Experience with a Fully Collaborative Classroom

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Abstract

One of the biggest challenges faced by the classroom teacher is keeping the students mentally engaged and involved in the instructional activity. In a classroom equipped with a workstation for the teacher and every student, these workstations can be made to be part of the same virtual system so that all participants are sharing (under the instructor's control) the environment of the instructor's workstation. All are collaborating in the same workspace, "on the same page." In such a full collaboration classroom, the teacher can direct activities that involve individual students, and activities that involve everyone. This paper reports on our experiences with such a classroom. This work was supported by funding from the Louisiana Board of Regents Support Fund Grant …

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1. INTRODUCTION

Technology is providing a rapidly expanding set of tools that offer the opportunity to improve instruction. However, the use of these tools does not <u>guarantee</u> better instruction. They must be chosen carefully, experimented with, and experience gained with their use. Over time, those tools that truly facilitate instruction will be broadly adopted and dramatically alter how we teach.

One of the biggest challenges faced by the classroom teacher is keeping the students mentally engaged and involved in the instructional activity.   Classrooms equipped with a workstation for every student can actually make the situation worse because the student may engage in an activity unrelated to the current topic of instruction. If such classroom labs are to truly serve us well in our instructional activities, better ways must be found to engage the students in the instructor led activity.

One of the primary motivations for this project stems from over 7 years of experience while teaching in "smart classrooms" in which the teacher has a workstation with a display projected onto a wall screen, and every student is at his/her own computer. While we have seen many benefits from such classrooms, we have also seen some negatives. Some students will stray from the topic and play games or surf the Internet. Even students that think they are engaged in an activity related to the topic are

often focusing on something other than what the teacher intends.

Monitoring and control of this situation is problematic. Only one seating arrangement permits the teacher to view all students' displays. That is the arrangement of the workstation in a U-shape around the side and back walls of the room with the student's backs to the center of the room. This arrangement is not space efficient, and has at least some of the students with their backs to the front of the room and the teacher[1].

While individual activities by the students are often appropriate and beneficial, in most classes there are times, typically many times, when the teacher wants all of the students to focus on what he is presenting, explaining or working on. It can even be a group activity but with a single common focus. The goal is to have everyone in the room "on the same page". That "page" is the image on the teacher's (or perhaps one of the student's) screen display. All the computers in the classrooms can be made to be part of the same virtual system so that all participants are sharing (under the control of the teacher) a common workstation environment. All are collaborating in the same workspace.

A common teaching method is to ask individual students questions to determine if they are following the discussion and hence can move to the next step. It is often beneficial to let the student actually perform the next step. An environment which facilitates these instructional approaches and makes the student's involvement natural and direct should be of real pedagogical benefit. A classroom that provides such an environment will be referred to as a **full collaboration classroom**. Current technology makes this environment realizable.

Software and hardware systems exist to provide this environment. These are often referred to as classroom management systems or classroom control systems. The software systems tend to be less expensive and more flexible, but slower than the hardware versions. Fortunately, PC and network speeds have reached the point that the software systems can provide quite satisfactory performance. Products in this category include (ACRL 2007) Vision from General

Logic, NetSupport School from NetSupport Limited and SynchronEyes from Smart Technologies Inc.[2] After a round of evaluation, we selected SynchronEyes, which costs only about $800 for the software that runs on the teacher's workstation. The student (client) software is free.

2. CLASSROOM SETUP

This SynchronEyes software was installed in one of our smart classrooms in the Computer Science Department. This room easily accommodates 30 student workstations, which are arranged in back to back columns (running lengthwise from front to back.) (Agarwal 2001) The teacher's workstation is at the center of the front of the room and consists of a powerful PC running WindowsXP. It has two video displays connected. The primary display is a Wacom Cintiq 21UX interactive pen display, while the second is a 15 inch LCD display. Two projectors display the teacher display(s) on screens at the front of the room. The room is fairly wide, so normally the primary display (Wacom) is projected on both screens. We frequently use the secondary monitor to hold information that we don't necessarily want the students to currently look at. A switch is provided that allows both displays to be projected if desired.

In order to make the system as responsive as possible, we upgraded the equipment in the room and its network segment. All the PC's contain dual core 3.0 GHz Pentium D's with 2 GB of RAM and gigabit Ethernet network cards. The room is served by a single gigabit network switch.

