

# **A Comparison of Software-Based Distance Learning Solutions**

## *In focus—Interactive Learning Systems*

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### **Introduction**

Within a short span of time, distance education has set a footprint in the world of learning. Appearing in hybrid forms of synchronous and asynchronous modes, it is beginning to sprout in both academic curriculum and training agendas even though the technology is still being tested and the results unclear. According to *International Data Corporation*, 85% of two-year colleges will offer distance learning courses by 2002, up from 58% in 1998 and 84% of four-year colleges will offer distance learning courses by 2002, up from 62% in 1998.

Given the impending demand for this form of learning, what kinds of delivery systems are available in the market? There are indeed quite a handful. It ranges from simple low-end solutions to elaborate high-end systems. For this assignment, I decided to explore the higher-end solutions—the *Interactive Learning Systems*—to find out how far the virtual classroom has been stretched.

An interactive learning system incorporates voice, data and video to simulate the classroom experience. It also has elaborate tools such as whiteboard annotation, application program sharing, assessment tools and various students' response mechanisms. The key is to provide instructor-student interactivity and to simulate the activities in a classroom. In my research for this assignment, I have found that there are quite a few vendors offering these capabilities. However, for the purpose of this paper, I have selected three vendors from the TeleCon East conference to do my comparative analysis.

### **Product Overview**

The three vendors that I have chosen to compare are: White Pine's ClassPoint, One Touch Systems' FrontRow and PlaceWare. ClassPoint and FrontRow have voice, video and data interactivity whereas PlaceWare only has voice and data interactivity. ClassPoint and FrontRow are set up specifically to target the distance learning market whereas PlaceWare markets itself more as a presentation tool which can be applied to distance learning needs. Although PlaceWare does not have all the interactive components in their product, their product is compatible with

other videoconferencing technologies to make up the shortfall in features. This can be an advantage as their customers have the flexibility of building their own complete distance learning packages.

All three vendors offer attractive interactive learning systems. For data interactivity, all three vendors have very similar capabilities. For audio interactivity, both ClassPoint and FrontRow offer two-way audio capabilities. For video, each of them differs in offerings. The differences between them are not so much in their features but in areas such as scalability, user interface, transmission methods and cost (see below for more details). White Pine's scalability is the lowest with twelve students per class (although a company can run multiple classes of twelve simultaneously). Depending on the class format, ClassPoint has the best scalability with 250 simultaneous participants in conjunction with 14,000 Response Keypad participants, however, it is also the most expensive solution.

In comparing these three vendors, I found that each vendor is capable of providing effective distance learning solutions. How well each of them will serve the customer depends largely on the customers' needs and budget. The table below gives a summary of the products' features.

