

The Introduction of an Online Learning Academy

C. Ben Farrow, P.E.
Auburn University
Auburn, Alabama USA

Higher education has operated on the premise that the location of knowledge and presence of teachers are limited. With the growth of the internet, technological tools, and expansion of education providers, knowledge has become available on demand. Students may select the time and pace most convenient to them. Research indicates that the college student of today learns very differently from the student of the past. In a previous study conducted in 2009, the McWhorter School of Building Science at Auburn University used focus groups to evaluate how construction management (CM) students learn best. Specific items included in the study included students' request for flexibility in all aspects of delivery, disdain for textbooks, and the need for more active learning in the classroom. In response to this research, the McWhorter School of Building Science at Auburn University developed an online learning academy focused on seven to ten minute introductory videos for various construction topics. The concept was simple: use the videos to replace some text/introductory lecture, provide the videos free online, and use the videos to generate more time in the classroom for active learning. This paper introduces the online learning academy in its current form and presents initial, anecdotal evidence for the first eleven weeks of operation. Results indicate initial penetration into the construction educational market, but also indicate a need for more prescriptive data that needs to be developed through a focused online academy web site.

Key Words: Online learning, flipping the classroom, construction education, teaching strategy, curriculum.

Introduction

As part of a curriculum review in 2009, the McWhorter School of Building Science at Auburn University conducted a study to determine how their current construction science students might learn best (Farrow et al, 2010). In other words, the study went beyond a curriculum review that typically examines "what" a school may teach to include "how" best that material might be delivered. The study considered background research on what other educational studies had shown about Net Generation or Millennial students born between 1980 and 2000. Then, focus groups of students at Auburn University were formed to determine how specific groups of construction management students might learn best.

Construction management student focus groups responded in similar ways to what the research indicated for typical undergraduate students. Key conclusions of the students included:

- Demand for experiential learning activities
- Desire to have multiple, smaller handouts over textbooks
- Contacts and relationships with faculty members through a variety of means
- Demand for team oriented projects when team members are like them
- Flexibility in all aspects of delivery and assessment

Based on this research, the author proposes that the classroom of the future in construction may look very different from today's lecture based environment. This classroom would include applied, problem-based learning. It would also allow for "hands-on", applied activities. These approaches mirror the responses given as part of the 2009 survey of how Millennials' learn best. If one believes that students of today learn differently and that new classroom strategies will be demanded by students and industry, how might academia best leverage their resources to produce this future learning environment?

In response to the 2009 study, the McWhorter School of Building Science at Auburn University has started the development of an online learning academy and a field laboratory. This paper focuses specifically on the online learning academy which includes approximately 60 short videos on basic construction management topics. Initial results from the first eleven weeks of operation are presented. At this point, results remain anecdotal in nature. By disseminating this information, it is hoped that the University can continue the discussion of the future construction classroom and receive feedback to improve the online learning academy.

The online learning academy also represents a unique opportunity to obtain both “peer” and “student” feedback on the teaching represented in the video. Peer review of teaching continues to be a major topic within University institutions and evidence of such is often required by tenure and promotion boards. The peer review of faculty created videos could be one tool in the evaluation of both teaching and learning. The development of the videos could be considered scholarship used in promotion and tenure.

ItunesU was used to house and disseminate the initial set of videos. Available free of charge to faculty at Auburn University, this system provided a fast, free system by which to launch the online academy. Approximately 60 videos were published in early August 2012 across various categories of construction. Faculty at Auburn University were informed that the videos were available and several other “soft” launches of the video channel were made. During eleven weeks, a total of 5961 videos were streamed while 9112 videos were downloaded. The highest interest from a topical standpoint included construction materials and methods-steel, soils, and heavy civil.

Literature Review

What is the motivation for online academy?

Traditionally, construction management schools have attempted to fill undergraduate students with the knowledge of construction. Application of that knowledge has often been pushed to industry through internships or on-the-job training. Harvard Innovation Education Fellow Tony Wagner indicates that such an education model is becoming obsolete (Swallow, 2012):

Today knowledge is ubiquitous, constantly changing, growing exponentially... Today knowledge is free. It's like air, it's like water. It's become a commodity... There's no competitive advantage today in knowing more than the person next to you. The world doesn't care what you know. What the world cares about is what you can do with what you know.

Short videos used to “flip the classroom” have been researched and are utilized across various curriculums (Berrett, 2012). In this approach, online material is used to convey understanding, and classroom time is used for higher level (applying and creating) exercises. When the classroom is “flipped”, students do not sit passively in class. Instead, they must gather information outside class through various means and are prepared to solve problems and apply new concepts in class. Berrett reports a “growing body of research” that indicates students learn more using this approach (2012).

