

## **Conversion of the Construction Management Program to the Hybrid Format**

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### **Abstract**

As Universities strive to deliver rigorous content with decreasing funds they are seeking innovative ways to attract new students while reducing costs. One method of reducing university costs is to deliver online courses. However there are many problems with fully online course, so the University of Texas at Tyler (UT Tyler) has implemented a Hybrid format delivery system. UT Tyler has defined a hybrid course as a course in which at least one half of the course content is delivered online and no less than one third of the course content is delivered face to face. Over the past three years, the Department of Construction Management at UT Tyler has implemented a hybrid delivery format for the majority of its courses. This paper discusses the procedures for producing online lectures as well as the advantages and disadvantages of the hybrid delivery system as experienced by the faculty and students of the program.

### **Introduction**

The traditional course delivery method for the University of Texas at Tyler (UT Tyler), Department of Construction Management (CM) has always been face-to-face in a classroom setting. However with budget cuts and the increased number of students working to support themselves the university began researching online course delivery systems with a focus on the overall student learning experience. This resulted in the program Patriots Applying Technology for Success and Savings (PATSS) developed by the Department of Instructional Design. PATSS was set up to provide faculty development and resources to build their hybrid courses. Courses become PATSS certified when the instructor takes advantage of this training and meets the rigorous quality requirements. The CM Department took advantage of this training and agreed to work toward a fully hybrid degree program. Instructors worked with the PATSS program to develop their courses in the hybrid format. This is the third year implementing a hybrid program and most of the CM classes have been taught in the hybrid format. This paper is a discussion of the process and the advantages and disadvantages of the program.

### **What is the Hybrid Format?**

Hybrid courses are defined as 50-50 or 33-67 where 50% or 33% of the course delivery is in the classroom and the rest is online. On-line classes consist of prerecorded lectures, on-line quizzes, YouTube videos, tutorials, discussion boards, and Wikis. In-class work is typically project group work, hands on building labs, class activities, or problems labs relating to weekly topics.

Instructors typically work over the summer to build the hybrid course and load all materials into Blackboard for the fall or spring course. It typically takes 10 weeks to develop a hybrid course.

Instructors work with the Department of Institutional Design to develop the layout of the course and make sure the course meets quality standards as defined by the Quality Matters Rubric Standards. These standards include a course overview, learning objectives, assessment and measurements, instructional materials and course activities, course technology, learner support, and accessibility. The course must achieve an 80 percent passing rate to receive PATSS seal of approval for the class.

Instructors have several options for recording lectures. They can work with a film crew in a green screen room to record lectures. This works well for lectures with PowerPoints. Typically PowerPoint slides are built with the entire lecture written out in the Notes Section. The presenter is videotaped while standing or sitting in front of a green screen as show in Figure 1. During recording, the video of the instructor is overlaid on the PowerPoint slides and the presenter reads or refers to their notes which are shown on one of two screens also shown in Figure 1. The camera is located behind the screen the presenter is reading from. This gives the impression that the presenter is speaking directly to the student. The other screen shows the video of the presenter overlaid onto the PowerPoint slide.