<b>Feature</b>	<b>White Pine (ClassPoint)</b>	<b>One Touch Systems (FrontRow)</b>	<b>PlaceWare</b>
System requirements (minimum)	<p><i>Processor:</i></p> <ul style="list-style-type: none"> <li>▪ 100 Mhz Pentium</li> <li>▪ 133 Mhz or higher to use application sharing</li> </ul> <p><i>Operating system:</i></p> <ul style="list-style-type: none"> <li>▪ Windows 95 or NT 4.0</li> </ul> <p><i>Memory:</i></p> <ul style="list-style-type: none"> <li>▪ 32 MB of RAM</li> <li>▪ 12 MB of hard disk space</li> </ul> <p><i>Audio:</i></p> <ul style="list-style-type: none"> <li>▪ 16 bit full duplex sound card with speakers and a microphone</li> </ul> <p><i>Browser:</i></p> <ul style="list-style-type: none"> <li>▪ Netscape Navigator v3</li> <li>▪ Netscape Communicator v4</li> <li>▪ Internet Explorer v3</li> </ul> <p><i>Format:</i></p> <ul style="list-style-type: none"> <li>▪ PC only</li> </ul> <p><i>Internet Connection Speed:</i></p>	<p><i>Processor:</i></p> <ul style="list-style-type: none"> <li>▪ 166 Mhz Pentium</li> <li>▪ 200 Mhz or w/MMX recommended</li> </ul> <p><i>Operating system:</i></p> <ul style="list-style-type: none"> <li>▪ Windows 95 or NT 4.0</li> </ul> <p><i>Memory:</i></p> <ul style="list-style-type: none"> <li>▪ 48 MB of RAM (64 MB recommended)</li> </ul> <p><i>Audio:</i></p> <ul style="list-style-type: none"> <li>▪ 16 bit full duplex sound card with speakers and a microphone</li> </ul> <p><i>Browser:</i></p> <ul style="list-style-type: none"> <li>▪ Netscape Navigator v4</li> <li>▪ Internet Explorer v4 with Service Pak 4</li> </ul> <p><i>Format:</i></p> <ul style="list-style-type: none"> <li>▪ PC only</li> </ul> <p><i>Internet Connection Speed:</i></p>	<p><i>Processor:</i></p> <ul style="list-style-type: none"> <li>▪ 100 Mhz Pentium</li> </ul> <p><i>Operating system:</i></p> <ul style="list-style-type: none"> <li>▪ Windows 95 or NT 4.0</li> </ul> <p><i>Memory:</i></p> <ul style="list-style-type: none"> <li>▪ Not mentioned</li> </ul> <p><i>Audio:</i></p> <ul style="list-style-type: none"> <li>▪ Sound card, microphone and speakers optional.</li> </ul> <p><i>Browser:</i></p> <ul style="list-style-type: none"> <li>▪ Netscape Navigator v3</li> <li>▪ Internet Explorer v3</li> </ul> <p><i>Format:</i></p> <ul style="list-style-type: none"> <li>▪ PC only for instructor</li> <li>▪ PC or MAC for students</li> </ul> <p><i>Internet Connection Speed:</i></p>