All computers in the room have a common set of software products installed. The teacher's workstation has a few extra items. This workstation is connected to an EBeam device which captures all writing and drawing done on a whiteboard at the front of the room and displays it on the teacher's primary display. Another product is Camtasia Recorder. We use it to capture the teacher's lecture. The teacher wears a wireless microphone. Camtasia captures the audio from the microphone as well as the display on the primary display. Students can later replay this video recording to review the class. These software systems do not seem to interfere with SynchronEyes or reduce its

responsiveness. The classroom is shown in Figure 1 in the Appendix.

3. FEATURES OF THE SYNCHRONEYES SOFTWARE

SynchronEyes has a rich set of features. You can monitor and control your students' computers. In particular, you can **lock** the mouse devices, keyboards and desktops of the entire class, of a group of students or of an individual student. You can also use SynchronEyes to communicate with your entire class, a group of students or an individual student. You can broadcast your desktop (or a student's desktop), conduct polls, send messages to students and receive replies, send files to students, distribute interactive quizzes, block applications, and more.

Since many instructors use this classroom, it was important to make the use of this product optional and unobtrusive. We chose a setup configuration such that if a teacher chooses to use SynchronEyes, he merely starts the program on the teacher's workstation. All students in the room who have already logged on to their workstations and all that subsequently log on are immediately under the control of the teacher's workstation. When the teacher logs off or closes the SynchronEyes software, normal operation resumes. Without administrative privileges, students are not able to exit from the SynchronEyes system, although the teacher can disconnect any student from SynchronEyes. This degree of control is necessary in order to achieve the desired effect.

The user interface of SynchronEyes consists of five views:

- Thumbnails view
- Quiz view
- File Transfer view
- Chat view
- Applications view

However, certain common functionality is available in all views. You can manage student groups, lock students' desktops, send messages, respond to student's questions, block Internet access and conduct polls from <u>any</u> of these five views. Most actions that you can take can be applied to the entire class, any subset of students, or a single student.

When you start SynchronEyes software, you'll see thumbnails (miniature images) of the connected students' desktops. See figure 2. These thumbnails change in near real time. They are updated every few seconds (the update interval is settable). Five different sizes for the thumbnails are available, and the contents of a thumbnail image are easily readable in the larger sizes.

In **Thumbnails** view you can:

- Monitor the class
- Monitor and take control of a student desktop
- Broadcast your desktop
- Broadcast a student's desktop
- Share control of any computer in the classroom with any student
- Capture an image of a student desktop
- Broadcast media files
- Open a Web page (within Internet Explorer) on students' computers, and
- Shut down, log off or restart a student's computer

In **Quiz** view you can:

- Create interactive quizzes (usually done offline with a free utility)
- Distribute a quiz to the class or a group
- Receive or collect completed quizzes
- View result summaries, including class averages and individual student scores
- Distribute the results to your students

In **File Transfer** view you can:

- Send files to students
- Send a file and automatically launch its associated application

In **Chat** view (which we have not used) you can:

- Chat with your students (with the entire class or selected groups)

- Chat privately with selected students

- Control student chat

- Save the current chat session as a text (.txt) file

- Clear the chat history

In **Applications** view you can:

- Block specific applications (by defining and enabling rules)

- Block all but specific applications

- Block all Internet sites or selected ones

- Remotely launch and later close specific applications on your students' computers.

From the Thumbnails view, you can watch a (full screen) live image of a student's desktop. See figure 3. You can view desktops simply to monitor students' work, but you can also take control of a student's desktop, write (with the Wacom pen) over the top of a student's desktop, broadcast the desktop to the rest of the class or to a subset of it.

You can view a student's desktop in Full Screen mode (the student's desktop fills your screen) or Window mode (the student's desktop appears in a resizable window. A broadcast in full screen mode leaves the student no control (unless you "pass the chalk" to him). A broadcast in Window mode lets the student access items outside the broadcast window.

When you are monitoring a student, you can capture an image of the student's desktop for your records and save it as a .jpg, .bmp or .png file.

