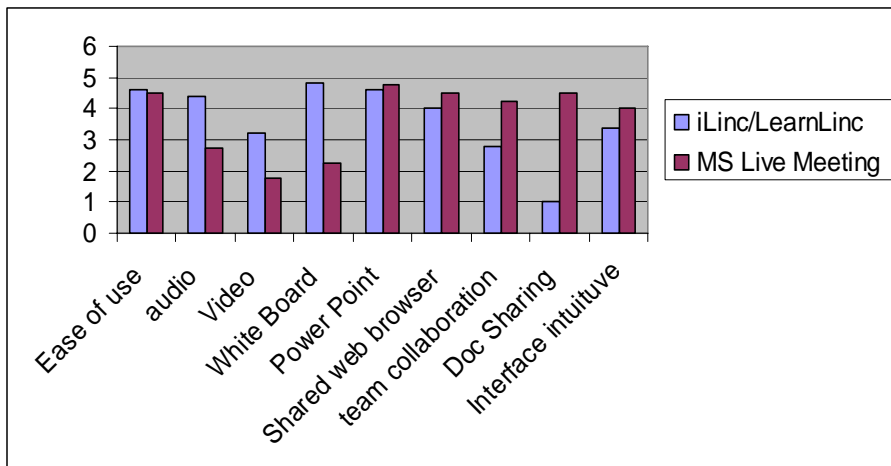
Microsoft Live Meeting is Microsoft's version of virtual classroom software. As you can see in the following figure, this product has the same look and layout as the Microsoft Office Suite.

Figure D1



In Figure D2, note that MS Live Meeting ranked very well. This is probably because of the familiarity of the Microsoft products made it easy to use. Live Meeting also has a function that is added into all of Microsoft Office products for easy integration.

Figure D2



References:

Ellis, David. "Trump Moves from Boardroom to Classroom". Trump Moves into Halls of Higher Education. 23 may. 2005. CNN. 24 May. 2005 <http://cnnmoney.printthis.clickability.com/pt/cpt?action=cpt&title=Trump+moves+into+ha>

Spooner, Tom. "Internet Use by Region in the United States. "Regional variation in Internet Use Mirror differences in Educational and Income Levels. 27 Aug. 2003. Pew Internet & American Life. 24 May. 2005 <<http://www.pewinternet.org>>.