

CTE Today

A Newsletter for
Teachers at USMA

Center for Teaching Excellence

February 2008

"There is no short cut to achievement. Life requires thorough preparation--vener is'n't worth anything"

George Washington Carver

Teaching Critical Thinking, by Dr. Mark D. Evans, CTE Director

What is critical thinking? How can we teach critical thinking and how can we assess it? Can critical thinking be taught at all, or can we only nurture its development while we set the stage?

Critical thinking may be defined to include: problem solving, searching for and finding evidence to back up your ideas,

"Experts in critical thinking recommend that it be taught in the context of rich subject matter knowledge."

and deducing conclusions from available evidence. Many have treated critical thinking as a skill that can be taught and learned, and then applied to new situations. However, research from cognitive scientists shows that critical thinking is not that sort of skill. Critical thinking is not a skill that can be called upon when needed. Learning woodcarving, for example, takes practice and is a developed skill that, once learned, can be recalled day

after day. Critical thinking is not a skill in that same sense. Children with no training can properly apply critical thinking to a video game puzzle and scientists with demonstrated proficiency in critical thinking in their domain area (eg: rocket science) might not apply any critical thinking in another, unrelated area (eg: tax-free bond analysis).

Critical thinking and thoughts (content knowledge) are related. Experts in critical thinking recommend that it be taught in the context of rich subject matter knowledge. The National Research Council put it well when they said:

"Teaching content alone is not likely to lead to proficiency, nor is engaging in inquiry experiences devoid of meaningful content." One cannot critically compare and contrast A and B without knowing something about A and B. Without content knowledge, critical thinking becomes a very naive, dualistic expression of how one feels about A vs. B. Thus, content and critical thinking are uniquely intertwined.

Let's say you set out to assess the critical thinking ability of a group of students and you crafted two scenarios in which they were to control variables and optimize the situation. One scenario might be a computer simulation requiring that biological entities be kept alive, happy, and flourishing. Students would be familiar with the requisite variables (food, water, rest, education, recreation, etc.) and were able to manipulate them for a successful outcome. Another scenario might require the same students to manipulate variables to minimize cooling of the water in a swimming pool. Fewer students would likely recognize that surface area is related

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NOTICES:

Dr. Ken Bain

author of the best selling book:
What the best College Teachers Do...

Will be at USMA on
7 March 2008

You are invited to a talk given
by him:

144 TH from 1610-1710.

**Apgar Award
Packages are due in
the CTE**

Wednesday 9 April 2008
See the CTE website for more
information.

Call for Mentors

Mentors are needed for the
Master Teacher Program.
Senior military and civilian
faculty or MTP graduates are
qualified. Contact the CTE to
volunteer.

Zunes and iPods

Zunes and iPods are available
for faculty innovation in
teaching and learning. Contact
Mr. Mark Vehec in the CTE for
more information.

Teaching Critical Thinking, *continued from p.1*

to cooling [or heating] and that some shapes optimize surface area for a given volume. Thus, your success in evaluating students' critical thinking and their ability to control variables related to an experiment cannot be evaluated without considering the student's prior domain knowledge related to that experiment.

So what's an instructor to do? Maintain high academic and intellectual rigor in your classes. Craft in- and out-of-class activities that require students to use the higher levels of Bloom's Taxonomy. Role model how you critically analyze your material and give cadets ample opportunities to practice critical thinking while providing feedback and guidance.

Bottom line: The content you teach in the classroom is no less important than the critical thinking skills you seek to develop. When students are asked to solve problems

"Without content knowledge, critical thinking becomes a very naive, dualistic expression of how one feels about A vs. B."

just like one they've seen before — that's not applying critical thinking. The ability to solve related, but unique problems based on prior learning is a demonstration of critical thinking. Building on your classroom content, you can help your cadets maximize their critical thinking ability.

