Open, Blended, Flipped, Social
courses in Mechanical Engineering

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BOSTON UNIVERSITY

National Academy of Engineering, Frontiers of Engineering Education 2012

Open Taking inspiration from open-source

Look at the impact of the open-source movement in software, how programmers collaborate on large, impactful projects. Think about its influence in Open Education:
Teaching and learning resources are made public, under a license that permits reuse, remix, rework, redistributing.

I make screencasts of class materials, and post them on iTunes U and You Tube. Instead of just sharing materials with students via an LMS, I make them public—screencasts, syllabi, notes, assignments—only constrained by my time and effort.

In one course, "Bio-aerial Locomotion" for engineering freshmen, the students write on a blog. Their writing assignments are public, so they take responsibility for the content and its originality.

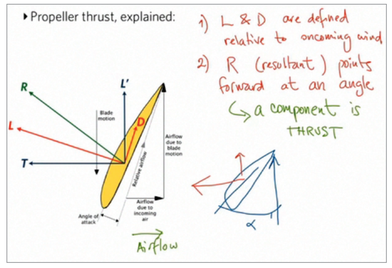
Blended, Flipped, Social Technology is your friend

Screencasting is a low-cost alternative to "cameraman" video. Anyone can do it!

This is my workflow: I prepare base slides, with images but also a lot of whitespace, using Apple's *Keynote*. In class, I project and annotate slides using a free app called *OmniDazzle*. I record the screen using *iShowU*. At the end of a class (or brief explanation), there is a *QuickTime* video ready for me to edit. I trim the ends and export to 640x480 pixels, then upload to *You Tube* or *iTunesU*. Lately, I've been creating quizes and context for the videos using *TED-Ed*. The students love this!

Moving from screencasting to a flipped classroom is natural—assign the video for home-watching, and do the problem-solving and group work in class. No student falls asleep in a flipped class!

To support the flipped class, I adopted an online, wiki-style Q&A forum called *Piazza*. For in-class student reponse and just-in-time teaching, I use *Socrative*.



Left — Screenshot of a slide, annotated live in class to explain a concept. The screen recording is later shared on video for recall and replay.

Objectives & Educational Outcomes

(1) to use the flipped classroom model enabled by educational video and new media to increase student engagement and achievement

(2) to share the educational media openly for enhancing recruitment, supporting off-campus learners and other broader impacts

(3) to incorporate social learning and peer-support platforms, both in-class and asynchronous

The educational outcomes of this innovation are (i) more in-class engagement leading to retention and increased conceptual understanding, and (ii) out-of-class engagement via social learning and open content contributing to student motivation and broader impacts.

Innovative courses Aimed at all levels

The objectives are being pursued incrementally in three engineering courses aimed at freshmen (Bio-Aerial Locomotion), juniors (Fluid Mechanics) and seniors/first-year graduate students (Computational Fluid Dynamics, CFD).

The CFD screencasts have amassed 55,000 views in You Tube since Spring'12.

The Bio-aerial Locomotion course is an introduction-to-engineering module presenting the physics of animal flight, gliding and falling. It was offered in Fall'11 for the first time and featured open media, lecture screencasts recorded live, open student assignments via a course blog, and remote guest speakers via video chat.

See the Bio-aerial Locomotion course blog at:
http://blogs.bu.edu/bioaerial2012/

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Please visit us at:
http://barbagroup.bu.edu

Credits Images and thanks

- Lolly sticks from Wiki Educator under CC-BY
- Word clouds made in Tagxedo
- Thanks to Jake Socha for helpful discussions.
- Fuding by NSF CAREER award OCI-1149784