

# ITL Script

## Intro

### January Survey

Back in 2020, we surveyed Mason faculty about putting undergraduate classes into online formats. Several faculty responded ... completely oblivious as to future would hold. Do you remember those days of innocence?

### Faculty Responses

A multitude of responses dealt with concerns of quality and resources. “We shouldn’t rush into this.” “We need lots of time to prepare.” “We should have more conversations about online education.” “Let’s not be too aggressive.”

Are you laughing?

### March 2020

Then in March 2020, this fellow showed up and we had to rush to being online. In just two weeks, we put 38,000 students online. It wasn’t easy, and it wasn’t fun. We rushed into it. We didn’t have time to prepare. We didn’t need a lot of conversation.” “We had to be aggressive.” We adapted.

The students also adapted. Cheating during the pandemic skyrocketed – across the nation. Students use a variety of methods, and cheating is no longer just looking over at the neighbor’s test.

Once again, we need to adapt and be aggressive.

### Textbook

Online education is here to stay. Online cheating will be rampant.

And ... this is the biggest sin of all ... students aren’t reading their textbooks. Come to think of it ... neither did I.

### Topics

These three issues will be addressed in this talk. I will show the tools I’ve used to create video lectures, new ventures into alternate student assessments, and finally, a venture into an ongoing project on creating a *flipped book*. So, sit back, relax, sip some coffee, and hopefully you’ll find a thing or two of use.

## Part 1 Lecture Videos

Part 1 – Lecture Video Tools

## Intro

This part of the talk centers on creating lecture videos. Most of us have ventured into making lecture videos, and have learned the same lesson. Quality is not easily obtained. Quality in presentation, in video quality, in voice quality, etc. I have made the same mistake others have made, “All I need to do is to put voice over powerpoints.”

Well, there were quality issues ...

## Lecture Video

At that time, Powerpoint provided the worst quality of sound recording. The recordings had more background noise and were in mono instead of stereo. I tried different microphones and even built a box with sound foam to suppress room noise. The solution, though, was simpler.

Multiple software packages were examined, and the following were the ones that performed the best ... and (except for Powerpoint) all the software is free and works on any platform.

The steps in creating the lecture videos generally followed this protocol. Create the lecture slides, save them as individual images, write the audio script, record the audio tracks, load the audio into a movie making software, upload and locate the image slides into the movie maker, and add any transitions between frames. Finally, render the file.

## Save Slides

The first two steps were to create the lecture slides and save them as individual images. We've all done the first step, ... so we march onto the second step. To save the slides as individual images, select the Save As dialog and an image format. PNG works better than JPG, because JPG will create ghosts near sharp edges. Hit the Save button and a dialog pops up. Save All Slides. There done. Unfortunately, this step will lose animations.

If you are creating slides in another software package such as Beamer, then you might need a program that will split the large PDF file created by your program into individual, single-page images.

## Write Script

I like to write the script before recording for two reasons. The first is I tend to put a lot of “ums” in live speaking. Yuck. The second is that students with visual problems will need a written script of your video. Yes, we do have software that can do that for us, but a file we write can have other information for the student.

Now, if you want to get fancy ... if you read from a script or speak while looking at a file, then your eyes aren't looking at the camera ... and thus not looking at the student. It's not a big deal, but it is noticeable. For less than \$200 you can get a teleprompter which uses your camera and iPad. Now you can read a script and look directly at the student.

## Cut Audio Tracks

I've recorded voices using different software. In my opinion, Audacity provides the highest quality. It tends to remove noise automatically. It can record in stereo (if you have a stereo mic), and it has a gazillion tools for editing ... of which I've used only three.

## Audacity MP4

Here's a case in which I recorded an audio track in a noisy environment. It didn't record well, and there is noise. Audacity allows me to amplify the audio track.

