DEVELOPING JUST-IN-TIME VIDEO RESOURCES TO SUPPORT ONLINE AND REMOTE TEACHING

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Universities have become accustomed to steady growth in their online programs. When the COVID pandemic began, most also faced the related challenge of a sudden need for emergency remote teaching. This article explores the development of concise demonstration videos to support online and remote faculty at a large Hispanic-serving Research 1 university in the southwestern US. The original purpose of the project was to meet the regular needs of growing online programs. However, the project began just before the local outbreak of COVID in early 2020 and morphed into support for the larger number of faculty facing emergency remote teaching as a new challenge. This design case examines the decision to develop just-in-time (JIT) video supports in-house, the staff and technology resources involved, design moves during the development process, mid-course design adjustments, promotion of the completed resource, and subsequent faculty usage.

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INTRODUCTION

In early 2020, the university's Digital Learning team made the decision to add a JIT video resource to the set of supports provided to faculty as they adopt the university's enterprise learning management system (LMS). I was asked to design and develop concise videos explaining and demonstrating LMS features. As a new member of the team, I did not have an assigned course load at the time, which made me available for this multimedia design project. The experience I brought to the project included prior work in corporate e-learning and years of instructional design support for faculty at another university.

With the advice and assistance of staff and management, I developed a set of 11 Blackboard Learn demonstration videos. They were reviewed and revised, and the completed videos were then hosted on the departmental YouTube channel and embedded on the Blackboard Learn and Zoom Tutorials support page (see Figure 1) on the university website.

This design case chronicles decisions made in the development of JIT Blackboard Learn videos for faculty. It covers the range of project stages and elements, including the selection of software, relevant design skills, application of multimedia pedagogies, early challenges that prompted design changes, subsequent design moves, review, revision, and promotion to faculty.

CONTEXT

This resource was developed for faculty at a large Hispanic-serving Research 1 university in the southwestern United States. Prior to the pandemic, there were limitations in the availability of technology in the state, as reflected in a 77% rate of household internet access compared to 84% in the nation as a whole (Number and Percentage of Households with Computer and Internet Access, by State, 2019).

While there are many valuable applications of instructional technologies, a major driver for broadening the range of supports is the expansion of online course offerings at the university. Several supports address faculty at the point of
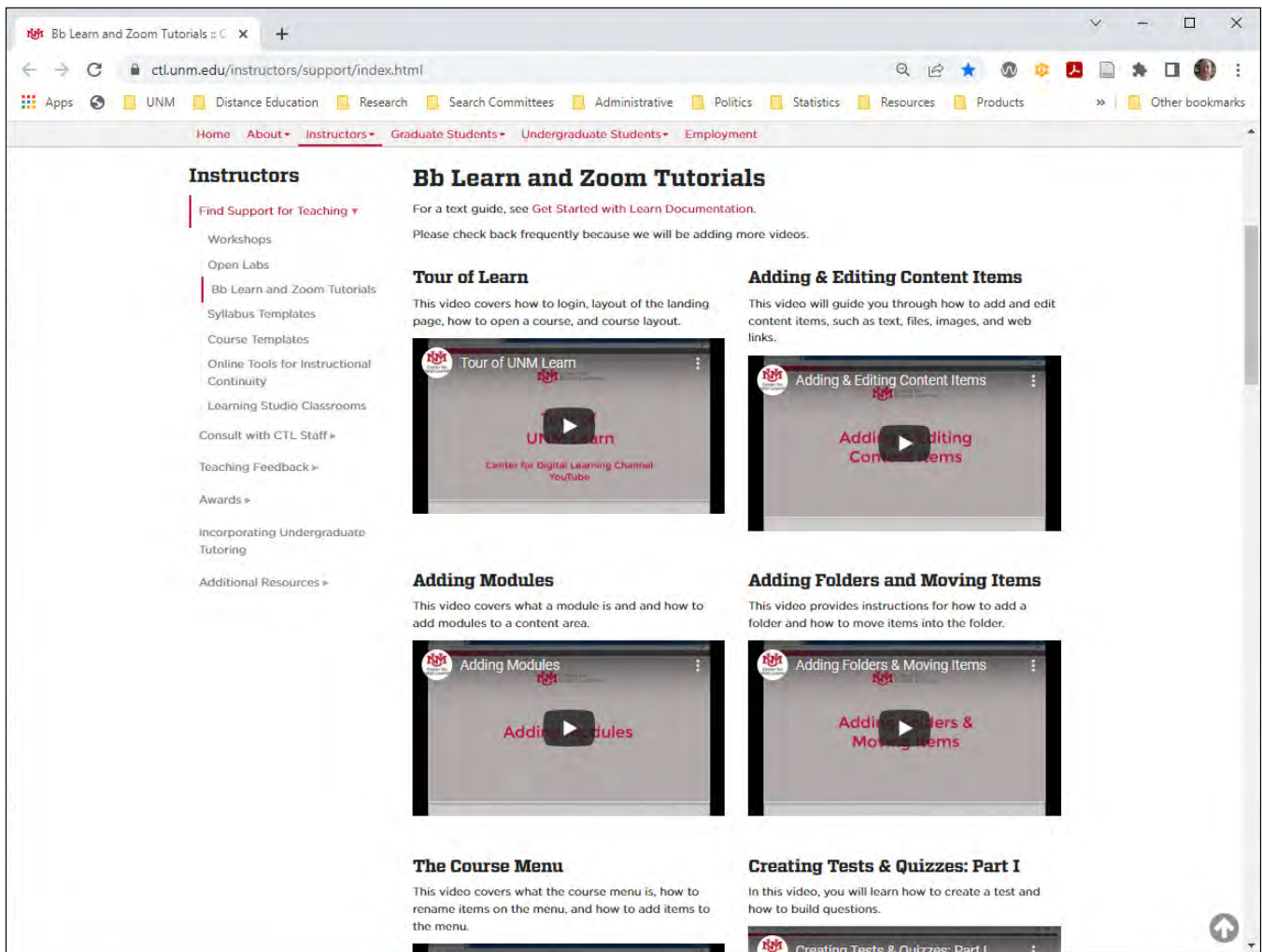
FIGURE 1. JIT videos are accessible from the Bb Learn and Zoom Tutorials support page.