In a recent study detailed in Science Magazine, authors examined two instructional approaches in a large-enrollment physics class (Deslauriers et al, 2011). In one class (267 students), topics were delivered using 3 hours of traditional lecture given by an experienced highly rated instructor. In the other class (271 students), topics were delivered using the concept of “deliberate practice” by an inexperienced but well-trained instructor. The “deliberate practice model” presented a series of challenging questions and tasks for the students to solve during class time while being provided with feedback. The “deliberate practice” class had increased student attendance, higher engagement, and more than twice the learning of the class taught using the traditional lecture-based approach.

Is there a model for the online academy?

One concept that has been used to flip the classroom is the use of short videos outside of class. One of the more successful entities in this regard is the “Khan Academy”. Available at www.khanacademy.org, Khan's approach uses seven to ten minute videos that provide information about a specific topic. Khan is a nonprofit organization

that offers lessons on elementary and high school topics. Khan states the goal as “A free, world-class education for anyone, anywhere.” (Strauss, 2012) High school students gain core competencies at their own pace allowing more problem solving to be done in class where the teacher is present to correct mistakes before they reach the mid-term or final exam. Khan’s website indicates that more than 3000 videos that have been viewed by over 200,000,000 people.

“TED”, owned by The Sapling Foundation, is another non-profit that uses short videos to “foster the spread of great ideas” (<http://www.ted.com/>). In March of 2012, “TED” opened a YouTube channel focused on teachers and professors with short, five minute videos (Young, 2012). Known as “TEDEd”, the idea was to connect content experts with professional animators. The concept was that one of these videos may be shown at the start of a class to “ignite excitement” about a given topic.

Instruction videos in clinical medicine have been developed by the New England Journal of Medicine (McMahon, 2006). This discipline specific resource (<http://www.nejm.org/multimedia/medical-videos>) is vetted through a peer review process to verify content. The goal of this process is to improve “clinical instruction and patient care”.

How has iTunesU been used as a distribution channel?

Open education resources are defined as digital material that are provided freely online for all to use (O’Hagan, 2011). O’Hagan reports a growth in audio and video platforms in open education as online technologies have matured, broadband connections have grown, and portable media devices have expanded. Distribution channels iTunesU and YouTube are available at no costs to universities and academic institutions. O’Hagan describes these channels as “easy to manage” offering “free media hosting resources” and a “direct way to connect with international audiences”.

Methodology

Approximately 60 videos were created by a combination of students, faculty, and industry. 8% were created by industry, 10% were created by students, and 82% were created by faculty during the spring and summer of 2012. Undergraduate students in construction management who have little or no experience in the field were the primary target audience for the videos developed. Typically, this student is between 18 and 22 years of age and has had at least one year of college experience. The videos were designed to partially replace some textbooks these students may be using and/or replace the first section of lecture in a class on a given topic creating time for more active learning exercises.

The videos focused on providing the undergraduate audience a fundamental vocabulary and level of understanding in construction. All videos were seven to ten minutes in length and were oriented around various construction topics including the following collections:

- Business Management
- Contracts
- Documents and Timeline Basics
- Ethics
- Heavy Civil Construction
- Insurance and Bonds
- Materials and Methods
- Soils
- Study Abroad
- The Trades (Courtesy of GoBuild Alabama)

The above topics were selected because they were deemed significant areas of need by our faculty during our curriculum review. Videos were produced in “mp4” format using a variety of means and uploaded to iTunesU. Videos are available for free at <http://itunes.auburn.edu/> and may be accessed with a Safari browser

All videos were readily visible on the University's iTunesU page available to all faculty and undergraduate students. Auburn construction management faculty and students were made aware of the videos in writing. The school's Twitter and Facebook feeds also indicated the videos were available. Based on conversations with select faculty at other institutions where construction management is featured, we asked them to watch some of the videos and make them available to students where appropriate. The online academy was presented in a positional paper at the Royal Institute of Chartered Surveyors' (RICS) Conference in Las Vegas in mid-September as part of a larger work on both the field lab and the academy. No other formal advertisements were made concerning the videos. No attempt was made to capture the number of people made aware of the online academy.