You can see that there is noise at the beginning and it abates. The room noise didn't go away, what you see here is Audacity figuring out what the noise is and then eliminating it. Best practice is to allow two seconds of recording before speaking so that Audacity can do its thing and remove the room noise.

However, there is still background noise. Some places in this file should be a flat line, but they have little bumps. Noise. Must go. A noise-only area is sampled, and then this noise profile is removed from the entire recording. Voila! No noise.

Finally, the recording can be edited. Here I snip off the beginning and ends. I allow for a few extra seconds at the beginning and ending of each recording, and then trim the track in Audacity.

All that's left is to save the file. Best practice is to name your recordings in the order you want to use them. Such as myfile1, myfile2, myfile3. There's a good reason for doing this which we will see in just a second.

## KDenLive

I've looked at several movie-making software packages. I did like Sony Vegas, but it costs money. I looked at several free packages, and most of them crashed my computer on a regular basis. Macs provide iMovie which works well ... on a Mac. The one that has worked best is KDenLive. It is free. It works on any platform. It is free. And it doesn't cost anything.

It has a timeline at the bottom of the image which is where audio and video clips are placed and manipulated. This software package has a lot of tools. Most of which, I don't even know what they do. But there are many, many instructional webpages, and whenever I've wanted to install an effect, there's always a webpage to explain how to do it.

## KDenLive Audio MP4

The program is started, and the audio files are loaded into is Project Bin. Just drag and drop into this space. If the file names are in alphabetical order then you can simply drag all files to one of the audio tracks. They will line up in nice and neat order.

You can manipulate each cut or move the whole batch. KDenLive does offer some audio editing tools, but they are not was extensive as those in Audacity.

## KDenLive Slides MP4

The images of the slides are also dumped into the Project Bin. However, it is best to load them onto a video track one at a time. Load one and resize it in the timeline to match the audio track.

There are many video editing tools and transition tools. You can have multiple audio and video tracks, thus seamlessly melding files gathered through multiple sources.

## KDenLive

Once the tracks are laid out, then the next step is to render the file. No wait. The next step is to SAVE the file. Then render it. Then save it again ... just in case. KDenLive, like most movie makers, does not store audio and video files. When you Save a Kden file, it just stores the position and effects to be applied to your audio and video files stored elsewhere on your computer.

## Green Screen

It even has green screen capability, but you have to supply the green screen.

## Lightning

Of course, once you have this software, you can have a lot of fun

## Part 2 Alternate Assessment

Part 2 – Alternate Student Assessment

### Justification

Online education has led to an enormous growth in cheating. Here are the reported cases in two other schools, but Mason's experience is quite similar. Since the pandemic hit – cheating has skyrocketed.

Students are using websites such as Chegg to post questions and answers *during* the exam.

They are posting answers to Chemistry questions on portals used for Computer Science. The Chem professors will not know where to look to find the cheating, but the students know where the answers are.

Students have gotten more creative in their cheating.

### Assessment via Project Video

The approach being developed for CDS 411 (Modeling and Simulation 2) is to replace exams with projects. During the semester, each student will be a member of 5 different teams, each with an assigned project. These projects address various aspects of modeling and simulation.

### Video Example

In the Fall 2021 semester, 50% of the class will be online and 50% in-class. The projects will still be presented as videos instead of live-talks. This will help keep the presentations to the 5 minute limit, and the videos archives are useful during the Q&A stage.

## Grading

Each student will be assigned to ask one question of another project. The quality of the question will be graded – otherwise they would ask uninformative questions “How much time did it take to compute your answer” “Where did you get that background template for your Powerpoint slides?” or “What color is your computer?”

Each student will be assigned to answer one question directed toward their own group.

There will also be a peer assessment part of the grade – to tag those students who are not participating.

## Cheating

A presentation forces the students to participate in part of the project. They can't just get answers off of a website. The mixing of the groups and peer assessment also encourages students to participate instead of finding a way to cheat.