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CTE ADVISORY COMMITTEE

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Upcoming Conferences

New Learning Technologies 2008 Society for Applied Learning Technology (SALT) Conference, February 20 -22, 2008, Orlando, Florida, <http://www.salt.org>

Annual Conference for the Society for Research on Educational Effectiveness, March 2 – March 4, 2008, Crystal City, VA, <http://www.educationaleffectiveness.org/conferences/2008/>

Open Learning Interplay Symposium 2008, March 10 – 12, 2008, Carnegie Mellon University, Pittsburgh, PA, <http://www.cmu.edu/oli/symposium2008>

2008 American Education Research Association Annual Meeting, March 24 - March 28, 2008, New York, NY, <http://www.aera.net/>

TCC Worldwide Online Conference, April 15 – 17, 2008, Fully Online, <http://tcc.kcc.hawaii.edu>

5th annual Teaching Professor Conference, May 16 – 18, 2008, Kissimmee, FL, <http://www.teachingprofessor.com/conference/index.html>

4th Annual Teaching with Technology Idea Exchange, June 5 – 6, 2008, Orem, Utah, <http://www.ttix.org>

Increasing Enrollment and Retention via Technology: Blending High Tech and High Touch, June 18 – 20, 2008, Cincinnati, OH, www.innovativeeducators.org,

2008 Textbook and Academic Authors Association Conference, June 20-21, 2008, Las Vegas, NV, <http://www.taaonline.net/TAAConference/index.html>

20th Annual World Conference on Educational Multimedia, Hypermedia, & Telecommunications, June 30 – July 4, 2008, Vienna, Austria, <http://www.aace.org/conf/edmedia>

24th Annual Conference on Distance Teaching & Learning, August 5 – 8 Madison, Wisconsin, <http://www.uwex.edu/disted/conference>

Interactive Technologies 2008 Society for Applied Learning Technology (SALT) Conference, August 20 – 22, 2008, Arlington, VA, <http://www.salt.org>

TEACHING-RELATED REFERENCES FOR ALL FACULTY TO CONSIDER

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- Angelo, T. A., and Cross, K. P. (1993). *Classroom Assessment Techniques: A Handbook for College Teachers*, Jossey-Bass, San Francisco.

Video AI – Adding a “Pull” Resource to a “Push” World,

By MAJ Jake Bruhl and Dr. Led Klosky, C&ME

Keeping up with trends in technology use among students is always a challenge. Cadets, like much of society, are increasingly “pulling” their desired content from the web (news, entertainment, etc.) rather than simply acting as passive receivers. Users are being provided more control over what, when, and where they receive information - TiVO and podcasting are two examples. The increase in availability of wireless internet also increases the users’ flexibility.

Cadets access on-demand content in many

“Education, however, remains broadly out-of-sync with the trend towards on-demand content.”

aspects of their lives. Many get their news from the internet rather than traditional broadcast news and download only the songs they want for their iPods rather than purchasing traditional music CDs (or cassettes, 8-tracks, and records...). Others use RSS feeds to have news segments, entertainment, or commentary automatically downloaded to their handheld devices. Our cadets have literally grown up with these technologies and are used to being connected to information and people in ways that are unfamiliar and sometimes troubling to the faculty.

Education, however, remains broadly out-of-sync with the trend towards on-demand content; we still rely primarily on a “push” approach. In our courses, we continue to implement the traditional education model: we decide which content is important, we prepare a lesson, and cadets come to class and recite or receive the information we deem important in a mode and at a time we choose. In effect, we force them to be followers in many aspects of their education; they live in a “pull” world, yet we continue to teach them in a predominately “push” environment.

Creating Short, Focused Video Content for Courses

To address the issue of cadet engagement and content timing by providing “pull” resources, we created short, focused videos for CE300, an introductory course in statics and mechanics. We call them “Video AI” and they are available for cadet use through the Blackboard portal. The addition of this “pull” resource was received extremely positively by our cadets – in short, cadets use and want more of it!

We used a Tablet PC and Camtasia screen capture software to create the videos. While Camtasia supports creating videos from PowerPoint slides, the majority of our videos were created simply by writing on the screen of the Tablet PC and recording voice as we went. The same could be accomplished by using a SmartBoard. To record audio, we used an inexpensive (read “free”) desktop microphone. While the audio is not studio quality, it is certainly adequate for our purpose.

“[Cadets] live in a “pull” world, yet we continue to teach them in a predominately “push” environment.”