At the end of the first eleven weeks, "usage" data was collected from Apple who owns iTunesU. This data contained categories including the following:

- "Browse"-User simply viewed a page containing the video link
- "Subscribe"-User subscribes to a collection
- "Download"-User clicks the free download button for a collection
- "Stream"-User clicks the play button for an item in the collection

The categories of "download" and "stream" were particularly interesting to the author. Both represent direct ways someone may have watched one of the videos. For example, someone could have downloaded the video prior to playing. Others may have streamed it directly from their computer. iTunesU does not allow one to distinguish these players as separate individuals. For example, someone could have both downloaded a video and streamed it to play the video. In this case, iTunesU would count once each for the download, and once for the streaming even though only one person had watched the video.

In addition, a review of the "star" rating of each collection of videos was made when one existed. iTunesU uses a system of a five-star rating for each collection indicating some form of user approval or disapproval for each collection. No specific instructions are provided to the user on how to complete the five-star rating or exactly what each star indicates.

Results and Discussion

Results indicate some initial penetration in the market for construction education. An average of almost 1400 videos per week were either downloaded or streamed in some fashion. The most popular ways to view the videos appear to be downloading (versus streaming) by almost a 1.5:1.0 ratio. Videos in three channels appeared to be the most popular including Construction Methods and Materials-Steel, Heavy Civil Construction, and Soils.

Section 1: Total number of students watching all videos

Table 1 indicates the total number of students who browsed, streamed, or downloaded the collection of videos over an eleven week period. It is interesting how the number of students that browse the videos on an overall basis is over 90% of the sum of the students who downloaded or streamed the videos. One could assume that students are either downloading or stream the videos (and not both); however, the data provided by Apple does not allow one to reach this conclusion. It is possible that single students are browsing multiple times while also both streaming and downloading.

Table 1

What were the total number of “browse”, “stream” and “download” over the 11-week period?

Parameter	Total	Average per Week
Browse	16157	1469
Stream	5961	542
Download	9112	828

The author believes engagement of 1200-1400 individuals in an online academy on a weekly basis in the first eleven weeks of operation is a positive sign. Since no assessment is included in iTunesU, and no formal record of students who watched the videos was maintained, it is impossible to determine the academic value realized by the students.

Figure 2 shows the number of “browse”, “stream”, or “download” collections on a per week basis. For all but one week, more students downloaded the collections than streamed them. The amounts of downloading exceeded streaming by approximately 50%.

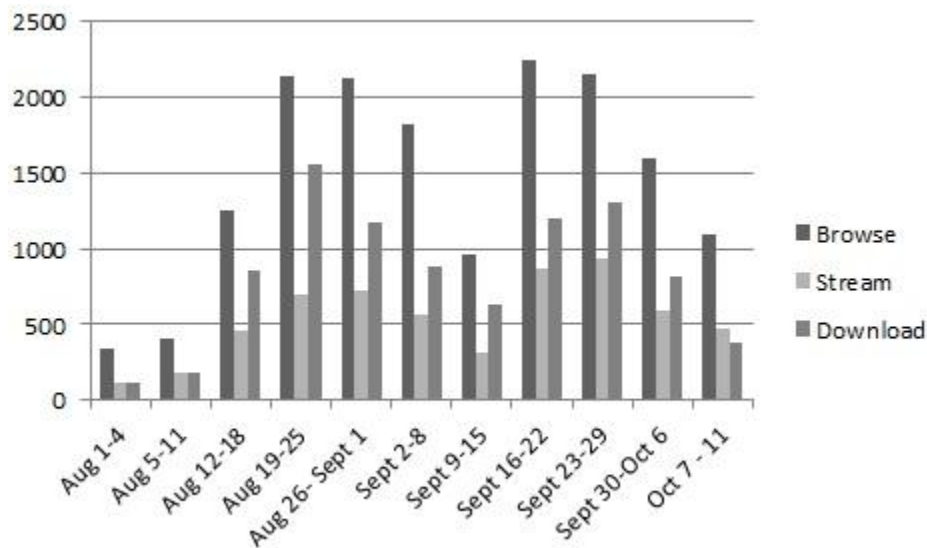


Figure 2: Bar graph illustrating number of “browse”, “download”, and “stream” weekly for 11 weeks.

Section 2: Most popular videos

The three most popular courses for both “downloads” and “streams” were “Construction Materials and Methods”, “Soils and Earthwork in Construction”, and “Heavy Civil Construction Basics”. Figures 3 and 4 illustrate the number of total “downloads” and “streams” based on total views during the eleven week period for each collection.

