Lecture Capture in the Classroom and Beyond

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• Established as Newark Technical School in 1881.
• Became the Newark College of Engineering in 1932.
• Became New Jersey Institute of Technology in 1976 with the addition of the New Jersey School of Architecture.

– 45 acre campus with 26 buildings.
– Located in Newark, NJ - across the river from NYC
– Public Research University
– Comprised of six colleges
– 659 faculty (full and part time).
– 8,398 enrollments
  • 5576 Undergraduate
  • 2822 Graduate
NJIT’s Background

- Computer-based distance learning (1979)
- Video based distance learning (1983-1995)
  - Tape based distribution
  - Broadcast, cable, public tv
  - Satellite
  - ITV
NJIT’s Earlier Efforts

- Various digital recording efforts
- DVD, CD
- Computer capture
  - SMIL
  - Articulate, Impatica
  - Captivate
  - Camtasia Studio
NJIT’s Goal

• Improve student retention
  – Enable students to view learning objects prior to class
  – Enable students to review lectures, after class
  – Empower instructors to reallocate class time for discussion and problem solving
NJIT’s Needs

• Affordable
  – Pay per cart not appealing
  – Pay per user license cost prohibitive
  – Unable to budget for annual costs
  – Ability to use with preexisting classroom hardware
NJIT’s Needs

- Easy to implement/scale
  - Most instructors don’t use for every course
  - Ability to capture classes **AND** learning objects
  - Can be used by faculty, staff and students
  - Desire for “Archival Master”
    - Ability to re-encode as needed
    - Files that are not proprietary
Evaluating a Lecture Capture System (LCS)

• Systems Evaluated
  – Tegrity
  – Echo 360
  – Panopto
  – Apple Podcast Producer
  – Camtasia Relay
NJIT’s Solution: Camtasia Relay

- Minimal hardware investment
- Flat license cost, no per user fee
- Friendly user interface
- Beta program offered unique opportunity for user input
NJIT’s Solution: Camtasia Relay

- Accepted as a beta tester winter 08
- Initial beta test spring 08
- Full launch fall 08

Currently:
- Over 70 instructors and staff members use Relay
- 4 courses have experimented with having students create presentations
How does it work???
Client / Server-based lecture capture system

M4V, iTunes U, MP3, HTML
Step 1: User Profile

- Assigned to individual users
- Determines output format and settings
- Tells Relay where to send files
Step 2: Install/Launch Application

- Small Application
- Open to all faculty, staff and students
- Login/guest options available
Step 3: Start Recording:

- Screen capture
- Audio capture
- Does not capture video of presenter
Step 4: Stop Recording

Step 5: Submit Recording
Step 6: Upload file to server

• Uncompressed file is uploaded to server for processing

Step 7: Server encodes video

• One recording to multiple formats
• Multiple destinations
Step 8: Final Product Published

- Lectures get automatically uploaded to NJIT on iTunesU, designated servers, websites.

Your presentation has been published.

View the presentation.

Presenter name: Blake Haggerty
Presenter email: blake.haggerty@njit.edu
Title: Test DIRECT to AFS
Description: Test
Presentation length: 01:25:58
Encoding: Web (1024x768)
Destination: Direct to AFS - MP4
File size: 274MB

View presentation link: http://podcast.njit.edu/relay/relay1/test/Test DIRECT to AFS - Web (1024x768) - 20090413 09.21.21AM.html
How do we use Relay???
Classroom Capture

ITMS maintains computers for sign-out/delivery

- Relay has been installed on all ITMS laptops/smart carts
- Select smart carts have microphones and visualizers
Classroom Capture:

USB Microphones installed in the ceiling of select rooms
- Can be used with laptops
- Carts are delivered to select classrooms
- Samson UB1 microphone (good)
- RevoLabs wireless microphones available for sign-out (better)
Total Costs for Rooms:

- $2,000 = 20 classrooms with microphones (Samson UB1)
- $20,000 = 20 new smart carts pc (Dell Optiplex 775)
  - (slated for upgrade previously)
- $5,500 = 6 Samsung visualizer (SDP-850X)
- $1300 = 13 sign out/test microphones (Samson UB1)
- $1,500 = 10 graphics tablets (Adesso Cyber Pad)
Server Information:

- Virtual server with four cores at 2.4GHZ max
- 150 GB of storage space
- Three simultaneous encodes
Learning Object Creation

- Many instructors create learning objects outside of classroom
  - LOs are shorter than a lecture (15-20 minutes)
  - Used to introduce concepts before class
  - Allows for more in-class discussion

- Instructors prefer to not think about encoding options
- Like having lectures sent directly to iTunes
- Instructors can “borrow” equipment for long-term loan if they make videos available to the public through NJIT on iTunes U
Examples
Graphics tablet with Adesso CyberPad Tutoring Center
Video tutorials:
http://www.youtube.com/user/njit
For this problem, a motor turns (or drives) a shaft with teeth cut on that shaft, A. Those teeth mesh with a gear, B.

Shaft diam = 24 mm; \( r_A = 12 \text{ mm} \) with \( \omega_A = 50 \text{ rad/s} \)

Find: \( \omega_B \) after \( \theta_A = 10 \) revolutions

\[
\theta_A = (0.006 \text{ rad}) \cdot 12 \text{ mm} = (0.006 \text{ rad}) \cdot \frac{12}{2} \text{ rad} = 0.06 \text{ rad}
\]

\[
\int_{0}^{10} (0.06 \text{ rad}^2) \, d\theta = \int_{0}^{50} (0.06 \text{ rad}^2) \, d\theta
\]

\[
0.06 \left[ \frac{\theta^3}{3} \right]_{0}^{20\pi} = 0.06 \left[ \frac{(50)^3}{3} \right]_{0}^{50}
\]

\[
(20\pi)^3 = \frac{1}{2} \left[ \omega_A^2 - (50)^2 \right]
\]

\[
\omega_A = 111.45 \text{ rad/s}
\]

After 10 revolutions

MECH 236 Dynamics:
Smart cart and visualizer
Legal Ethical Issues:
Smart cart and microphone

- What is the underlying goal of our Legal System?
- What is ethics?
- What is the difference between business ethics and social responsibility?
Matlab Instructions:
Recorded Outside Classroom
STS 304  Writing about Science, Technology and Society:
Students record podcasts
Medical Informatics: Incorporation video
Recorded at home or in office
Distribution
Option 1: Relay uploads to NJIT on iTunes U
Option 2: Relay uploads to website
Homegrown Drupal Solution:

1) Relay publishes to Drupal
2) Drupal crates a page (think YouTube)
3) Videos are tagged with person’s name and info automatically
4) Collections of videos can be created by users, comments, ratings, etc… The module is fully integrated with Drupal, so if you know what that can do, then you know what this module facilitates.
5) Search / Browse function available through faceted search
6) Email sent to users when new videos are added
7) Podcast feed can go to iTunes (or other tools)
8) When/where/who/ info is available through custom data views that are easily created

Developed by Keith Williams: keith.a.williams@njit.edu
Drupal Option

https://carbon.njit.edu/video/
Feedback:

• Initial student feedback has been positive

• Instructors like the program and find it easy to use

• We have not done any formal analysis – in works for fall 09
What did we learn?

• Distribution, organization, and storage are a challenge

• Capturing equations / non-PowerPoint can be a challenge
Questions ???