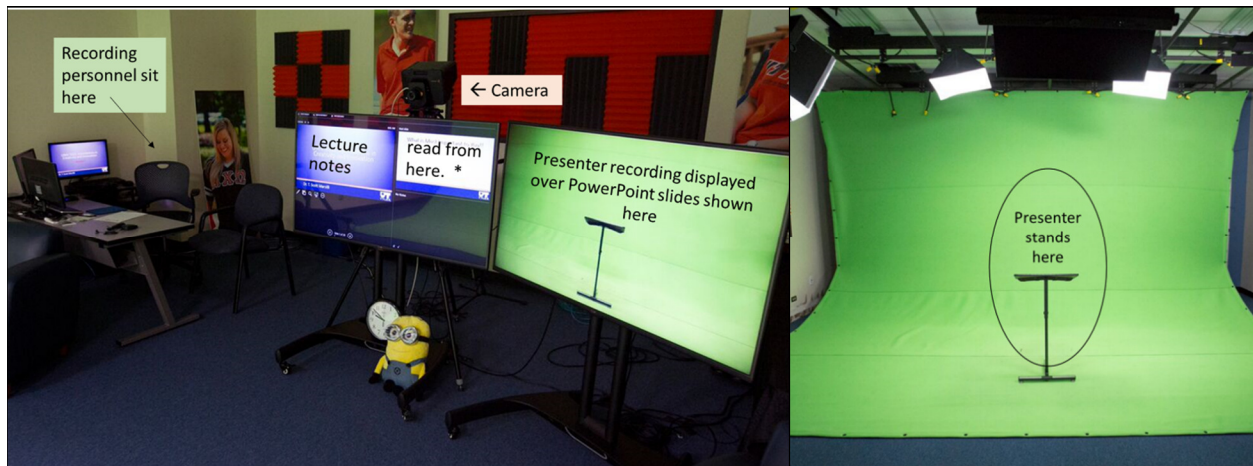


Figure 1. Photos of the green screen recording lab.

Alternatively the instructor can record their lectures in their own office using a program such as Tegrity or Camtasia. This works best for courses where the instructor is demonstrating problem solving techniques or making a tutorial in a program such as AutoCAD, Revit, Microsoft Project, or Excel. Using screen capture in Camtasia, the instructor can walk the students through a process on their computer such as how to set up projects in Microsoft Project or how to define a wall in Revit. The instructor has the option to insert a video of themselves into the presentation using a simple computer camera.

The College of Engineering has created a virtual desktop accessible from anywhere with a high speed internet connection. All programs the college provides to students have been placed on the Citrix Receiver for students' use. Students can work in the computer programs while following the tutorial from their home computer.

### **The Instructors' Roles**

Dell, Low, and Wilker [1] found that "online instructors should focus on providing high quality instruction for online learners." To do so, an instructor must fill many roles including: creator, designer, scheduler, presenter, grader, motivator, reviser, and student.

As creator and designer the instructor puts in long hours determining the best methods for presenting each topic online and which topics are best to remain in the classroom. Each topic must be placed in the course schedule in a logical order that fits the online and face-to-face dates. One method of organizing the course information is through "Modules" in Blackboard. Modules can be kept "unavailable" until a pre-set time, preventing students from working too far in advance, but can be opened early allowing students to work ahead. Depending on the course, modules can be by topic such as wood or brick for a

materials class or can be weekly for a structures course where each topic flows in to the next. The instructional designers of UT Tyler have advised to do modules by topic or subject matter. This will prevent running into issues with textbook edition changes or going out of print. To ensure that students are reviewing the module material, instructional designers at UT Tyler suggest doing lecture quizzes at the end of each lecture. Major exams can be scheduled at the end of a Module or group of Modules giving the course a rhythm.

As creator, designer, and scheduler the amount of preparation required to put the course online can be overwhelming. Professors who try to build their online course during the semester they are teaching often find the process overwhelming, especially if they have a heavy workload. While some instructors try this, the better time to build the course is during the summer prior to the course offering. Proper time management and scheduling weekly video lecture sessions in the greenroom during the summer help alleviate some of the pressure to complete the class by the due date. The professors at UT Tyler who choose to have their course PATSS certified were required to build the course during the summer break. For a new course this takes approximately ten weeks of full-time work. However, having everything prepared prior to the first day of class gives the professor confidence in the course and time during the semester to make adjustments.

All assignments must be scheduled with both date and time if the assignment is submitted online. This helps with the course efficiency and student productivity. When unseen events happen such as school closing due to weather, this can throw off your careful planning. When school closings happen on days with online lectures, the schedule is not affected, however it is harder to make up when a school closing happens on the day of a scheduled face-to-face lecture. To help avoid this issue, it is a good idea to be proactive when you schedule your classes for the semester. There should be a few days in the schedule that will give you some leeway and flexibility. For example, when you are laying out your course schedule, you may want to have a few classes that have the same topic. This also helps with topics that are more difficult for students to grasp. By having additional time allotted in your schedule, it will create a contingency plan for the unexpected delays.