making a transition to online teaching, assisting them with the development of relevant pedagogical and technological skills. Supports are then maintained through the assignment of a Digital Learning staff person to each online faculty member and the availability of workshops and open labs. Providing supports in a range of synchronous and asynchronous formats addresses the diverse needs and preferences of our online instructors. JIT videos can be particularly useful as concise and repeatable demonstrations of key platform features that are accessible to faculty 24/7.

The recipients of these supports are highly educated, but their experiences and comfort levels with instructional technologies vary widely. According to a recent literature review, anxieties associated with the adoption of instructional technologies are "a factor impacting successful technology integration and technology change for teachers at all levels" (Henderson & Corry, 2021, p. 584). Staff on our support team identify technology anxiety as one of the most frequent challenges for the population they serve. Digital technologies are continually updated with new versions,

while also rapidly increasing in range of applications. When used to teach, digital technologies have been described as "protean, unstable, and opaque" (Koehler & Mishra, 2009, p. 61). Combined use of technologies is increasingly common, as when an instructor wants students to turn in a draft of an assignment, but also share it for comment with the class, using a combination of cloud storage (with certain sharing and commenting settings) and discussion boards in the LMS. For this combination, an instructor needs to think of an external tool as a space for students to do the work and an internal LMS tool for assignment submission, although submission is done in the LMS with the tool labeled "discussion," not the one labeled "assignment."

This project began in March 2020 and was completed in April. Unexpectedly, the project overlapped our local experience of the first wave of COVID, which ultimately resulted in remote completion of the university's Spring 2020 classes and an increased need for concise and remotely accessible LMS resources. In 2020, the need became perhaps as broad as one could imagine for teaching faculty at a university. In

addition to the sudden adoption of remote teaching, fully online course offerings jumped during the first pandemic year and continued on a steady growth path. The total number of online student credit hours increased from 47,825 in Fall 2019 to 51,698 in Fall 2020 (8%), and then to 60,834 in Fall 2021 (another 18%). The number of fully online course sections grew from 795 in Fall 2019 to 938 in Fall 2020 (18%), and to 999 in Fall 2021 (another 7%) (Megli et al., 2022). During normal periods of steady growth, remote and online teaching withstood a pandemic-related surge, resulting in the need for a robust range of resources, particularly those aimed at the rapid development of fundamental LMS skills. When considering the range of faculty supports, JIT videos have particularly strong potential for meeting the needs of novice LMS users.