4. SPECIFIC USES AND EXPERIENCE

A virtue of SynchronEyes is that you can use as much or as little of it as you like, and this provides a gentle learning curve for the teacher. The first step is to simply start it up and leave it in Thumbnails view. In our classroom this window can be moved to the secondary display. You have a view of all the students' screens and they are not even aware of it. If you find a student engaged in activity you want to stop, you can lock his desktop and blank his screen (with a customized message displayed). Alternately, you can lock all students' desktops in order

to direct the focus of their attention to the front of the room. Yet another alternative is to broadcast your screen to all student displays.

Still in the enforcement mode, but exercising a lesser degree of control, you can block or allow any combination of applications. This allows the student some freedom but enforces some limitations.

Moving beyond the enforcement mode to the collaboration mode, your (teacher) screen can be broadcast and control can be passed to a specific student for him to complete a task or offer a contribution. Alternately, the screen of a student can be broadcast for your and others' comments, suggestions or assistance. Control can be bestowed on any member of the class for active contribution. This mode was used in a programming class. When a student asked why their program was not working correctly. The instructor broadcast the student's screen to the entire class to see who could determine the problem(s) and how to correct the program. A student proposing a correction could be given control to edit and run the program.

Yes/No polls can be easily and quickly administered with results displayed (if desired).

Short or long quizzes (best prepared ahead of time) can be delivered and (for certain question types) automatically graded. Multiple choice, fill in the blank, matching, ordering and essay question types are available.

One author prefers to have his students use Microsoft Word to complete exams for the sake of legibility. He has worried that students could sneak online access to files or programs that they should not be accessing during the exam period. SynchronEyes provides a number of tools to prevent this. First, he can visually monitor the thumbnails for inappropriate access. Beyond this he can block all applications other than Microsoft Word. He can also transfer the test document (.doc file) to the students with the option set to automatically launch the application (Microsoft Word). Problem solved.

5. CONCLUSION AND RECOMMENDA-TIONS

SynchronEyes is an amazing product that has great potential to solve attention issues in a classroom with computers for the teacher and every student. Furthermore it offers great potential for real focused collaboration and involvement.

SynchronEyes is a good example from the expanding set of tools (Sigle 2004) that can be used for instruction. It, like many others, offers the potential to improve instruction. However, its use does not guarantee better instruction. It has been our experience that implementing the technology itself is often not the biggest hurdle in successfully introducing the use of such technology on a regular basis into the classroom. The bigger challenge is for faculty to become acquainted with the technology and comfortable with its use. Also, in some cases, faculty members have to make a paradigm shift in order to perceive the advantages of its use. This is most likely to occur when they see a colleague or two using the technology to advantage.

SynchronEyes is a powerful tool, but it is only a tool. In order for its potential for improved instruction to be realized, instructors must learn how to make effective use of the tool, to find the circumstances, opportunities and methods that exploit that potential. This requires experience using the tool, motivation, and creative effort.

SynchronEyes has the advantage that its use can easily be made optional and unobtrusive. It allows a gentle learning curve for the teacher. Its many features can be gradually learned and used as experience is gained with the system. Over time, it has the potential to dramatically alter how we teach.

