

## Classroom / Distance Learning Mash-Up Aids Student Performance

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In many circles Distance Learning is seen as an alternative to Classroom Instruction. Distance learning certainly addresses some of the limitations of classroom instruction, in particular the barriers of “at this time and in this place.” Distance learning can eliminate one or both, but not without its own costs.

In this article we will look at an ongoing effort at the University of Michigan-Flint to use distance learning to augment classroom instruction, and vice versa, in a room they call the Cyber Classroom. Using video, audio and lecture capture technology, presentations given in that room are automatically turned into recorded distance learning programs available to all the students on a multi-media website.

We'll see that students' situations and learning styles vary widely and that having both classroom instruction and distance learning resources available to all students enrolled in a course improves student understanding of the course material as demonstrated by final grades.

### The Cyber Classroom Technology

The Computer Science, Engineering and Physics department of the University of Michigan-Flint started making video recordings of lectures in 2007. They use Foveal Systems' AutoAuditorium System<sup>1</sup> as a front-end to Sonic Foundry's Mediasite<sup>2</sup>, to capture class sessions for their students.

Each recording is automatically composed of shots of any projected material combined with a Tracking Camera shot of the professor walking around the front of the room, and an occasional shot from the back of the room. The AutoAuditorium System does the shot selection and composition while operating the Tracking Camera, changing pan, tilt and zoom settings as appropriate. If there is more than one person moving “on stage” the Tracking Camera zooms out to look at all of them. If there is only one person walking and gesturing, it zooms in enough to keep the person in frame. Someone calmly standing in one place results in a head-and-shoulders shot.

The audio of the class session comes from the wireless microphone the professor wears plus ceiling mounted microphones over the presentation area at the front of the room and over the student seating area. These are automatically mixed together so those watching the recordings can hear almost everything said in the room. The ceiling microphones over the stage are also a backup against a dead battery in the wireless microphone because audio from them is still good enough to provide continuous coverage. The room is small enough that everyone can hear without using the audio mix for in-room sound reinforcement.

The Mediasite Recorder captures, encodes and synchronizes the video, audio and projector feeds into a recorded presentation. Simple controls allow the professor to label, start, pause and end the recording of each class. The recording is available on the Mediasite Server's Cyber Classroom catalog ten minutes after class ends.

Since each set of recordings is addressed to a particular section of a particular course offering, the recordings are removed from the catalog after final exams.

### The Cyber Classroom Student Experience

All the students signed up for a course given in the Cyber Classroom have access to all of the lectures as both in-person classroom instruction and distance learning recordings. Students don't have to choose in advance between one or the other. Instead they are free to use both in any way that works for them. For a school with a large proportion of adult learners who live off-campus, are employed or have families, this arrangement provides those students with a great deal of flexibility.

Their stories reflect the diversity in learning styles and instruction preference, from purely classroom to purely distant.

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1. <http://www.AutoAuditorium.com>

2. <http://www.SonicFoundry.com/mediasite/>

One student swore he never, ever watched the videos, “except this one time I didn’t understand something. I don’t know how many times I replayed that one section of that one recording, but I finally understood the concept.”

Others would watch portions of almost every recording, ranging from a couple of short segments where they didn’t quite understand something to much longer sections to review before exams.

A few students both came to class and watched the recordings in their entirety. One instructor tells of a student whose English was not very strong. “He came to every class, and then watched the recording with a friend who would translate and explain. In the end his English was much improved and he did well in the course.”

Another, handicapped student who could not take notes while attending class also watched the recordings in the dorm.

Then there was the student that thought he could sleep late and just watch the video “but then discovered that he really wanted to ask questions and so started attending in person.”

Another, who found that sometimes the material was going by too fast, watched the recordings and made liberal use of the Pause button.

Of course there is the case where a business trip, weather or other event keeps a student from attending class. “I see *the* class I missed, with the same professor with the same body language and emphasis I’m used to, and the same students asking the same sorts of questions they always ask.”

And there were a few who did not attend class at all because of work conflicts. For them the Cyber Classroom was Distance Learning.

## Measuring the Effectiveness of Cyber Classroom Instruction

In 2008 Stephen Turner and Michael Farmer, both Cyber Classroom instructors, realized that they had a rare opportunity to make direct comparisons of student outcomes both without and with the Cyber Classroom recordings. Three professors who had taught the same courses for a number of years were now in the Cyber Classroom. Turner and Farmer compared 176 past students who attended 448 lectures against 173 students attending and/or watching 308 Cyber Classroom lectures. In their paper “Assessment of Student Performance in an Internet-Based Multimedia Classroom”<sup>3</sup> they reported these comparisons of the final grades:

- the average of all grades went up nearly half a grade point, approximately C+ to B–
- the standard deviation of the grades improved by going down by about 10%
- 36% more students received honor grades, B+ and above, and
- 56% fewer students failed

“The significant drop in failing grades can directly be attributed to the integrated blending of on-line and in-class formats through the Cyber Classroom, since most failures in our students can be attributed to the students ‘vanishing’ for extended periods of the semester due to external problems and commitments. The Cyber Classroom allows these students to remain connected and participating in the class despite their sudden inability to come to class thus validating the concept of integrating on-line and distance learning for maximum flexibility in student participation.”

## The Administrative Viewpoint on the Cyber Classroom

Chris Pearson is the department chair of the Computer Science, Engineering and Physics (CSEP) department.

“All our graduate courses and many undergraduate courses are given in our Cyber Classroom. It is booked from 8 am until 9 pm on the four days a week we offer instruction. We make 22 recordings each week.”

“Since our removing the distinction between on-line and in-class instruction is primarily student-centered, we concluded that we needed a second room. Our decision was to just clone the first. We did not see the need to consider alternatives.” Their second Cyber Classroom was installed in the fall of 2010.

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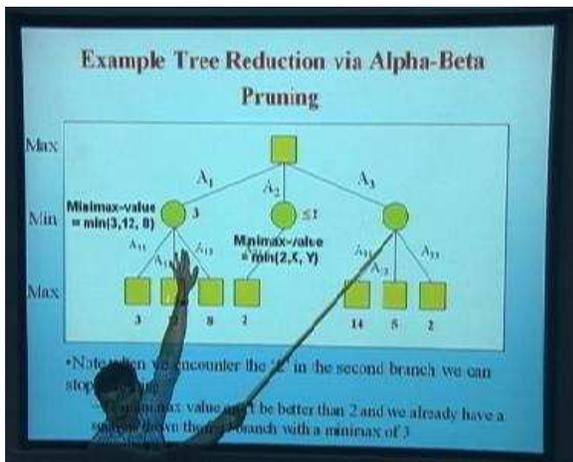
3. [http://www.AutoAuditorium.com/PressRelease/FECS08\\_StudentPerformance.pdf](http://www.AutoAuditorium.com/PressRelease/FECS08_StudentPerformance.pdf)

**Conclusions**

The Cyber Classroom is now an established fact of the CSEP Master Degrees. All of those courses are taught in the Cyber Classrooms and all the current masters students have had all their classes in those rooms. It is no longer possible to do a before-and-after comparison in this program.

We can say that the blending of traditional classroom instruction with distance learning technology can have a wide range of benefits for a variety of students.

We can also expect that, in the future, the attributes currently thought of as Cyber in a Classroom setting will simply become “the classroom.”



Scenes from a Cyber Classroom recording.

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A 4 minute video about UM-Flint’s Cyber Classroom is available at [www.youtube.com/watch?v=sUwdMqHCvlo](http://www.youtube.com/watch?v=sUwdMqHCvlo)

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