Another key factor influenced the initial decision to develop JIT video resources in-house. Many popular applications and platforms provide extensive supports through their websites, often including concise videos that demonstrate platform features. In some cases, those videos are embeddable on a client organization's support page. Videos from large vendors may offer high production values and regular content updates, making them attractive resources for basic training. Blackboard offers such videos for their Learn platform. However, the university's Blackboard Learn system is hosted locally, and several customizations have been implemented over a period of years, making generic videos less useful.

Finally, there were several characteristics of the Digital Learning team that impacted the design process. Over the last decade, the university has made substantial investments in developing supports for online teaching and learning. At the time of this project, the team had a staff of 15, consisting primarily of instructional and multimedia designers. Several team members have both instructional design and multimedia development experience.

As the lead designer of the JIT videos, what I brought to the project was experience with building desktop demonstration videos and an understanding of related multimedia learning concepts. The team also has years of experience utilizing and explaining the features of Blackboard Learn, providing ample review resources. Members of the team engage daily with faculty as a central element of their work, giving them valuable advice to share regarding which LMS features are used most frequently and what aspects faculty find most challenging.

DESIGN PROCESS

The Decision to Develop JIT Videos

The JIT video project was proposed by the Associate Director of Digital Learning during routine meetings with the Director of the Center for Teaching & Learning. They determined that adding a video resource would be a logical supplement to existing faculty supports for the adoption of instructional technologies. Each in the range of supports meets a particular combination of faculty needs and preferences in terms of content, availability, and format. For example, our weekly open labs meet the needs of faculty who teach in person, but who enhance their courses with web components and wish to engage with synchronous support. Those teaching fully online tend to have greater support needs, which are met through the ongoing assignment of a Digital Learning support person. Adding JIT videos to the mix supplements the range by making concise and repeatable demonstrations of LMS features available remotely at any time faculty may find them useful. Managers in the Center for Teaching & Learning also hoped that producing these videos departmentally would prompt faculty to identify them with our team, encouraging further engagement with us.

It should be noted that this step of adding a resource reflects an institutional commitment to providing robust technology supports. In early 2020, the Digital Learning team was busy supplementing several faculty resources, including a transition from in-person open labs to remotely accessible virtual open labs. Both the JIT video and virtual open lab projects began just prior to the first local wave of COVID. A steady institutional commitment of resources prior to the unexpected health emergency enhanced our capacity to respond when the emergency came.

Project Planning

In early 2020, the Associate Director of Digital Learning asked me to lead the development of the new JIT resource. We discussed the primary goal, the development of concise demonstration videos showing the steps for utilizing the LMS features most relevant to faculty. The Associate Director made several members of the team available for support, including the leader of our Instructor Development team, our most experienced media designer, and one of the team's videographers.

As the project began, I made a list of commonly utilized LMS features and fine-tuned the list in discussion with the Associate Director. Based on her experience with online instructors, she identified topics that should be developed first. I suggested that I write scripts for the first few videos, and she recommended the lead of our Instructor Development team as a resource for script reviews. Subsequent decisions about the order of video development were made during the project through periodic conversations with the Associate Director.