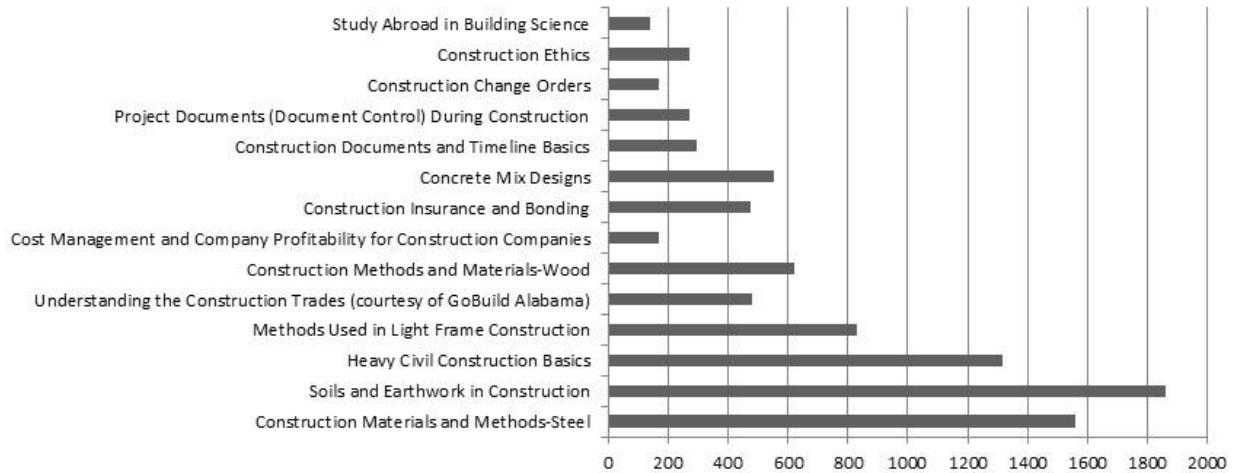


Figure 3: Bar graph illustrating number of “downloads” per video collection.

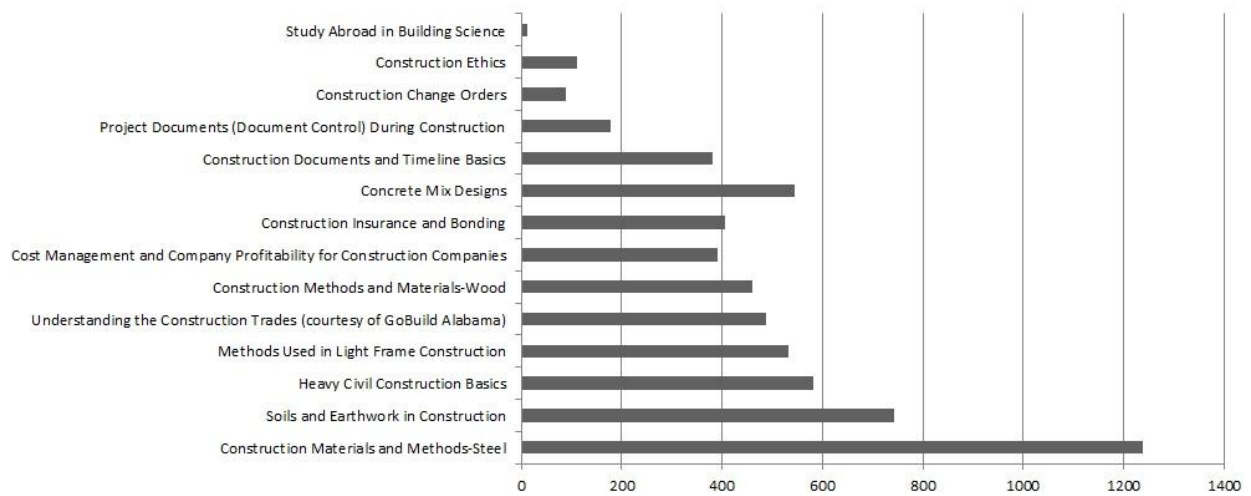


Figure 4: Bar graph illustrating number of “stream” per video collection.

Section 3: Rating of the videos

How were the collections of videos ranked by the users based on iTunesU 5-star scale? None of the collections received enough rankings to meet iTunesU’s minimum for establishing a baseline rating. Thus, the iTunes system did not provide a method of evaluating student perceptions on the videos during the initial eleven week trial.

Author’s Analysis and Conclusions

Auburn University has developed an online academy using 7 ½ to 10 minute videos that teach elements of an undergraduate curriculum in construction management. These videos were developed in response to a set of 2009 focus groups that considered how millennial construction management students learn best (Table 2).