CMGT 4375 – Construction Administration and Economics – Fall 2015							F2F Wednesdays	
Les. #		Date	Topic	Asgn #	Homework	Resources	9:05am - 10:00 am revised 10/14/15	
<b>Week 1</b>							<b>Due Date</b>	<b>Due Time</b>
1	Mon-Online	24-Aug	Introduction; Future of Construction	Q* 1	Introduction Future of Construction Quiz Intro wiki		26-Aug	9:05 AM
2	Wed-F2F	26-Aug	Excel work shop income statement	2	Excel Income Statement		26-Aug	End of Class
3	Fri-Online	28-Aug	Construction Projects, History	Q PA1/Q	Construction Projects History Quiz PA1 Questions Quiz	(PA1) Drop Box Drawings & specs Questions	2-Sep	9:05 AM
<b>Week 2</b>								
4	Mon-Online	31-Aug	Project Delivery systems	Q 3	Project Delivery System Quiz Bid room Wiki	Asgn 3 Bid Documents	2-Sep	9:05 AM
5	Wed-F2F	2-Sep	Team signups: what makes a good team leader/member	PA2	PA2 – Preliminary Research Wiki		9-Sep	9:05 AM
6	Fri-Online	4-Sep	CSI Master Format	Q PA3	CSI Master Format Quiz Estimate	CSI PDF Files	9-Sep	9:05 AM

Figure 2. Typical schedule with assignment due dates and times

Setting up the course content takes time, but once the course is established, the recordings and online quizzes can be used again. However, the course creator must be careful to not embed due dates in the

course material. For example, in a review video, the instructor cannot reference an exam next Wednesday at 3:00. The next offering of the course may not have the exam on that day or time. This would confuse the students and the instructor would have to re-record the video. Due dates for all course requirements, including online quizzes, assignments and projects must be given in a detailed course schedule or syllabus. Figure 2 is an excerpt from a hybrid course schedule. It clearly shows which days the class meets face to face and the date/times assignments are due. Figure 3 shows the corresponding Weekly Modules set up in blackboard. Each folder links to the required work for that week.