While these elements of planning and resource allocation were made at the beginning of the project, a wide range of design processes and decisions took place in the execution phase, involving design moves by the lead designer, in periodic consultation with other team members. Those processes and decisions included which media development
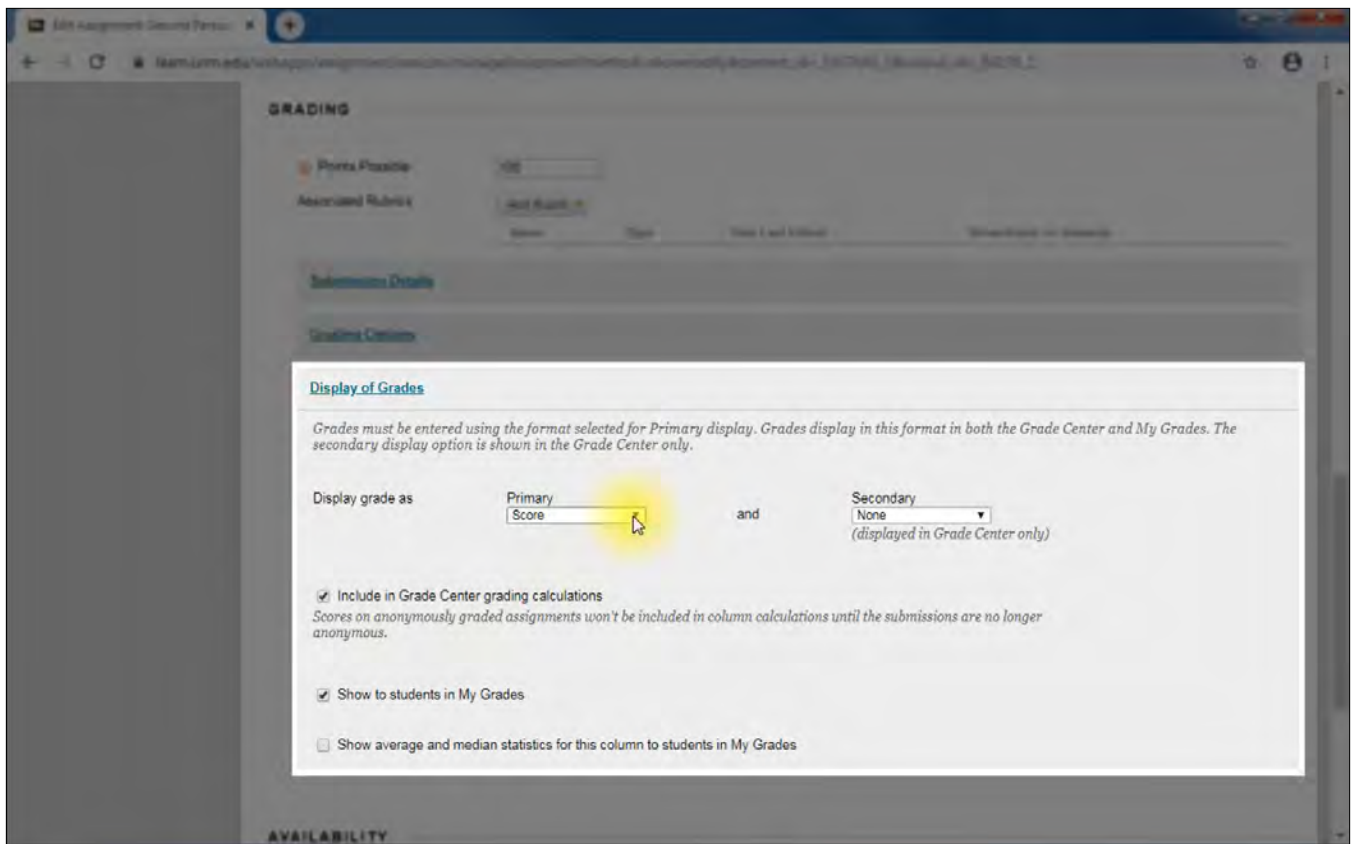
FIGURE 2. Camtasia's spotlight feature is used for both signaling and coherence. The spotlight feature grays out everything outside the rectangular Display of Grades section of the screen, simultaneously signaling learner focus on it and limiting the possibility of attending to dark areas outside that focus. Note the mouse pointer as an additional signaling element and the yellow cursor effect around it, indicating there is about to be a click. Yellow cursor highlighting signals an impending click throughout the videos.

technologies to use, the features of those technologies to apply, alignment of media technologies with relevant learning principles, decisions as to which LMS features to demonstrate, and which explanations and visuals are most likely to be helpful to faculty. Taken together, these decisions during the project extended the primary project goal to focus not just on the steps of utilizing an LMS feature, but concisely interweaving information about the most common ways of utilizing that feature, why they are used that way, which settings are most appealing to instructors, and their impacts on students.

A set of design concepts developed by Dorst (2004) can be seen in this combination of initial project parameters with impromptu design moves. Design is neither "completely determined" by the initial problem statement nor "completely free" (p. 3). The problem evolves alongside the solution, with the designer occupying a "dominant" position in applying their style and abilities to both the problem and solution (pp. 3, 7-8). Dorst proposed a five-level model of design expertise in which the fifth level represents breadth and depth of knowledge sufficient to support on-the-fly decisions and adjustments by the designer (p. 9). The current design is just such a level 5 process, made possible by years of experience

with the relevant elements, including the subject matter (the LMS), design tools (Camtasia and Adobe Audition), audience (faculty), and media pedagogies (primarily Mayer's multimedia learning principles). The remainder of this section describes the unfolding of design decisions during the development process.

