Teaching Exchange Fellowship
Sharing Session: Learning Glass

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Movitation
Online Courses

MOOCs and SPOCs are popular now!

An international bent

Class Central reports as well that 1,800 new MOOCs were offered in 2015, taking the number of total courses introduced (since late-2011) to 4,200 as of this month.

Components of Online Courses

1. Instructional videos
2. Presentation slides
3. Exercises & Quizzes
   • Instant feedback

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Question 2

Which of the followings is NOT a differential equation?

Select one:

- a. \( y(dy/dx)^2 - d^3 y/dx^3 = 0 \)
- b. \( dy/dx + 4x = 2y/x \)
- c. \( dy/dx = (x^2 + y^2)/xy \) ❌
- d. None of the other options
- e. \( 5d^2 y/dx^2 + 3\sin(x) = 3\sin(x) + 2dy/dx \)

Your answer is incorrect.
The correct answer is: None of the other options
What are Instructional Videos?

- A simple recording of lecture or a combination of slides, audio and animation.
Why do we create Instructional Videos?

- Flipping the classrooms
- Customized learning
- Efficient sharing of teaching materials.
Different softwares

- Camtasia
- Panopto
Camtasia

- Capture the screen
- Video Editing -- on multi-tracks
- Works well with different formats e.g. MP4, MPEG-4 etc.
- Good for sharing
- Many library of tutorial materials or resources

https://tl.hku.hk/2016/07/diy-video-production-for-flipped-classroom/
Support from HKU - A DIY streaming station

TEL Li is glad to have filmed Professor Rick Glofcheski's flipped class for Tort Law (LLAW 1000) this morning.

A DIY streaming station was set up in our studio room – from now on, professors can help themselves at the station and film online courses whenever they want. This DIY streaming station is a great time-saver and is convenient to use. It is a cradle where many high quality, innovative and educational videos were conceived. Through real-time streaming, subject experts can share their ideas and insights efficiently with a large audience, saving the trouble of setting up and post-editing.

The development of software has made filming technology more accessible to amateurs. It has empowered us to create sharable content more easily with a much smaller budget. In the past, expensive TV broadcaster level hardware and a team of experienced crew are prerequisites to produce videos. Today, with a laptop-camera and your trusty smartphone or computer, you’re good to go!
DIY streaming station
Teaching Exchange Fellowship
Host Institute and Hosts

- UCLA
- Professor James W. Stigler & Karen Givvin
- Co-author of The Teaching Gap & The Learning Gap
- Directed the TIMSS video studies
Hardware: Learning Glass

- A transparent whiteboard
- A neon marker
- Camera
- One computer
- Two monitors
What is Learning Glass?

- A new technology for recording lectures
- Allows instructors to write lecture notes while maintaining face-to-face contact with students
- It’s a transparent whiteboard/lightboard paired with a lecture capture system
San Diego State University's New Learning Glass Studio Makes Class Time More Engaging

Students say they feel more connected to their professor while watching lectures online via Mediasite versus face-to-face instruction.

San Diego State University is making class time more personable in a unique new learning studio with help from Mediasite from Sonic Foundry, Inc., the trusted global leader for video solution and management solutions.
Learning Glass Users

RICE
UNC CHARLOTTE
UCLA
splunk
Oregon State University
Left-handed?

- Images are flipped in real time for streaming or live presentations.
- No special skills (such as writing backwards) are needed.
Facing the audience with the PowerPoint file

- Students get disturbed when teacher faces towards board. (Jadhav et al., 2016)
Petimani (2015):

- “Blackboard teaching remains the best preferred teaching aid”
- “A good lecturer can motivate the students on a journey of discovery, exposing students to one interesting fact after another by blackboard teaching method.”
- “Students will have better retention of the subject afterward if the notes are written with the lecturer's explanation.”
### Solving higher order homogeneous linear difference equations

#### Step 1

<table>
<thead>
<tr>
<th>Difference equation</th>
<th>Characteristic polynomial equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_n = 1.55 \ x_{n-1}$</td>
<td>$\lambda = 1.55$</td>
</tr>
<tr>
<td>$F_n = F_{n-1} + F_{n-2}$</td>
<td>$\lambda^2 = \lambda + 1$</td>
</tr>
<tr>
<td>$z_n = z_{n-1} + 5z_{n-2} + 3z_{n-3}$</td>
<td>$\lambda^3 = \lambda^2 + 5\lambda + 3$</td>
</tr>
<tr>
<td>$p_n = 5p_{n-2}$</td>
<td>$\lambda^2 = 5$</td>
</tr>
<tr>
<td>$y_n + 4y_{n-2} = 0$</td>
<td>$\lambda^2 + 4 = 0$</td>
</tr>
<tr>
<td>$x_{n+3} - 7x_{n+1} + 6x_n = 0$</td>
<td>$\lambda^3 - 7\lambda + 6 = 0$</td>
</tr>
</tbody>
</table>
Hardware: Learning Glass

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The half-life of radium-226 is 1,600 years. If the current amount of radium-226 is $M_0$, then

- after one half-life, there will be only
  $$M_1 = 0.5M_0$$
  left.