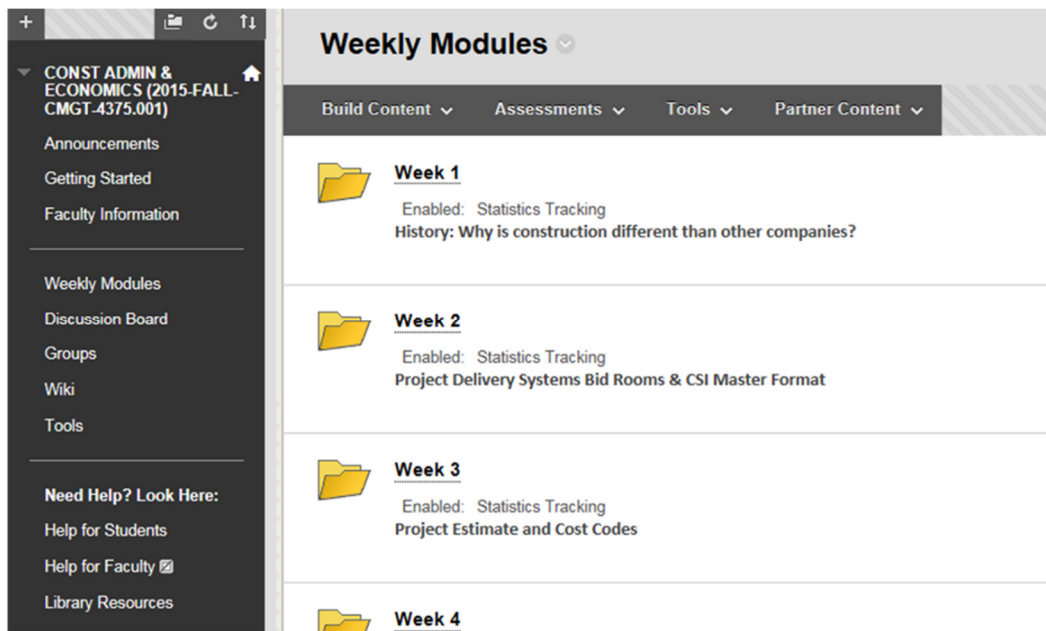


Figure 3. Blackboard Screenshot

Dell, Low, and Wilker [1] emphasized that “the design of the learning environment should include tools to help students with time management, pacing their work load, deadlines that facilitate the completion of their assignments, and appropriate learning strategies.” If students have multiple hybrid courses, it can be hard for them to keep up with due dates. A few ideas an instructor could do to avoid confusion with schedules are as follows:

- Provide weekly online class announcements about due dates.
- Setup your modules to have a weekly “What’s Coming Up?” note and explain the upcoming topic and briefly review due dates.
- Provide students with a two week look ahead schedule with each daily task noted.
- Provide a class schedule in a central online location students can view weekly.
- Provide monthly calendars online or hand-out in class.

The main objective is to communicate the schedule to the students clearly and make sure appropriate expectations have been set for due dates in a consistent manner. Having a poor schedule and bad communication at the beginning of a course can throw the class off for the remainder of the semester. It is the responsibility of the instructor to facilitate the online hybrid experience and to provide clear instructions.

Instructors have always played the role of presenter in their courses. When an instructor walks into a classroom and lectures to the students, there is no permanent record of their performance. While instructors are very knowledgeable in the subject matter, they occasionally make mistakes, correct them, and move on. Students are very good at pointing these out during the lecture. However, when recording a lecture mistakes are often not caught until the lecture goes online. At this point it is very difficult to edit the video and insert the corrected portion. For example an instructor may mispronounce a word or misread a number. It is difficult to insert the correct pronunciation or number after the recording session has ended. Mistakes that are caught during the recording session are easy to correct. The presenter simply repeats the section and the incorrect portion is edited out. If the instructor notices there is a mistake after posting the lecture live online, the instructor should react quickly and rectify it immediately. Notification can be made in the classroom or with an announcement in Blackboard. An errata can be placed next to the video in blackboard. This will avoid confusion for students.

It takes time for the instructor to learn how to be a presenter in recording sessions. Because the lecture is presented to a camera instead of a class, it is hard to show excitement for the subject until you have gained some experience. The presenter must learn how to dress (anything green will cause you to be the “invisible man”) and where to put your arms so you are pointing at the correct portion of the screen without having your hand cut off by the camera. Finally viewing yourself on video is an awakening experience. “I had no idea that I looked like that, talked with that accent or had that tic” is a common speculative brought on by viewing oneself on video.

Unless the instructor has a student grader, grading becomes a time consuming task. It takes work to develop assignments that are easy to grade but also guide the student through a rigorous task developed to enhance their creative and reasoning skills. Self-graded assignments submitted on Blackboard work for determining if a student has reviewed the material but do not demonstrate creativity or reasoning skills. Excel assignments, essays, problems and other similar assignments show creative and reasoning skills and can be submitted through Blackboard and graded online. However these tend to take longer to grade than hand written assignments. Each assignment must be downloaded, commented on and assigned a grade. Then the graded paper is uploaded back to the student through Blackboard. The advantages to this method are 1) it is clear when work is submitted late, 2) excel formulas can be checked, 3) MS Word will check for grammar and spelling errors leaving the grader’s time free to focus on content, and 4) class time is not used to return papers. Ultimately, it is the instructor’s decision to have students turn in assignments online or in class. Keeping a consistent format will prevent confusion of where to post or turn in assignments.

In face-to-face classes the instructor monitors the students’ progress by simply asking if there are any questions. Pep talks motivate students to keep trying and reminders of due dates motivate students to turn work in on time. Online instructors must motivate students through online assessments and periodic announcements through Blackboard. Their progress can be monitored through grading online assignments and viewing their online quiz grades.