Technology Resources

Developing the first video scripts gave me an early opportunity to obtain content-related feedback from our team. There was also the early question of what technologies to use. I looked at a few in the range of desktop capture applications and ultimately selected Camtasia as the recording platform. It provides user-friendly recording options and robust editing features, including the ability to easily add slides and a variety of ways of highlighting objects on the screen. Camtasia's highlighting options support the application of the signaling and coherence principles in Mayer's multimedia learning model (Mayer, 2021). Indeed, the spotlight feature I utilized for the first signaling level applies both principles—coherence through the graying out of irrelevant portions of the screen and signaling through spotlighting the relevant portion (see Figure 2).

I also selected Adobe Audition as the application for processing audio. Multimedia research underscores the importance of audio quality. The coherence principle suggests that removing extraneous sounds, such as background hissing and crackling, improves the focus on meaningful aspects of communication. The voice principle also suggests that narration with a pleasant-sounding human voice improves learning transfer (Mayer, 2021). These findings are reflected in my own experiences with instructional audio and those shared by colleagues. Over time, poor-quality audio becomes grating to the listener, prompting fatigue and disengagement.

Prior to this project, I had experience with Adobe Audition for routine audio processing. For the JIT videos, I used Audition to sample and subtract background noise, and I applied dynamics processing to bring up softer passages and keep the volume in an agreeable range. I also used vocal enhancement for a fuller voice profile. While these techniques do not bring a soft and thin voice, such as mine, to the level of professional voice talent, they can substantially enhance routine instructional narration. A sample of the resulting audio can be heard in the first video, which provides a tour of the LMS. For comparison purposes, here is the audio without processing. Note that a portion of the original audio was removed (the part that references a "sandbox course") for reasons discussed in the Adjustments section of this case study.

Preparing to Record

As I began the project, I anticipated a general process of preparing to record, then recording, editing, reviewing, and revising. However, the sub-steps involved in each step were not as clear to me. It was helpful to get feedback on the first few scripts, but I was not sure if those scripts provided practical support for recording. Would I continue to write them? Would I, instead, make lists of features, options, and related advice, and reference those as I recorded? When recording full screen, a complicating factor is an inability to open a cueing document on the same screen without showing it in the video. I knew I could display the document on a second screen, but then I would need to look at the second screen as I demonstrated features on the first. Among other things, I would need to direct the mouse to the appropriate clicks on the first screen while reading from the second.

Recording

There may well be a technological solution to this problem, but I found and applied an old-school one. I taped a printout to either the right or left side of the screen, positioning it so it would not cover parts of the screen I was demonstrating. I learned early that full scripts were not practical for recording. I could cue myself on each topic via brief glances at the document, but I could not read a full sentence while also performing the correct step. This is why I transitioned from

full scripts to documents with lists of steps and related terms. One perspective I gained during this project is that there is a range of skills involved with the creation of desktop demonstration videos. At the top level, there may be media professionals who can spontaneously provide rich explanations of steps and context, without a script or cueing document. I learned that I am not such a person, even when explaining steps on a platform I know well.

From the start, I used an informal, conversational style, beginning videos with "hi folks" and using "you" and "your" when referring to viewers, along with other informalities. This approach reflects the personalization principle in Mayer's multimedia learning model (Mayer, 2021). Another aspect of personalization relates to a tendency of mine while managing all the inputs and outputs of information, to explain the steps in a mechanical tone of voice, with little emotion. I reminded myself to try to add feeling as I was talking, and I needed to continue those reminders all the way through the recording process. The personal style of phrasing ("hi folks") supported efforts to speak with the normal emotional flow of a conversation.

While recording, I believe I applied another important dimension of audience focus, though I did not consciously consider it at the time. I was recording more than the procedural instructions for using platform features. I explained the context, including when and why an instructor might want to use the feature, what options are typically selected, and why. The explanations drew from years of experience working with faculty as they learn those features, transitioning what might have been a conversation into a continually available video resource.