	<ul style="list-style-type: none"> <li>33.6 Kbps</li> </ul>	<ul style="list-style-type: none"> <li>33.6 Kbps</li> </ul>	33.6 Kbps
Audio/Video capabilities	<p>Students can see and hear instructor in real time. (uses CU-SeeMe® Internet videoconferencing software)</p> <p><i>Audio:</i></p> <ul style="list-style-type: none"> <li>The instructor can give permission to any student to address the entire class.</li> <li>Students can have one-to-one conversation with the instructor.</li> </ul> <p><i>Video:</i></p> <ul style="list-style-type: none"> <li>The instructor can view up to 12 students' images at one time. However, students can only see the instructor or those classmates that the instructor specifies.</li> </ul>	<p>Similar to ClassPoint's capabilities</p> <p><i>Audio:</i></p> <ul style="list-style-type: none"> <li>Students can converse with the instructor and other students in real time.</li> </ul> <p><i>Video:</i></p> <ul style="list-style-type: none"> <li>Students can see a head-shot of the instructor.</li> </ul>	<p>Does not have video capability.</p> <p><i>Audio:</i></p> <ul style="list-style-type: none"> <li>Uses conference calling for audio.</li> </ul> <p><i>Video:</i></p> <ul style="list-style-type: none"> <li>System is compatible with other video teleconferencing software such as PictureTel or iSight.</li> </ul>
Whiteboard and application sharing	<p>Uses Microsoft NetMeeting for instructor controlled whiteboard and application sharing.</p> <ul style="list-style-type: none"> <li>Instructor and students can use the electronic whiteboard to share notes and other materials.</li> <li>Students can share a program running on the instructor's computer.</li> </ul>	<p>Has similar whiteboard capabilities as ClassPoint.</p> <p>FrontRow also allows two-way data interactivity and application program sharing such as instructor-led Web browsing.</p>	Similar capabilities as ClassPoint and FrontRow.
Student Assessments	<p>Quiz and questionnaire capable.</p>	<ul style="list-style-type: none"> <li>Quiz and questionnaire capable.</li> <li>System can generate real-time class performance reports for instructor to analyze (students can also share the information).</li> <li>Results and class records can be logged into a central database.</li> <li>Optional Response Keypad for easy response.</li> </ul>	<ul style="list-style-type: none"> <li>Quiz and questionnaire capable.</li> <li>Can compile results in real-time.</li> </ul>
Content Delivery	<ul style="list-style-type: none"> <li>Uses a Web browser to display content.</li> <li>Can annotate on whiteboard</li> </ul>	<ul style="list-style-type: none"> <li>Uses a Web browser to display content (Powerpoint).</li> <li>Can annotate on</li> </ul>	<ul style="list-style-type: none"> <li>Uses a Web browser to display content (Powerpoint).</li> <li>Can annotate on</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Has a Lesson Planning Center to control class setup and materials.</li> <li>▪ Students can access class materials anytime-before, during or after class.</li> <li>▪ Recording capability, absentees can access class session later.</li> </ul>	<p>whiteboard.</p> <ul style="list-style-type: none"> <li>▪ Has the option to use One Touch's Prompter Authoring Tool to develop content.</li> </ul>	<p>whiteboard.</p> <ul style="list-style-type: none"> <li>▪ Instructor can take screen snapshots of any material on the Web and include in presentation during lecture or to prepare for class material.</li> <li>▪ Recording capability, absentees can access class session later.</li> </ul>
Interactivity	<ul style="list-style-type: none"> <li>▪ Two-way audio</li> <li>▪ Multipoint video</li> <li>▪ Application sharing (Web tours, Word, etc.)</li> <li>▪ Text chat capable</li> <li>▪ Hand raising feature <ul style="list-style-type: none"> <li>▪ Student(s) can request to be recognized by instructor for questions and answers for collaboration.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Two-way audio</li> <li>▪ One-way broadcast video</li> <li>▪ Application sharing (Web tours, Word, etc.)</li> <li>▪ Response Keypad enables a student to "call" or "raise a hand" to alert the instructor. Student's name, location and picture will appear on the instructor's screen.</li> </ul>	<ul style="list-style-type: none"> <li>▪ One-way audio (using conferencing call, two-way if a video-conferencing tool is used to supplement).</li> <li>▪ Video (if it is supplemented)</li> <li>▪ Application sharing (Web tours, Word, etc.)</li> <li>▪ Text chat capable</li> <li>▪ Students feedback through InstantPolling™</li> </ul>
Scalability	12 students per server, up to 25 students	250 remote students per server in conjunction with 14,000 Response KeyPad participants.	Up to 1,000 per server.
Transmission Method	<ul style="list-style-type: none"> <li>▪ IP Multicast</li> <li>▪ IP Unicast</li> </ul>	<p>Three options:</p> <ul style="list-style-type: none"> <li>▪ Two-way satellite</li> <li>▪ Two-way transmission over broadband wireline network.</li> <li>▪ Satellite delivery of outbound instructor video, voice and data; return of student voice and data via telephone lines.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Two-way byte streaming over HTTP or TCP networking.</li> <li>▪ Java enabled firewall compliant.</li> </ul>
Cost	<ul style="list-style-type: none"> <li>▪ \$7,000 for 10 seats (include two instructors).</li> <li>▪ \$15,000 for 25 seats (include 4 instructors).</li> <li>▪ Windows NT 4.0 server additional.</li> </ul>	Enterprise-wide setup costs starts from \$50,000 to \$250,000 depending on transmission method chosen.	<ul style="list-style-type: none"> <li>▪ \$220 per seat with a minimum of 10 seats.</li> <li>▪ To supplement with videoconferencing will incur additional costs (or can download freeware from the Internet).</li> <li>▪ Server costs not included.</li> </ul>

## **Usability**

PlaceWare has the easiest-to-use interface. One Touch Systems' FrontRow is a close second and WhitePine's ClassPoint is third. PlaceWare may not have built-in audio and video to make an attractive distance learning package but its simplicity is appealing and can attract customers who are not computer savvy or students who have low-level computer knowledge. One Touch Systems and White Pine have elaborate instructor interfaces because their systems have more classroom management tools.

### ***PlaceWare***

The instructor uses a three-step process to start a lecture. The first step is to type in a URL in the Web browser, the second step is a drag and drop process for the instructor to load his/her presentation files, the third step is to give the presentation. The software uses traditional conference calling for the audio portion of the lecture. The whole process sounds user-friendly. However, if videoconferencing were supplemented, it would add more steps to the process.

