The Problem…

- There is a direct positive relationship between good student-teacher contact and academic success
  - Questions, tutoring, discussion of course/subject material
  - Role models, mentoring, inspiration, motivation
  - Personal connections = personal investment

- Unfortunately, CUNY colleges have many factors that make student-teacher interactions difficult to establish and maintain
  - Commuter schools
  - High teaching load of professors
  - Financial demographics of our students
  - Cultural differences between our students and our professors
  - Cultural demographics of our students, per se
The idea for using IM

- New professor at CUNY
  - Flabbergasted… NO ONE comes to office hours, asks questions by email, etc.!
- Placed Notes on student exams requesting meeting.
  - Nothing.
- A sound heard in class…

The Setup

- Halfway through the course, the professor announced that he will be available during office hours (and periodically other times) on AOL Instant Messenger.
- Screenname: JJDrLents
- Student-teacher contact was carefully monitored, both on IM and in-person (office hours)
- Courses – Biology 101 and Biology 103 (General Biology)
Data

<table>
<thead>
<tr>
<th></th>
<th>Office Hours (before IM)</th>
<th>Instant Messaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total time spent in contact (h)</td>
<td>1.75</td>
<td>15.75</td>
</tr>
<tr>
<td>Number of contacts/visits</td>
<td>5</td>
<td>38</td>
</tr>
<tr>
<td>Number of unique students</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Average time per visit (m)</td>
<td>21.0</td>
<td>24.9</td>
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</tbody>
</table>

Cifuentes OE and Lents NH, revisions pending, Electronic Journal of Science Education

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<td>7.25</td>
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<tr>
<td>Number of contacts/visits</td>
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<tr>
<td>Number of unique students</td>
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<td>24</td>
<td>10</td>
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<tr>
<td>Average time per visit (m)</td>
<td>21.0</td>
<td>24.9</td>
<td>31.1</td>
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</tbody>
</table>
Conclusions: Lessons Learned

- Instant Messaging (IM) is a powerfully effective means to increase student-teacher contacts
- IM breaks down barriers and makes professors seem more approachable, friendly, and interested in helping
  - both for questions regarding course content,
  - but also academic and even career advising
  - True “mentoring” often takes place with IMs
- Caveats
  - Can lead some students to the perception that professors should be available to them 24-7
  - Students can stray off topic and waste time of both
  - Barriers = bad; Boundaries = good

Part Two: Video Lectures

- Inspiration – City College video lectures on CUNY TV
- The “Push” – funding from the Alfred P. Sloan Foundation to CUNY to develop technology- and interned-based teaching
- The chosen approach – Voice-Over-PowerPoint
  - Much smaller files than full video (10 – 30MB)
  - Easily deliverable and viewable through Moodle, (deleted), youtube, Google sites, etc.
  - Students need only an internet connection and a web browser with a Flash player installed (freeware)
Voice-Over-PowerPoint (VOPP)

- Files are very easy to create
- You need a program that can create “screen shots” and recording audio at the same time. I used the Camtasia® Suite
- Before lecture begins, click on “record.”
- Lecture is given completely normally!
- Microphone needed, but computer-embedded mic is just fine.
- Remember students will not see YOU, only your screen
  - Thus, use the mouse cursor to point things out!

VOPP Demo

Double-click, Control, Shift — it's totally intuitive!
Experimental Setup and Data Collection

- Course – Bio104 (second semester of General Biology)
- Five Sections:
  - 01+02 – Meets as double section for lecture (control group)
  - 05 – Meets as single section for lecture (experimental group)
  - (03+04 taught by someone else, not included in this study)

<table>
<thead>
<tr>
<th>Section</th>
<th>Format</th>
<th>Instructor</th>
<th>N attempted</th>
<th>N withdrawn</th>
<th>N passed</th>
</tr>
</thead>
<tbody>
<tr>
<td>01+02</td>
<td>Standard Lecture</td>
<td>Lents</td>
<td>63</td>
<td>4</td>
<td>57</td>
</tr>
<tr>
<td>5</td>
<td>Mix: Standard + Video</td>
<td>Lents</td>
<td>25</td>
<td>1</td>
<td>24</td>
</tr>
</tbody>
</table>

- For selected lectures:
  - Section 05 did not meet “live”
  - Rather, they were given, through BB, a VOPP recording of the lecture given to Section 01+02
  - Data Analysis – a) Exam scores; b) performance on specific questions testing concepts covered by the VOPP lectures

First, are the two groups comparable???

A fruitful discussion

- Instructor asked, “what happened?”
- Many students confessed to feeling unengaged, bored, and easily distracted
- The class was almost ready to vote against any more video lectures
- A few classmates that preferred the video lectures then spoke up and offered the following advice to classmates:
  - Try watching the video with the textbook open, following along with figures
  - PAUSE VIDEO in order to write things down, so that you can fully listen while instructor is talking
  - REWIND VIDEO and repeat if you are unsure about anything
  - PAUSE VIDEO if you are still confused and look things up in the text or other sources, then continue after you get it
  - Watch videos AGAIN before the test
- In summary, those that LIKED the video lectures, frequently paused, rewound, and were actively engaged, not just passive watchers/listeners.
- The class voted to keep trying video lectures.
Data – Next three exams


Data – Optional Attendance (exam 4)

Data – Final Scores

Who prefers to come to class?

Data – Student Perceptions

Conclusions: Lessons Learned

- VOPP lectures are simple to record, simple to view, and simple to post to BB
- Most students can learn core concepts of General Biology as effectively through VOPP lectures as in-class lectures
- When given the opportunity, most Bio students at JJC will watch a lecture more than once
- A large majority of students agree that VOPP lectures prepares them as well or better than traditional in-class lectures
- Most students support the increased use of VOPP/video lectures

Some Work in Progress

- Explicitly teaching the Process and Nature of science has been shown to facilitate significant content learning gains
  - This means data-driven, inquiry-based learning
  - Teaching content using primary data & experimental results (classic and recent)
- Introduction of process-centered content in several sections of Biology, Chemistry, Natural Science
  - Visionlearning.com (contact A. Carpi, John Jay College, acarpi@jjay.cuny.edu)
- Laboratory exercises that focus on “guided inquiry” of real primary data
  - Students behave like scientists. Design experiments, collect and interpret data, draw conclusions
  - First new lab – phylogeny and systematics (evolutionary biology)
  - Students explore the common ancestry of humans and close primate relatives
    - Use real DNA sequences, protein sequences, and chromosome density maps
Results

Lents NH, Cifuentes OE, and Carpi A. Revisions pending, CBE: Life Sciences Education, Jan 2010
Simple but Powerful Tools for
Enhancing College Science Education

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