Here are links to a few examples of applications and advice woven into the demonstrations:

- A contextualized explanation of the Safe Assign plagiarism detection tool, briefly describing what it does and the student experience of it.
- The superfluous Question Title field, which has little use, but is positioned prominently and often unnecessarily filled out by instructors.
- Context regarding the perpetually troubling Force Completion option on the Test Settings page.
- The Due Date and Display After/Until settings, which are explained together, since instructors may choose to use one or the other, with suggestions as to which is likely to be more appealing and date settings that tend to be clearest to students.

An observation by Lee Shulman, developer of the pedagogical content knowledge (PCK) model, may be relevant here. Teachers develop ranges of renderings of content that make the content "comprehensible" to sets of learners, including "the most useful forms of representation of those ideas, the
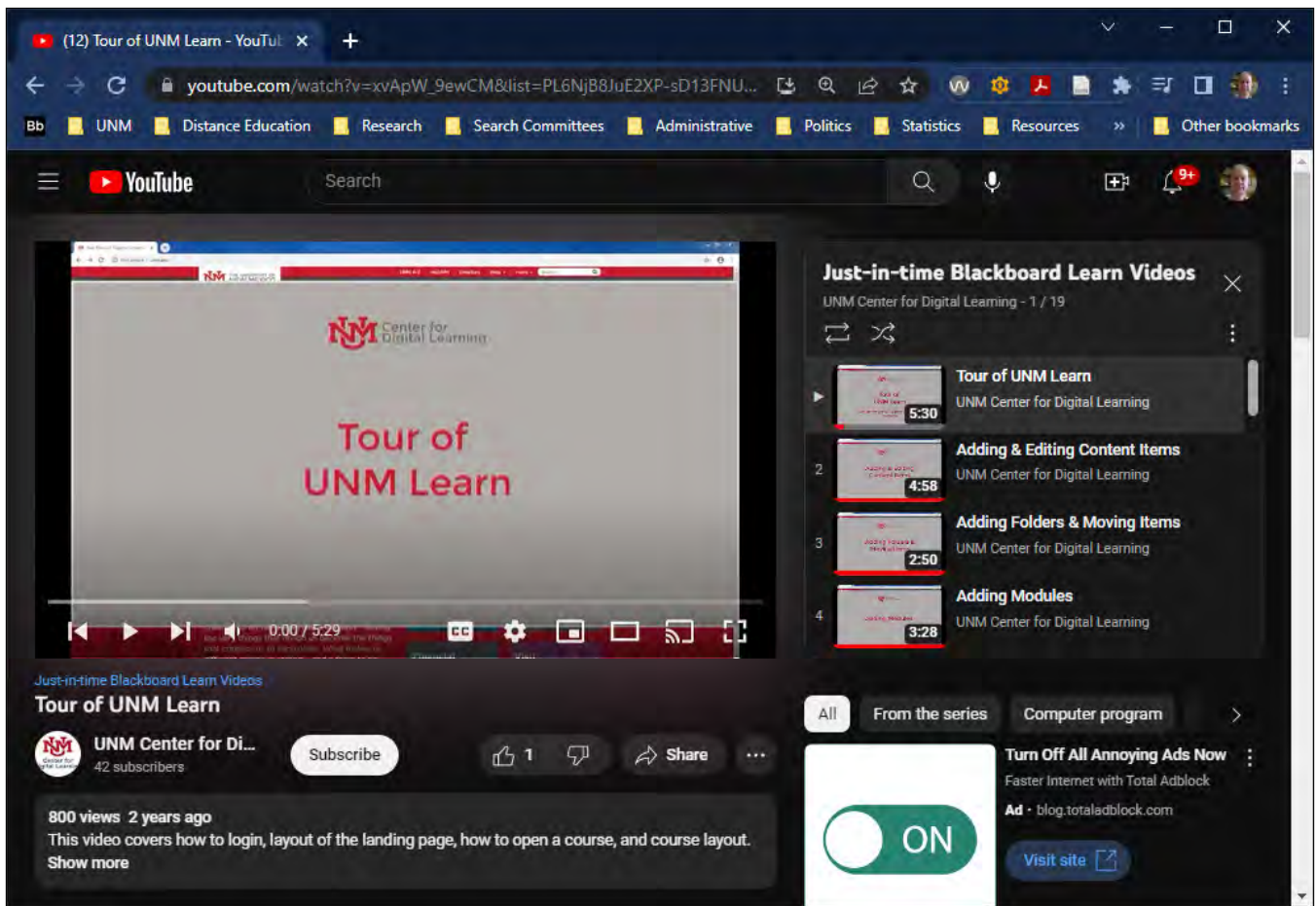
FIGURE 3. A JIT video viewed on the departmental YouTube channel.

most powerful analogies, illustrations, examples, explanations, and demonstrations" (Shulman, 1986, p. 9). Working with faculty over a period of years to develop their LMS skills gave me (and other members of our team) a range of contextual explanations of platform features and experience regarding which are the most helpful to faculty.