Table 2
Description of how the field lab responded to 2009 focus groups.

2009 Focus Group Indicated...	Online Academy Responded...
Demand for experiential learning activities	Limits class time required for basic understanding
Desire to limit textbooks	Replaces textbooks in some contexts
Relationships with faculty	NA
Demand for team oriented projects	Limits class time required creating time for team projects
Flexibility in all aspects of delivery	Free, available 24/7/365

The videos were posted free of charge on iTunesU with usage data (as available from Apple) measured after eleven weeks. Key items measured were number of downloaded or streamed video collections. The data available from Apple was limited or non-existent with regard to teaching effectiveness, student retention of knowledge, or even student perception of the videos. The Apple data was obtained from the college's Information Technology group, and they believed that this basic data was all that could be obtained. Further research or new developments within iTunesU could yield more relevant and needed data.

The data did provide some initial evidence that the market may support such an online academy. The author was encouraged by over 15,000 downloads or streams of the video collections over an eleven-week period. The demand for learning online in a construction management context initially appears high using an approach with short videos. At the least, this number indicates engagement of the academy as an education tool and demands further study to determine specific user data.

For several channels, the number of videos downloaded or streamed greatly outpaced other channels by at least two to one. This is interesting; however, the data does not reveal why this is the case. It is possible that networking between students caused the significant difference in the type of collections viewed. It is also possible that one collection was assigned by a professor for a particular class or topic area.

As a result of this study, the McWhorter School of Building Science at Auburn University is pursuing the development of a website that will manage and distribute the videos. Logins by users will be required, which will provide feedback as to whether the undergraduate customer is being served as intended. The website will include both a "peer review of teaching" section as well as a "customer review" section for the videos. These tools will help the program understand and measure perceived teaching effectiveness. If successful, an effective "peer review" process of academy videos could provide an incubator for one to have his/her teaching reviewed by peers across the globe.

These evaluation tools will also help the program clearly understand what videos "work" and specifically, what elements of videos that work. It is possible that by creating and receiving feedback on teaching, the overall quality of teaching in construction management could be improved. This research should help determine what subject matters may be in demand and in what areas the greatest penetration of videos may be obtained.

The program plans to develop approximately 100 videos and have them peer reviewed and active on our website by the end of spring 2013. This should provide a basis on which to determine value, evaluate the model, measure quantitatively the results in a more formal fashion, and determine the next steps in the online academy. As a part of this process, it will be critical to collect student feedback on the academy. The program also hopes to solicit additional videos from construction faculty across the globe in an effort to connect students with subject matter

experts, engage collaboration, provide peer evaluation of teaching, and help all understand how to teach and learn better.

References

- Berrett, D. (2012). How 'Flipping' the Classroom Can Improve the Traditional Lecture. *The Chronicle of Higher Education*. [WWW document]. URL: <http://chronicle.com/article/how-flipping-theclassroom/130857/>
- Deslauriers, L., Schelew, E., and Wieman, C. (2011, May 13). Improved Learning in a Large-Enrollment Physics Class. *Science Magazine*, vol. 332 no. 6031, pp. 862-864.
- Farrow, C. B., Liu, J., Tatum, M. (2010). Establishing Curriculum Delivery Preferences of the Net Generation, *Associated Schools of Construction International Proceedings of the 46th Annual Conference*, Boston, Massachusetts, 7-10 April 2010.
- McMahon, G. T. (2006). Videos in Clinical Medicine – A New Journal Feature. *New England Journal of Medicine*. [WWW document]. URL: <http://www.nejm.org/doi/full/10.1056/nejme068044>
- O'Hagan, B. (2012). Media Distribution Channels and Open Educational Resources. [WWW document]. URL http://ccnmtl.columbia.edu/enhanced/primers/media_channels_open_educational_resources.html
- Swallow, E. (2012). Creating Innovators: Why America's Education System is Obsolete, *Forbes*. [WWW document]. URL <http://www.forbes.com/sites/ericaswallow/2012/04/25/creating-innovators/print/>
- Strauss, V. (2012, July 27). How well does Khan Academy Teach? *The Washington Post*. [WWW document]. URL: <http://www.washingtonpost.com/blogs/answer-sheet/post/how-well-does-khan-academy-teach>
- Young, J. (2012, March 12). TED, Known for Education Videos. *The Chronicle of Higher Education*. [WWW document]. URL: <http://chronicle.com/blogs/wiredcampus/ted-known-for-idea-talks-releases-educational-videos/35745>