Post-Production Guide

Post-production ended up being much more involved than we anticipated. First, the PI and/or research assistant viewed the raw footage for a given lesson multiple times, separated the video into chunks with the particular video type labeled (i.e., Making Sense; Exploring; Reflecting, or Repeating Your Reasoning), and made decisions that omitted 1/2 to 2/3 of the raw footage by using the main mathematical goals for the lesson as a guide. Simultaneously, the technician cleaned up the various digital streams that need to be coordinated (overhead and front camera shots, students, and the Cintiq displays) and superimposed the students (filmed against a green screen) onto a background. At the time of writing the grant proposal, we had not anticipated the value to future viewers of our videos (who we refer to as "vicarious learners") of adding labels to highlight key mathematical features of the work produced by the students in the videos (who we call the "talent"), voice-over narratives to create a story line, and animated sequences using the talents' gestures and written artifacts to summarize important mathematical ideas. These aspects of post-production are crucial but time-consuming.

Because your resources are likely different from ours, a step-by-step guide is probably not helpful. Also, we recommend you seek training in Final Cut Pro X (FCPX) and Camtasia, either through watching/reading tutorials online, or by taking classes as appropriate. FCPX, in particular, is a complex and complicated piece of software. We highly recommend you become familiar with how it stores and manages files before proceeding to post-producing your footage.

Below is the work-flow that we developed for our needs.

Import: Raw footage from multiple sources (for us, this included the main camera and the Camtasia file that captured the talents' work from the Cintiq) is imported to the workstation using FCPX. At this point raw footage lives in two places: Workstation (and is redundant via RAID1 hard drives) and memory cards.

Master File: Raw footage is processed in FCPX resulting in a video that has the green screen replaced first with a 'linen' background, and then the cropped Cintiq footage is overlaid on that. This results in the **MASTER FILE**, which is large and unable to be uploaded to YouTube.

CH: **Chunking.** This process involves a simple one-pass edit in which the Master File is cut into "**CHUNKS**" that correspond with the various video types/lesson sub-blocks. Little effort is made to cut out laughter, bad takes, etc. These chunks are the basic building block of a final video that would be uploaded for public viewing.

Up:CH: **Upload Chunks**. The chunks from the previous step are uploaded to YouTube. This allows team members to view the videos from their own computer to facilitate editing and scripting.

ESheet: Trimming: **Edit sheet for trimming**. Once chunks are hosted on site, they are viewable by project team members. Team members must view the chunks and note all non-mathematical episodes in an edit sheet, which will be edited out later.

Trimming: Edit Chunks into Strips using FCPX. Using the ESheet from previous step, chunks are **TRIMMED** to remove all non-mathematical episodes. These include instances in which the talent pause to take a break, have discussions that are not related to the lesson (e.g., an incident at school, something about their family, etc.), or laughter, bad takes, etc. The result of this process is a collection of **STRIPS**.

Up:ST: **Upload strips.** Strips are uploaded to YouTube. This facilitates further editing.

ESheet: Scripting: **Edit sheet for scripting.** Once strips are hosted on site, they are viewable by project team members. Team members must view the strips and make content-based editing decisions. This includes further cutting of non-essential mathematical material, editing for clarity, and adding scripts for annotations, animations, and voiceovers in an edit sheet.

Scripting: Edit Strips into Episodes using FCPX. Using the ESheet from previous step, strips are **SCRIPTED** to remove all cuts noted in ESheet. Annotations, animations, and voiceovers are also added (see below). The result of this process is an **EPISODE**, which is a final product ready to be viewed by the public.

VO: **Voiceover Strips.** Using the ESheet from a previous step, voiceovers are recorded and mixed into strips.

A&A: **Annotate and Animate Strips.** Using the ESheet from a previous step, diagrams, definitions, calculations, animations, and other helpful additions are added to the strips.

Up: E: **Upload Episodes.** The final videos are uploaded to YouTube and hosted on the project website. The episodes are hosted under the appropriate lesson.

Raw Footage
- is **IMPORTED**
- then becomes

Master File
- is **CHUNKED**
- then becomes

Chunks
- are **TRIMMED**
- then become

Strips
- are **SCRIPTED**
- then become

Episodes are uploaded