The instructor's interface is quite simple to use. On the left of the screen, there is a column that shows an itemized list of the slides for the lecture. Below this column, there are four tool icons and a few navigation buttons. On the right, there is a tool palette for whiteboard annotation. If videoconferencing is added, a window showing the instructor's image will take up a corner of the screen. The student's interface is similar to the instructor's except for the tool icons.

### ***One Touch Systems***

The instructor's interface has a number of separate windows displaying various utilities such as lecture notes, students' requests for attention and students' responses to questions. The layout is neat and the display is touch-activated. Actually, its usability is comparable to PlaceWare. One Touch Systems requires a bit more learning to manipulate the display.

The student's view is neat and uncluttered. On the left is a window used to display video that can be the instructor's head-shot or a video clip. On the right is another window displaying Web-based content or Powerpoint slides. At the bottom of the screen is a set of buttons for students to control their interactivity with the instructor.

## ***White Pine***

The interface for White Pine seems more cluttered because it has to accommodate the multi-point video frames. This capability reduces the instructor's content window. The instructor has to keep resizing the various windows on the screen accordingly. It can be cumbersome. Clicking icons activates the use of the other features. The instructor panel is not difficult to use, just like the other systems; the user has to learn the software's respective functions.

## **Compatibility**

In terms of compatibility, PlaceWare is the most flexible. It is compatible with low-end browsers and is based mostly on the Internet. It can also run on any HTTP server that can serve Java applets. The software can also be easily compatible with other videoconferencing tools because they are run separately. Customers can tailor their video needs according to their own clients' hardware capabilities. The disadvantage is that extra work is needed to source and setup another system.

The other two systems are self-contained and complete so their compatibility issues are less. They also utilize Internet-based protocols. However, One Touch Systems does require higher versions of browsers as well as more robust processors and RAM.

## **Cost**

The cost of these three systems will be one of the factors affecting decision-makers. At one glance, the most expensive system is One Touch Systems' FrontRow. Most of the setup costs go to hardware requirements, the cost of the software is minimum and One Touch System may be willing to absorb some of this cost depending on overall expense. The need to have high up front costs may be a barrier for their prospective clients. However, they are definitely designed to cater to the needs of larger corporations.

On the other hand, if One Touch Systems is compared with White Pine's ClassPoint on a per seat basis, their price may be competitive if the customer has existing infrastructure usable for this system. Moreover, White Pine's ClassPoint costs \$7,000 for ten seats and the price does not include the cost of the server whereas the cost for One Touch System includes the server and can be scaled up to 250 students. Thus, depending on the customer's existing network, One Touch may not be that expensive after all.

PlaceWare's solution may be the most economical to implement as its setup costs are affordable. Their customers can use freeware or shareware from the Internet to supplement their lack of video and two-way audio capabilities. This will greatly reduce costs and make their solution attractive. Besides, if the customer has an available server, the setup cost is reduced further. The advantage of PlaceWare's pricing system is that it gives the customer a choice to have an elaborate system or not.

### **Evolutionary Path**

PlaceWare is a relatively new company. Its PlaceWare version 3 Conference Center was released recently so it is still testing the market with this product. If there should be any upgrading in the future, I foresee them to include audio and video capabilities. Currently, they market this product as a presentation tool more aggressively than it being a distance learning solution. To get a bigger piece of the distance learning market, they will have to add features such as classroom management and scheduling.

One Touch Systems' FrontRow is also an improved version of their distance learning solutions. They have incorporated the latest collaborative technologies and partnered with Hughes Network Systems to offer satellite transmission options. They do not foresee any upgrading in the near future.

Last summer, White Pine integrated NetMeeting into ClassPoint to enhance their product so that they can remain competitive in the distance learning market. I reckon they will keep a close watch on new emerging technologies to maintain their market advantage. To make their product user-friendlier, one of their engineers said that they would be working towards improving their interface. They hope to include automatic sizing of the interface in ClassPoint and to make the software firewall compliant.

### **Conclusion**

The road to knowledge has become more diverse, accessible and global. Although the reality of interactive distance learning may still be a way to go for many, the technology to enable this form of learning has arrived. Just like

many new technologies, they need to mature and be refined. Once these technologies pass the test of time, we will be able to experience them more easily and our learning options will expand beyond traditional classrooms.

**References:**

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