Blackboard quizzes are used to record students’ understanding of the on-line lectures and encourage them to keep up in the course. The purpose is similar to “Pop Quizzes” given in the face to face lecture. Students are required to watch the videos prior to the next face to face meeting. The quizzes are self-

grading and automatically close according to the due date/time given in the class schedule, encouraging students to keep up.

Student abilities vary from class to class. When teaching face-to-face, experienced instructors recognize which sections need more emphasis for individual classes and make adjustments to their lectures. It is harder to recognize this in online teaching. When an online instructor receives several inquiries for clarification on the same concepts it is advisable to make an additional video or study guide to help students. Online courses require continuous revisions and updates to be effective in student learning.

### **Transition from Online to Face-to-Face Class Meetings**

Carol Rogers, in her article "Defining Reflection: Another Look at John Dewey and Reflective Thinking [6]" provides a framework she developed for teachers to promote student reflection by creating engaging environments and activities. Her principles are derived from John Dewey's ideas about reflection. John Dewey was a turn of the century researcher influential in education and social reform. One of the principles states, "Reflection is a meaning-making process that moves a learner from one experience into the next with deeper understanding of its relationships with and connections to others experience and ideas. It is a thread that makes continuity of learning possible, and ensure the progress of the individual."

The layout of a hybrid course should transition into the face-to-face class meeting with this reflection in mind. It is the responsibility of the instructor to provide activities to engage student learning from topic to topic throughout the semester. The face-to-face class meeting is a time to connect with students and provide additional tools to help enhance the topic for the week. For example, the instructor can provide a class activity that reflects upon what was discussed in the online lecture. Doing a hands-on experiment in class enhances student knowledge and promotes student engagement. The classroom meeting should move students towards a deeper understanding of material presented in the modules. Often the student becomes the teacher and it is within that moment the instructor can see how the reflections of others promotes learning and progression in the class.

### **Advantages and Disadvantages for the Instructor**

The seemingly obvious advantage would be professors spend less time in the classroom. However the time gained pales in light of the amount of time professors use in preparing online lectures, meeting with students outside of class and grading online papers. With less classroom face-to-face time, students tend to spend more time in the professors office requesting more one-on-one-time. Encouraging students to work in groups on assignments and come to the professors office with the group when everyone is having trouble with a concept helps reduce repetitive one-on-one meetings. However, there is a fine line between working in groups on assignments and out-right copying others work. But this occurs for all types of course offerings. Only meeting once a week gives instructors more flexible time to perform research but the additional time required for preparation and grading results in less actual time to perform research. It's also easier to lose track of the class, especially the second time it is taught.

### **Learning Curve of the Program**

It took time for the students who were accustomed to the traditional classroom to adjust to the hybrid courses and to buy-in to the benefits of online learning. This is also true for freshmen coming into the program. Although the first courses in construction management are taught to sophomores and these

students have likely experienced at least one hybrid course in their core courses. The first hybrid courses taught in this department met with resistance from the students. But as more courses were developed and improved, students have come to appreciate the flexibility of the hybrid course and gained self-discipline to succeed with the hybrid course format.

An unexpected problem with hybrid courses is it is easy to assign too much work in a course. All those projects you just never got around to in a face-to-face course can be added by simply adding another ten minute video. You can justify this by saying a 50 minute class can have 5- ten minute videos. However, a 50 minute class never covers 50 minutes of pure edited content. Professors must be sensitive to the actual work load they are requiring of students.

Since the class lectures are recorded, it is natural to go to a flipped class. Flipped classes are classes where the lecture is watched on the student's own time and class time is used helping students work problems and answer their questions. Flipped classes work very well with the hybrid format.

Although, not all online material should be recorded lectures. It is important to design online activities that are in full alignment with the course goals and objectives as outlined in the syllabus.

All professors have a learning curve when preparing and teaching a hybrid course. The time it takes to adapt to the rigor required and comfort in front of a camera varies among professors. There is also an adaptation period for students with different familiarity of computer applications which will be discussed in the next section.