Early Miscues

There were two important points early in the project that either *did* or *should have* led to process adjustments. Both relate to the fact that I was a new member of the team, having only joined three months prior to this project. Since I did write early scripts, reviews of those scripts identified elements of the institutional environment I had not yet discovered or internalized. I wanted to call the platform "Blackboard Learn," when the standard way of referencing it campus-wide omits the word "Blackboard."

Those edits to the scripts were valuable. However, a second issue arose related to the sandbox course I was using for demonstrations. The course had the word "sandbox" in the title, which showed on the screen, and I discovered that the word "sandbox" was never used in communications with faculty. Sandboxes were only provided to staff with LMS

support responsibilities. When faculty were given a space to practice or to build courses, it was referred to as a "temp course." Sandbox courses were thus not shown to faculty to avoid faculty requests for them or related complaints.

A few other issues arose with the early recordings. The screen resolution I utilized was not ideal, given that the initial video display on YouTube may show the video on half or a third of the screen (see Figure 3). A similar default occurs on the university's instructor support page where the videos are embedded (see Figure 1). Viewers have the option of going full screen, but some may routinely use the default view. Recording at a lower resolution, which makes everything on the screen larger, was a better option for these videos. The basic issue with these early missteps is that I recorded five videos on my first recording day. If I had recorded one, edited it, and then identified the sub-optimal elements, I would have been able to re-record that one video, and then apply the improved settings while recording the rest.

Adjustments

As it was, I and members of my team used a few techniques to either minimize or resolve the early issues. One of our videographers applied a masking effect to cover the word

"sandbox" in the videos. I did parallel audio editing to remove "sandbox" from the narration. The masking and audio editing are both somewhat noticeable in the final versions of the first five videos. In the example just linked, you can also see the zoom and pan effect I applied to enlarge parts of the screen while they are being discussed, thus making them legible in the default YouTube display.

Continued Recording

Videos six through eleven were longer than the first five, covering major platform features. They apply the various lessons learned from the first five recordings. I created and used queuing documents—the pages that were taped to the side of the screen—with lists of steps, key terminology, and reminders of relevant explanatory context. The absence of full scripts, combined with the inclusion of explanatory narration, lengthened both the recording and editing processes. I recorded in continuous takes but reworked the phrasings as I went along by repeating some portions, relying on subsequent editing to select and keep the best takes. Through this approach, initial recordings often ended up being two or three times longer than the final edited videos.

Editing

Editing was also the stage for applying visual emphasis, consistent with Mayer's signaling principle (Mayer, 2021). I applied an initial signaling level using the spotlight feature in Camtasia to focus attention on the relevant area of the screen. Once an area was spotlighted, I used a second signaling level (yellow highlighting) to call out a specific part of the spotlighted space. The third and fourth signaling elements involved the movement of the cursor and highlighting the cursor just prior to a click. The first signaling level was sufficient through most of the videos, but subsequent levels became important for complex sequences, where items within items were being emphasized. An example that uses all levels is the sequence in the Grade Center Fundamentals video that introduces the Full Grade Center.

Review & Revision

Once the initial edit of a video was completed, I forwarded it to several team members for review, including the Associate Director, Project Manager, Instructor Development team lead, and our most experienced media designer. A number of adjustments were made, including splitting the Tests & Quizzes video, adding more tips for faculty at various points, and reworking or enhancing a few feature explanations.

Release & Promotion

Once the videos were finalized, they were passed to a team member for uploading to the department YouTube channel and then embedded on the JIT video support page (see

Figure 1). That team member also edited the closed captions for accuracy to make the videos accessible. After the videos were uploaded and embedded, they were announced to faculty through our regular departmental communications and subsequently included in faculty reminders about available resources. Some Digital Learning staff also added links to their email signature lines. At the end of our routine faculty workshops, we also give a quick overview of the other available supports, and the JIT resource was included with those support reminders.