6. REFERENCES

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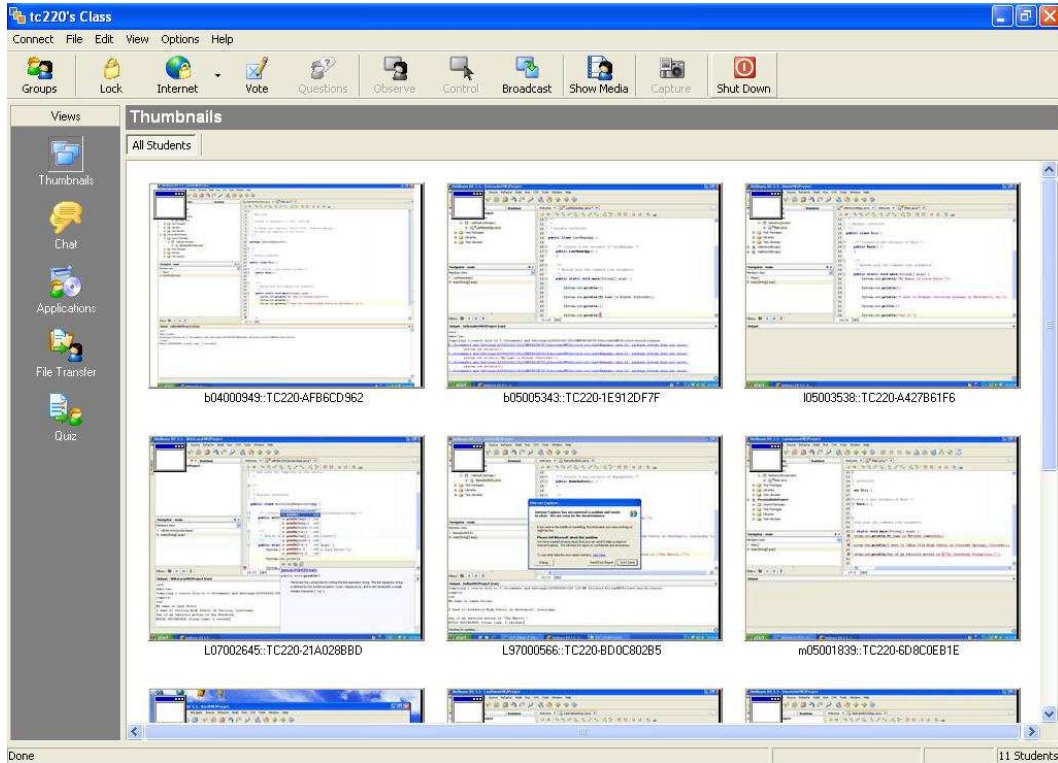
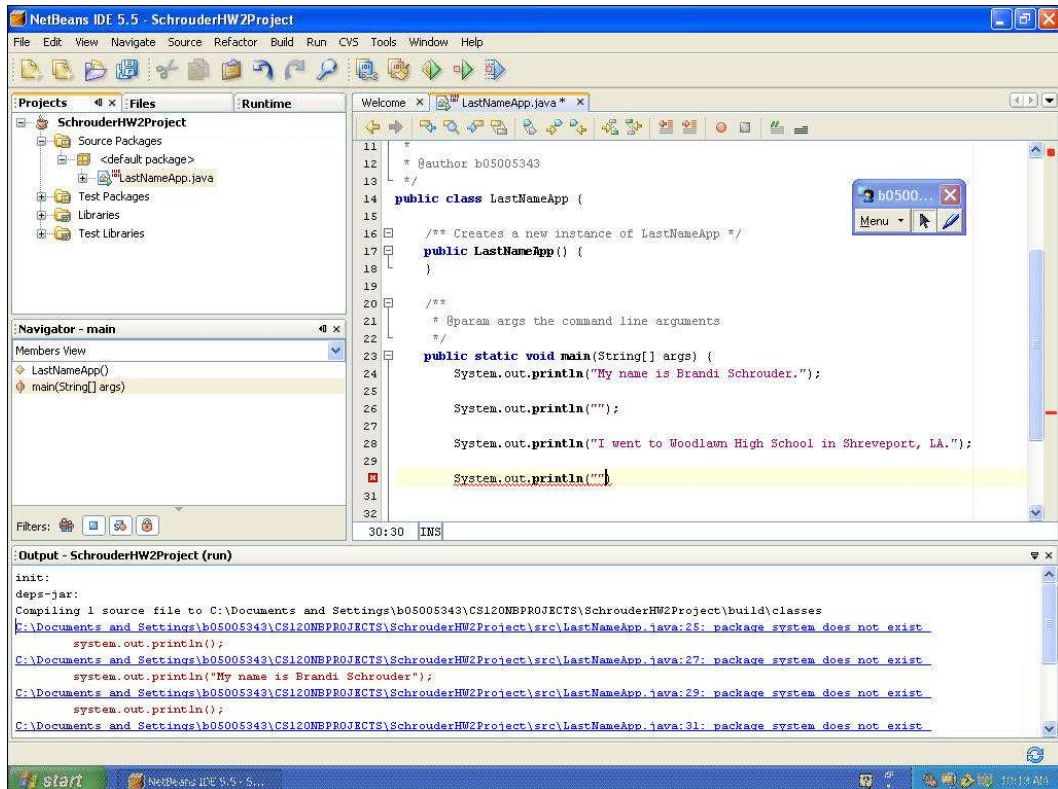**Appendix**

Figure 1

Figure 2

Figure 3