Using Institutional Repositories and Multi-channel On-demand Streaming Media for Effective Teaching and Learning

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One year ago, the Via College of Osteopathic Medicine (VCOM) in Blacksburg, Virginia, embarked on a program (now called VCOM-TV) to create an effective teaching and learning environment for their students. Within the year, the content of the program increased tenfold and usage increased 800-fold. More than 1,000 different educational lectures are now available.

As VCOM medical students were frequently on rotation to hospitals, VCOM needed a way to reach its students without incurring tremendous costs in time and money. VCOM solved its problem by recording classroom lectures in rich media format, synchronizing the lectures with presentation slides, producing streaming video of the synchronized content, and making these videos searchable and available on-demand via the web.

What started out as a method for reaching students on rotation has now turned into a very effective teaching tool for faculty and learning tool for all students, even those not on hospital rotations.

This presentation will discuss VCOM's solution in its entirety--from content creation to management and delivery. From the beginning, each step of the process focused on three simple objectives: promote self-service, focus on controlling costs, and increase service levels. Flexibility was built into the process, allowing faculty to create content at their own pace and students to absorb content on their own schedule and at their chosen location.

The technology used to deliver the solution is not complex. Except for the lecture preparation itself (which the faculty has to do anyway), the creation process is simple and, after the first time, can be handled by the faculty member without any outside help. An operator loads the data into the institutional repository. Users authenticate themselves, search the repository, select the desired lecture, and view it from a cloud-based streaming system.

The creation process uses a multi-channel, video recording system. One channel shows the faculty member and the other shows a PowerPoint (or any other activity – like lab experiments). These channels are automatically synchronized, which allows students to "jump" around in the content from either channel as needed. In addition to being a consistent teaching tool, the system is an effective learning tool. It lets students navigate and review small portions of a lecture (for exam preparation) from anywhere using a standard browser.

The **VTLS VITAL Media** solution developed for this project is based on Fedora™ and VITAL. Fedora is an open source institutional repository. VITAL is an enhanced version of Fedora with a variety of workflows and system management capabilities. VCOM's VITAL repository is used to store the content in small collections and provide discovery and authentication tools. When students log on, they are authenticated as first-year, second-year, or third-year medical students and gain access to the appropriate sets of videos. The solution supports searching and discovery by means of topic, date, instructor, and many other user-defined facets. The videos are delivered on-demand using the **VITAL Media Cloud option**. Content can also be delivered using local streaming media resources.
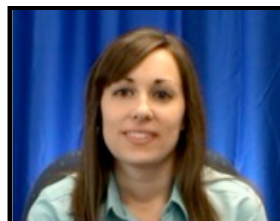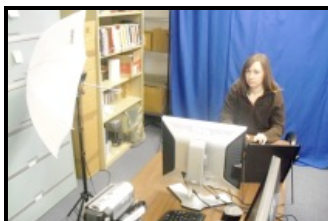
The success of the program can be judged by the exceptional growth in the usage as shown below. In less than a year the number of videos has gone from 80 to 1,100. The bandwidth usage has grown from almost nothing to over 2,200 GB per month. The number of visitors has increased to more than 8,000 per month.

Number of Visitors by Month (2010)

GB Transferred By Month (2010)

Total Videos by Month (2010)
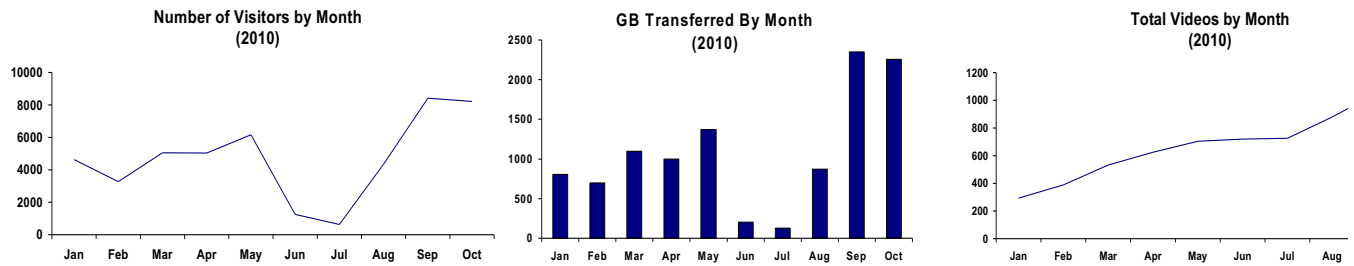
Focus is now shifting to the analysis of the program's effectiveness, and the following questions are to be addressed:

1. Pedagogical questions:
   a. How do we measure the effectiveness of this delivery mechanism over traditional means?
   b. Do the students prefer this format to traditional means…
      i. For full lectures?
      ii. For exam preparations?
   c. Is it better for students to take class notes (as an aid to concentration), or is it better for them to simply listen to the lecture?

2. Procedural questions:
   a. Is it better to record the videos live in the classroom or prerecord them in the studio?
   b. Should the faculty members stop lecturing in the classrooms and instead require the students to listen to the lecture before they come to class and use the class time for discussions?
   c. When will these recorded lectures become obsolete? When should they be re-recorded? In short, what is the "life" of a typical recording?

3. Technological questions:
   a. What other features are required to make the process simpler?
   b. What software features are needed to make this system totally self-driven by faculty and the students?

4. Questions regarding applications:
   a. How will these videos be used when the new campus opens in South Carolina next year?
   b. Should we be recording dissertation defenses? If so, should we attach them to the ETDs?
   c. Can this system be used for lab work?
   d. Would this system be effective for safety training? (already started)

CREATE　　　　　　　　　　　　　　**MANAGE**　　　**DELIVER**