### **Advantages and Disadvantages for the Students**

The main advantage for students is the flexible schedules within a time framework. Students choose when to watch videos during a time frame window, usually 1-2 weeks. Many of our students work in the construction industry in positions with somewhat flexible hours. This allows them to take a course meeting once a week and then work the online portion during their off hours.

Prior to the first day of class students are emailed instructions on how to access the course and navigate Blackboard which is used as the online delivery system for all hybrid courses at UT Tyler. Not all students are computer savvy. Some may lack the technical skills to work on their own, navigating the online portion of the course. Therefore a portion of the first face-to-face class meeting is typically devoted to demonstrating to the students the technical requirements to navigate the online portions of the class. Other students may not have access to high speed internet, especially students living in rural areas.

The multiple modes of delivery available in the hybrid format meet the needs of students with diverse learning styles. Students can watch the recording again if needed, stop the recording to digest what they have heard, or replay portions that they are having difficulty with.

One disadvantage is students have less face-to-face time with their instructor and with other students in their class. This means less social time to meet other students and form contacts. Lin [5] found in a study that online students value convenience and flexibility more than interaction with the instructor and peers. However, this can be problematic for group work and projects. One method to encourage student interaction is the use of a Wiki in Blackboard. Students post their photo and contact information on an introduction page, as shown in Figure 4. This helps students learn each other's names quicker and get in contact with each other for group work or just help with assignments.

**Instructions**  
\* Indicates a required field. Cancel Submit

**WIKI PAGE CONTENT**  
\* Name

Content

In one of the rows below, provide your name, contact information, and photo. Answer the question "What are your career plans after graduation?" When you insert your photo following the instructions on the "Getting Started" page, make sure that no dimension is larger than 300 pixels.

**General Grading comments:**  
A Wiki is not a text message. Spell check and grammar check your work. You can use the wiki spell check or type your text in MSWord then copy to the Wiki. Items that need correcting will be highlighted in red.


Your Name & contact info (6 pts)	What are your career plans after graduation? (8 pts)	Your Photo (6 pts)
Dr. Althea Arnold <a href="mailto:arnold@uttyler.edu">arnold@uttyler.edu</a> 903-566-7002 It is best to contact me by email	My plans for the future are to involve more construction companies, improve the courses offered, improve classroom tools, and building the student organizations.	

Figure 4. Screen shot of Wiki Class Introductions page

When viewing videos students can't ask "real time" questions. Emailing professors with these questions takes too long to receive answers. Professors usually have a 24 hour turnaround, which is too late when students wait until the last minute to do assignments.

Students don't watch the videos, then blame the instructor for not teaching them. This is related to when students don't read their text as assigned in regular face-to-face classes. Students may have come into the course with the idea that the material is too hard to understand and give up before actually trying. Keeping up with the assignments is another problem for students who are not organized. Assignments are usually due once a week, just prior to the face to face meeting. If students put off a week's worth of work until the last minute they will be overwhelmed.

While many of the university core classes are offered in both the hybrid and face to face format, construction course are only offered once a year, giving students no choice of format. This means that the only offering of these courses are either Hybrid or face-to-face, depending on the agreement of the instructor to teach the course as hybrid.

For team projects, students must meet together. This is more difficult when students are not on campus on a regular bases. However, when students are taught to use video conferencing software such as Skype and Zoom, they not only are able to communicate from separate locations, they expand their knowledge of methods used in the construction businesses. Another method to help students to engage with each other outside of the classroom is the use of Discussion Boards within Blackboard. The professor asks an open-ended question and students post their answers in essay form and if required they comment on other students answers. However the quality of student involvement depends on the professor creating good questions and monitoring the student answers on a timely basis.



## **Advantages and Disadvantages for the University**

The biggest advantage for the University is the marketability for the Construction Management Program. The Hybrid course offerings have attracted students who work in the field and have not had the opportunity to earn a degree. Students have more available time during working hours for their job. They can watch videos during the evenings or on weekends and only attend class one day a week.

