How to Design and Build an Inexpensive Video Recording Space

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Abstract

This article provides practical guidance regarding the rationale for and design of an inexpensive video recording studio. The article includes a brief illustration of a case study based in an academic library. However, the design is applicable to any library that provides support to instructors or library staff who wish to create high-quality video recordings, including screencasts and slide presentations. Specific hardware and software recommendations are provided. In addition, broad suggestions regarding the importance of addressing audio, lighting, and other challenges are provided to help guide the reader interested in creating their own space. The article is intended to aid library staff who may lack experience with dedicated recording spaces, but who are interested in achieving high-quality results.

Keywords: educational technology; video recording; screencasting; recording studio; how-to guide; case study.

Introduction

Before the pandemic, our library at the Louisiana State University (LSU) Law Center became closely involved with faculty developing online and blended courses. Our educational technology staff conducted face-to-face workshops, created training materials, and consulted with faculty. We also created a low-cost video recording studio that has made it easy for faculty to create short lecture videos and screencasts. As we move towards a stronger on-campus presence in the coming semesters, we expect that this resource will become an important piece of our service offering to faculty. In this article, we will provide a description of how we created the studio, including a list of the supplies for review.

Background

Prior to the pandemic, we began to receive more frequent requests from faculty to assist them as they created lecture videos. Although university-supported video recording and publishing tools are relatively straightforward, many professors were unhappy with the results and the process. We thought that we could help them by providing a dedicated recording space that would relieve them of technical burdens and focus on developing great presentations. Although we lacked funding, we had creative colleagues across campus who had expertise and experience designing similar spaces on a low budget. With their help, we designed and built a video recording space with high-quality lighting and microphones for $1,900.00.

Problems

We found that the problems faculty were facing when they were recording from their home or campus offices could be described under four topics: reliability, audio, lighting, and convenience.

Reliability

Our faculty were not fond of the need for multiple takes because equipment was not working properly. And although a few enjoyed exploring the capabilities of the technology, most were happy to simply record their videos successfully the first time.

Audio

Our faculty wanted better audio. While using headsets with microphones can provide high-quality results, some faculty did not like wearing them for extended periods of time. And it can be challenging to ensure that the correct microphone is selected in recording applications. Good audio is crucial for instructional videos. For hearing students in any discipline, it is essential that they be able to perceive what is being said. They must be able to hear their professor's voice or have access to an accurate transcript or closed caption. Some have characterized the task of learning a lexicon-rich subject like law as akin to learning a "foreign language" (Harris et al., 2016), and for second language acquisition, it is "important to provide large amounts of *comprehensible* input [emphasis added]" (Krashen, 1982).

For students who are deaf or hard of hearing, the issue is more critical. Poor audio may make speech difficult to understand, and if machine captions edited by a human are delayed due to additional time needed to correct results, then students who are deaf or hard of hearing will be prevented from taking advantage of the direct instruction provided in videos. In addition, neurodiverse students may benefit from the presence of captions when speech may be difficult to discern from background noise or audio itself may be distracting. Also, many hearing students prefer to play videos silently due to circumstances (e.g., proximity to sleeping children, waiting in line, etc.).

Lighting

Savvy books on the topic of instructional video production advise that webcam video quality is not as much of a problem as you might think. In fact, students may regard a less polished product as being more authentic and relatable (Costa, 2020). However, many of our students expressed a desire to see their professors in response to internal surveys we conducted. While surprising to us at first, the notion of *instructor presence* (Garrison et al., 1999) might help explain how their sense of the visual presence of their professors might support their engagement in the course. We hoped that more complementary lighting might help faculty to feel more comfortable being seen on camera.

Interruption-Free Space

What could be more convenient than recording in your own home? While making videos at home certainly saves faculty the trouble of coming to campus, it does not make it easier to find an interruption-free space. For many, this deficit will count as the single biggest obstacle to any kind of work that requires sustained concentration (as when reading a script and maintaining steady eye level with a webcam's tiny lens), stable arrangements of lighting and equipment (as are often required to ensure that your webcam, improvised light diffuser and window blinds are in alignment), and soundproof barriers between you and any family members, pets, or outside noises. In summary, we needed to provide faculty with an easy-to-use, reliable recording option with enhanced audio and lighting in a conveniently located interruption-free space.

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Solutions

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With a clearer sense of the problems facing faculty, we tried to explore our available resources. Shared video recording spaces across campus were not available to us, but shared expertise was. A professor in the School of Library and Information Science at LSU was facing

similar challenges, and created a small, relatively inexpensive recording studio in an unused office for his colleagues to use. The space included video recording capabilities, lighting, and sufficient audio equipment to support multi-person audio interviews. His design turned out to be very popular. At least three other schools and departments took his design and modified it to fit their circumstances and goals, including the LSU Law Center.

After reviewing his design, we decided that we needed the following features:

- A room sufficiently large enough to house video/audio recording and lighting equipment, podium, and small desk

- Sound dampening materials to discourage reverberation and echo

- HD video camera with external HDMI feed

- Small video monitor for subject and videographer to use to make lighting and camera adjustments easier

- Lighting to highlight presenters

- Neutral background

- Microphone to further isolate subject's voice and eliminate audio artifacts

- PC, HDMI to USB capture device and video capture software

- Video capture capabilities that will allow simultaneous capture of video and PowerPoint slides

We wanted our design to facilitate the creation of a single video file that could include synchronized video and PowerPoint slide captures that could be edited in screencasting software and easily produced as a single video file. We wanted our faculty to be able to easily direct our staff to make minor edits (or to continue those edits themselves on their own machine using their own screencasting software), or to give faculty a single video file of the finished product that

they could share in the video publishing tool of their choice (Kaltura, Panopto, YouTube, etc.).