The screen capture software is simple to use and we purposely chose not to do any editing. Editing takes a lot of time, and our goal was to produce a large number of these videos. Given a finite amount of time to devote to the project, we put our egos aside and went for more videos rather than a few perfect ones. Our inherent laziness turns out to be good, since recent research shows that today’s generation of students prefers unedited, or “raw”, video – such as those available on YouTube – to more “professional” videos with animation and high-tech graphics. Check out the CTE website for an example of one of the videos we created (and to hone your truss analysis skills!).

Creating the video takes only as long as it takes you to present what you want to present. Of course, there is some preparation time required, but writing directly on the Tablet screen rather than creating PowerPoint slides from which to create the video significantly reduces this prep time. Once the video is captured, Camtasia walks you through the process to produce it in desired formats and then runs in the background to create the finished videos while you go about other tasks. In our experience, it takes about 30 minutes to plan, record and post one short example problem or topic supplement.

Student Response to Video AI

We first implemented Video AI late in 07-2. We began by creating four videos on common trouble topics from the second major block of instruction in the course. These were created about two weeks prior to the second WPR of the semester. An additional three videos were created between the WPR and the end of the semester.

The most exciting outcome of this initial implementation is the impact these videos have on academic performance. Scores on the two portions of WPR 2 that had video AI available were significantly higher than the historic average (8% and 14%) while performance on the portion of the exam without video AI was right at the historic average. Cadets doing poorly in the class (C or below) were much more likely to make use of the videos and those cadets saw the most dramatic increases in WPR performance. If you are interested in the statistical data backing up this claim, please contact the authors.

In addition to improving academic performance, student response has been overwhelmingly positive. From the release of the first video, cadets have remained excited about Video AI. They are excited that their instructors are trying something new to help them learn and are enthusiastic consumers of the product. In 07-2, 52% of the

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Video AI – Adding a “Pull” Resource to a “Push” World, *continued from p.3*

125 cadets in the course watched at least one of the seven videos. 72% of these cadets reported using the videos to prepare for the WPR and 50% stated they used the videos to assist them in the completion of homework. Most cadets (78%) paused the video and/or skipped around while watching in order to implement the concept in a problem they were working through and, surprisingly, 44% reported taking notes while they watched.

The videos were produced in both Windows Media Player and Video-iPod formats. All of the cadets used the Windows Media Player version and reported watching the videos at their desks in the barracks as they completed problem sets or prepared for an exam. No cadet watched the videos on a video-iPod or other hand-held device. The authors tested some of the content on a hand-held device, and while comprehensible, it is clear from that testing why the cadets prefer the desktop experience. As hand-held screens become bigger and brighter (witness the i-Phone), it seems likely that the content will migrate to the portable video devices.

Conclusion

Video AI allows faculty to meet cadets on their technological turf. That said, there are a few guiding principles that helped us to be successful with the implementation of the video AI process. First, the videos should be created using very simple, easy-to-learn technology that does not require assistance from outside the department. Second, the videos should not be seen as a replacement for the material presented in the course or the traditional classroom activities; rather, they augment the course and provide an additional resource for cadets' use when studying and solving assigned problems. Third, the videos must be short and focused on a single concept; they do not require a large time investment for a cadet to benefit. By following these three simple rules, we believe that we produced a resource that cadets use and that provides a measurable learning benefit.

The CTE has 1 new copy of
“Lowman” for sale: \$20
(proceeds go to G. Corbari)

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- Levin, D. and Arafeh, S., “The Digital Disconnect: The Widening Gap Between Internet-Savvy Students and Their Schools”, Pew Internet and American Life Project, 2007.
- A 30-day free trial of this software is available from: <http://www.techsmith.com/camtasia.asp>. Contact Mr. Mark Vehec, CTE, for more information about this and other similar software or to try the software on a Tablet PC.
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Newsletter Submissions

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Submissions to *CTE Today* are welcome and encouraged. When submitting, please keep these guidelines in mind:

We are interested in a wide range of teaching and learning topics.

We are interested in innovative strategies, techniques, and approaches that facilitate learning

We are interested in reflective analyses of educational issues of concern.

Write with the understanding that your audience includes faculty in a wide variety of disciplines and in a number of different departments.

What you describe must be relevant to a significant proportion of USMA faculty.

Write directly to the audience, remembering that this is a newsletter, not a journal publication.

Keep the article short; generally between 1 and 3 double-spaced pages.

If you'd like some initial feedback on a topic you're considering, you're welcome to share it electronically with the editor.