Other advantages for the University are less classroom space required. A Monday-Wednesday-Friday class converted to 33-67 model will use one third the classroom space when “paired” with two other similar hybrid classes. Therefore one classroom time slot will serve three classes during the week. Since students are on campus only one or two days a week, less parking is required. Students attending hybrid classes tend to use their own facilities, such as computer labs and study rooms, or use university facilities at off peak times.

Less scheduled class time alleviates conflicts for classes and teaching faculty, except for scheduled final exam times. Although many faculty take advantage of online final exams.

The biggest disadvantage for the University is the need for more computing space, including servers and wireless access. Required Blackboard storage space has doubled since the beginning of hybrid class offerings. The Department of Institutional Design has gone to great expense to provide recording equipment, recording personnel, and recording areas.

UT Tyler hired RAND Education Corporation to perform a study on the feasibility of the PATSS program [4]. They conducted a pilot survey of student perceptions of hybrid courses and found that students felt that PATSS courses were equally engaging and rigorous. Students felt the PATSS courses were better organized and the PATSS format was “More flexible” and “less stressful”. There is an ongoing study to determine the University cost savings of the program.

## **What works?**

Several studies have shown that the instructional strategies used are more important than the platform or medium in which they are presented [1], [2], [3]. This makes it even more important that the instructor is engaged in the student learning. What works in hybrid courses is both instructor and class dependent. Mainly lecture courses such as Construction Safety work well in the hybrid format. Students like the Construction Safety in the hybrid format and those who watch the videos discussing safety and take the online quizzes over the subject material are well prepared for the major exams. In the face-to-face meetings students have discussions over ethics and costs of safety vs costs of accidents.

Lecture classes with imbedded labs also work well. For example in a Methods and Materials class with an imbedded lab the lectures covering construction materials are put online, while the labs are face-to-face. Students watch the videos online then come to lab to gain hands on experience with the materials and construction methods they learned about in the online portion of the class. Prior to moving this class to a hybrid format, the main student complaint was that the lectures were too boring. However, after recording these same lectures and providing the students the videos along with the PowerPoints, they prefer watching the videos to reading PowerPoints. And no student has commented that the videos were boring.

When taking a structures course in which full lectures were recorded and delivered to the students online, one student commented “When you don’t understand your screwed.” Other students seem to give up too easily when trying to understand the long videos. Students also come for one-on-one instruction because they do not understand the material. Math heavy courses such as structures (statics, mechanics of materials, concrete and steel design) require a different approach to online learning. Students do not know how to watch this type of video lecture. Since they are not in class they do not understand the importance of taking notes while watching the video. Lectures must be broken up into short videos of only one key concept. These are easy for students to rewind and view sections again that they do not understand. Short online quizzes over each video helps guide students to take notes and study the content. It is also easier for the professor to understand where in the video students are having trouble, because they will reference that specific video instead of that day’s lecture. Professors can also view the online quizzes over each video to see which questions students are missing.



*Figure 5. Light Board recording setup*

UT Tyler has developed a new method for recording lectures referred to as the Light Board. As shown in Figure 5, the presenter stands behind a Plexiglas board and presents a “black board” lecture using fluorescent whiteboard markers while facing the camera. Students find this type of recording more engaging than other recorded presentation methods and professors find it easier to produce. This is the best presentation type for problems courses.

### **Success or Failure**

Determining the success or failure of the hybrid format for course delivery depends on who you talk to and often on the day of the semester. Professors and students alike have had to make adjustment to this new teaching/learning style. One student who has been in the hybrid program since the beginning remarked “I had to learn to like the hybrid courses.” This student now prefers the hybrid format.

While the burden of developing the hybrid course falls on the instructor, UT Tyler has provided many resources for lecturers to use to accomplish this daunting task. This included training, course design support, Blackboard support, and video recording and editing assistance. Remaking courses into hybrid courses is not for the faint of heart, but can be rewarding for both the faculty and the students.

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