Our requirements were substantial, but our budget would have to be modest. Fortunately, we already had several essential components of our studio: An unused PC, two spare 19" monitors, a full-length podium, a table, and an empty, windowless office. The remaining items were all available at a well-known professional photo/video supplies vendor and through other online vendors (see Appendix 1).

Studio Setup

Once our equipment arrived, we began setting up our studio. Our team had years of experience supporting lecture and interview recordings and was comfortable with recording technologies. However, we had never had a dedicated recording space that would give us so much control over the lighting and audio. This was a learning experience for us.

Lighting

When it came time to set up the lighting equipment in our space, we were able to rely upon the generosity of our colleagues across campus. One of them had years of studio photograph experience was able to help us set up a simple, but effective three-point lighting arrangement. Although the lighting arrangement felt alternately harsh and barely visible to us during the testing, the resulting video was very appealing. As a low-budget operation, we deployed blue gaffer's tape on the floor to mark the exact positions of our lighting equipment. This was a simple, but effective approach in the event that the lighting equipment was moved away.

Audio

When it came to producing quality audio, we took a multi-faceted approach. Although our recording space was somewhat isolated and located behind two sets of doors, it was not free

of noise. Our first step was to try to shut off the overhead vents, but this was not possible. However, we did eliminate most reverberation and echo by using moving blankets as acoustic dampening materials. We used simple carabiner clips and zip ties to suspend the moving blankets from the ceiling tile grid. To reduce possible exterior noise, we used a weighted noise blocker to cover the gap between the floor and the door. And to avoid loud door knocks and interruptions, we used an exterior sign to indicate when a recording session was underway.

After we had taken every step available to us to remove unwanted audio artifacts, we set up our microphone, audio capture, and monitoring. Our wireless lavalier microphone was inexpensive but did a fine job of picking up a speaker's voice while avoiding possible noise generated by the HVAC system. This microphone and receiver were simple, affordable, easy-to-operate, and provided an analog audio signal directly to our camera. Once the audio was delivered to the camera, it could be converted to a digital signal and routed to the PC for capture by the screencasting software we used.

We were able to monitor the audio at three different points in our signal chain. At the video camera, we used simple analog headphones. On our small, tripod-mounted video monitor, we were able to view visual volume meters. This visual display enabled both our videographer and presenter to monitor audio levels. And we had a second set of headphones at the PC to ensure that the final captured audio was clear and understandable.

What Comes Next?

The sudden interruption of our ability to teach and learn together in the same physical space is now being eclipsed by a return to campus. Our students and faculty will be able to enjoy the sorts of dynamic interactions and spontaneity that face-to-face encounters afford. Yet the lessons we have learned about providing high-quality direct instruction through appealing and

easy-to-produce videos will still be valuable. We hope that this brief guide to creating an

inexpensive studio will also provide you with resources to build your own.

References

Costa, K. (2020). *99 tips for creating simple and sustainable educational videos: A guide for online teachers and flipped classes*. Stylus Publishing, LLC.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, *7*(2), 95-105.

Harris, R. L.W., Lee, E., & Green, L. (2016). Law is a 'foreign' language: An analysis of the language of law and the use of second-language teaching pedagogy in an undergraduate business law course. *Journal of Legal Studies in Business*, *21*, 76–95.

Krashen, S. D. (1982). Principles and practice in second language acquisition. *Learning*, *46*(2), 327–369.

Appendix 1. Equipment List

Description	Item Cost	Quantity	Cost
Panasonic HC-V800 Full HD Camcorder	$495.50	1	$495.50
Magnus VT-350 Video Tripod with Fluid Head	$74.96	2	$149.92
Magewell USB Capture HDMI Gen 2	$253.80	1	$253.80
Savage Promo Background Stand	$78.74	1	$78.74
Julius Studio 6 ft X 9 ft Grey Chromakey Fabric Backdrop	$15.99	1	$15.99
Cheaplights - Heavy Duty Muslin Clamps 4 1/2 inch 6 Pack	$7.89	4	$31.56
Digital Juice Butterfly Bungee Cord Set (28 Pieces)	$24.26	1	$24.26
Azden PRO-XD 2.4 GHz Digital Wireless Lavalier System	$162.00	1	$162.00
Vello CB-510 Dual Shoe Bracket with Silicon Rubber Grip	$11.21	1	$11.21
Computer (Dell OptiPlex 7060 SFF Intel Core i7 8700 32GB 2x16GB DDR4 M.2 512GB PCIe NVMe Class 40 Solid State Drive)	$1,237.00	1	$1,237.00
LCD monitor	$235.00	1	$235.00
Lilliput A7S 7" Full HD Monitor with 4K Support	$119.25	1	$119.25
Bescor Field Pro FP-180K Bi-Color LED 3-Light Kit	$221.40	1	$221.40
Pro Moving Blankets (12-Pack) - 72" x 80"	$59.99	1	$59.99
RAM-PRO 24pc Tarp Clips Heavy-Duty with Carabiner	$26.99	2	$53.98
MAGZO Door Noise Blocker	$19.99	1	$19.99
Extension cables	$30.00	1	$30.00
Table	$0.00	1	$0.00
Camtasia	$169.00	1	$169.00
Kingston USB 3.0 High-Speed Media Reader	$16.92	1	$16.92
Black Do Not Disturb Sign	$13.99	1	$13.99
Total			**$3,382.58**