Besides, projects are far more fun than written exams. Although I will miss some of those bizarre answers we all get on written exams. (voice 1) “What is Newton's second law?” (voice 2) “The apple doesn't fall far from the tree.”

Yeah, I'm gonna miss those.

## Stearns

This assessment project has been piloted in Fall 2020. During Spring 2021, this project was part of the Stearn's Center exploration into alternative assessments. Several faculty are developing other inventive approaches. Some of them may be ideas you will want to adopt.

## 2<sup>nd</sup> Justification

There is a very good second reason for these projects. Computational and data science companies want to see student applications and the ability to work in teams. These projects will give our students something to talk about during an interview.

## Part 3 Flip Book

Part 3 – a Flipped book (look left)

## Intro

Many of you have tried a *flipped class*, in which the student watches a video or (gasp) reads a book before coming to class. Then the class time is used for problem solving and/or discussions. The philosophy is : Students learn by doing. I think I would have enjoyed this modality when I was a student.

## Alt Room

Mason embraced this idea and developed the ALT (active learning technologies) classroom, which is a wonderful place for active learning. It is a horrible place for lecture-style classes, but for active learning – it is **fantastic**.

## Mobile Labs

There were two innovations that came from that experience. The first, which I'm not going to talk about in this video, was to create a suite of physics labs using smart phones as the detectors. Every smart phone has an accelerometer, a magnetism detector, a camera, a video camera, and even a microphone. Who would of thought ... a microphone on a smart *phone*? We developed 13 labs, and the total cost of outfitting 13 labs for 72 students was \$1000. Total In this project, students were to study the effects of a lever using a cell phone – but using it as a fulcrum!

## Book

But I'm not going to talk about that project, now, am I? And I'm not going to shamelessly plug the resultant book, which is available through the Fenwick Library.

## Flip Book

Instead, I'm going to talk about the second innovation. We surveyed the students about how they were using the physics textbook. Most students admitted that they didn't read the chapters. They read the Chapter Summary, and they did the Homework problems.

The words inside the chapter though, escaped unscathed.

## Sense

This makes sense.

The book presents information from first principles and develops theory. Not once did a scientist innovate in that way. No, they had a question without an answer. They collected evidence. The answer usually came before a well-thought-out theory.

This is how people do things. Questions first – answers later. Textbooks present materials in a reversed order: Theory first – questions at the end.

The philosophy of the flipped book is ... to ask the question first.

Given a 10 kg mass, launched at an angle of 20 degrees, with an initial velocity of 40 m/s. How far away from the launch will the mass land?

How the heck should I know?

Ah ... the question that needs an answer.

## Digging

Alice knows everything, and she can answer this question without further study.

Bob knows much about physics, but needs a refresher on one or two aspects. He can read the pages of interest.

Carol took physics in high school – three years ago. She needs a refresher on many topics.

Dave ... well... Dave is lost. He needs everything

Whatever a student needs, they drill backwards to get to the theory of importance – many of which were used in earlier chapters.

## State of Art

There are developmental issues. Physics theory builds on itself, making the scaffold easy to design. Modeling and simulation is less structured. Ideas used in the Chess program do not overlap with those used in coupled differential equations or modeling oscillatory motion. So the scaffold will be harder to construct.

Something to look forward to, I suppose.

## Ending

Part 4 – The End.

## Summary

Our world keeps changing. I believe these changes are inevitable, and that the pandemic merely accelerated those changes. We need to keep expanding our ability to communicate with students through a variety of modes, and we need to do that with quality.

We need to understand that student assessment practices need to be kept modern. This will combat cheating, and in some cases, will be more in-line with what employers want.

Finally, with the vast tools we have at hand, we need to keep modern with how people learn and retain information. This, of course, is a big field. The small contribution presented here was the concept of a flipped book.

Thanks for spending a few minutes with me. I'd be glad to discuss these topics with you.

## Answer

Oh, by the way ... the answer to the physics projectile problem is 105 meters.