- after two half-lives (i.e. 3,200 years), there will be just
  $$M_2 = 0.5M_1.$$ 

- after three half-lives (i.e. 4,800 years), there will be just
  $$M_3 = 0.5M_2.$$ 

In general, the amount $M_n$ of radium-226 after $n$ half-lives satisfies the difference equation

$$M_n = 0.5 M_{n-1}.$$
Problem of the Rabbits

• Initially there is a pair of baby rabbits – one of each gender.
• Each month, a couple of baby rabbits will mature.
• Each month, a couple of adult rabbits will produce a couple of baby rabbits.
• Assume that the rabbits will never die. What is the total number of rabbit pairs after one year?

<table>
<thead>
<tr>
<th>Time</th>
<th>Number of pairs of baby Rabbits</th>
<th>Number of pairs of mature rabbits</th>
<th>Total number of pairs of rabbits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>Jan 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>After 1 month</td>
<td>Feb 1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>After 2 months</td>
<td>Mar 1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>After 3 months</td>
<td>Apr 1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>After 4 months</td>
<td>May 1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>After 5 months</td>
<td>Jun 1</td>
<td></td>
<td></td>
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<tr>
<td>After 6 months</td>
<td>Jul 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 7 months</td>
<td>Aug 1</td>
<td></td>
<td></td>
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<tr>
<td>After 8 months</td>
<td>Sept 1</td>
<td></td>
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<td>After 9 months</td>
<td>Oct 1</td>
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<td>After 10 months</td>
<td>Nov 1</td>
<td></td>
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</tr>
<tr>
<td>After 11 months</td>
<td>Dec 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1 year</td>
<td>Jan 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Solving Differential Equation

Solve \( \frac{dy}{dx} = 2x + 3 \) with initial condition \( y(1) = 2 \).
Why not PowerPoint in writing equations?
If I teach using PowerPoint, ...

Petimani (2015):

- The lecturer shows the PPT slides and explains the important points during the lectures.
- PPT promotes better organization and understanding of the lecture topics as the coverage and flow of subject are well fixed.
- During lecture, the individual PPT slides serve as memory aids, which reduce the mental strain on the lecturers.
- As most of the contents are already given in the form of handouts, this reduces the need to take notes during the lecture.
- Moreover, students able to pay more attention to the discussion part of the topic instead of taking notes.
“However, few drawbacks come with PPT presentation. Some lecturers tend to create PPT slides that are more suitable for them to read rather than explaining.”
Software: Open Broadcaster Software Studio

Free and open source software for video recording and live streaming. Download and start streaming quickly and easily on Windows, Mac or Linux.

Share your gaming, art and entertainment with the world.

Download OBS Studio
Software: WireCast

Wirecast Rendezvous, Facebook Live Comments, Multi-track Audio Mixing & so much more!
COMING SOON: Vimeo Live Integration—Title and create events directly from within Wirecast to make streaming to Vimeo a breeze

Wirecast
Live streaming video production software for Mac or PC

Download Free Trial  Buy starting at $995
Camtasia vs Wirecast
Camtasia vs WireCast

Camtasia 9:
- Quiz
- 30 FPS

WireCast: Live Streaming
- 60 FPS
- ScoreBoard
Write on slides using Camtasia
Research on effective making of videos: face vs no face?

- A recent study attempted to compare the learning effectiveness of different types of video lecture, and reached a conclusion that the learning performance with videos showing the lecturer is significantly better than voice-only videos (Chen & Wu, 2015).
- Some researchers proposed that the presence of lecturer in videos could enhance the learning process, probably by non-verbal communications such as gestures (Valenzeno et al., 2003).
Gestures

- Gestures are regarded as an important tool to present abstract ideas and enhance students’ comprehension of course materials in classroom (Alibali & Nathan, 2007).
- There were studies demonstrated that children exposed to gestures of the lecturer in instructional video had better understanding of taught concepts about linguistics and symmetry compared to those who were exposed to videos without gestures (Valenzeno et al., 2003; Church et al., 2004).
Shall we invest?

It depends on the application.

- Learning Glass: face, gesture, powerpoint slides, facing the audience, writing, pointing at the powerpoint slides
- Camtasia/Panopto: powerpoint slides, face, writing

WireCast: https://www.telestream.net/wirecast/overview.htm

Thank you!

Q&A