JUST-IN-TIME BLACKBOARD LEARN VIDEOS

The design solution for this project was a set of 11 instructor-focused JIT videos demonstrating features of the Blackboard Learn system. They start with fundamental aspects of the system, through a five-minute tour of the interface. The videos then cover major platform features, including the course menu, folders and modules, assignments, discussions, tests and quizzes, grading assignments, and the grade center. The videos range from 3 to 12 minutes, with the longest being the discussions video. The recording for tests and quizzes was longer but was divided into two parts.

Coverage of Platform Options

In most cases, the options covered in a video are far from exhaustive. At one end of the spectrum, the grade center has far more features than could be covered concisely. I mention in the video that there are other options on various menus, while also explaining why the options being discussed are the most commonly utilized. At the other end of the spectrum is the Creating Assignments video, which covers a feature that is relatively simple but also utilized quite frequently by instructors. For many, it is the primary means of collecting student work. The video was organized into a first section that covers the four main elements of an assignment, followed by a second section that exhaustively goes through the remaining settings, some of which have substantial appeal for instructors, with a total video length of 9 minutes.

Multimedia Principles

The videos provide both visual and verbal information, consistent with the multimedia effect, which is the overarching principle in Mayer's multimedia learning theory (Mayer, 2021). Verbal information is provided through audio narration, with little on-screen text, consistent with the modality effect (p. 281). The videos also apply the temporal contiguity principle through consistent timing of narration with relevant visuals (p. 227), and they apply several levels of visual and verbal emphasis, consistent with Mayer's signaling and coherence principles (pp. 143, 166-167).

An example of these principles applied together is the sequence in the Creating Assignments video that explains the four basic settings for an assignment. It starts with a

spotlighted section of the screen, then sequentially high-lights the four settings, with audio timed to the highlighting and to on-screen selections as they happen. The completed videos also have an informal tone, consistent with Mayer's voice and personalization principles (Mayer, 2021, pp. 305 & 322).

Contextual Explanations

The completed videos apply another dimension of audience focus through contextual explanations of various features and settings. On the one hand, the context is concise, maintaining overall brevity, but it focuses on the immediate needs of novice users arising at the point of instructional decision-making. That combination of brevity and focus was realized through steps much like those described by Shulman involving the experienced selection of the most meaningful representations for a particular audience.

It should be noted that, at the time of this project, I had not read Shulman and was not familiar with his PCK model. Contextualizing the various platform options was a choice I made as a designer—an element added to simple step-by-step videos—and once I began doing that, experience with faculty combined with a determination to keep the videos brief led naturally to an effort to select a limited number of the representations likely to be most meaningful.

Faculty Usage

Faculty accessed the JIT videos either through the Blackboard Learn and Zoom Tutorials support page (see Figure 1) on the university's website or directly from our department's YouTube channel. A few factors may influence usage counts. First, the support page embeds all videos on a single page, with each allotted a small portion of the screen. This makes it likely that users will click through to view the larger YouTube versions. Second, the YouTube counts cap-ture views on pages where videos are embedded in addition to direct views on YouTube. This may make the counts on YouTube more reflective of total views than counts on the institution's support page. However, it should be noted that some viewers of our publicly available YouTube channel may not be our instructors. Table 1 shows the YouTube view counts for each video.

LESSONS LEARNED FOR THE DESIGNER

This design case offers potential lessons regarding both the development process and the application of learning theory.

Process Lessons

The major process lesson is the importance of prototyping before committing time to project deliverables. A prototype of an edited video may have led to earlier recognition of the issues with mislabeling and screen resolution, resulting

in a consistent set of videos with improved visuals. I am not sure we would have noticed all of these issues in a single prototype, so this is a case where doing two prototypes may have been optimal.

I sense a more significant missed opportunity involving the steps we took to promote these videos. My perception relates not so much to this project, but to design moves we have begun to adopt in other recent projects that surface some of the dynamics of faculty engagement. We are aware that both faculty and staff receive much more emails than they can read. While addressing recent training goals, we have asked faculty if they would like to have optional synchronous meetings to discuss the resources available to them and to help them chart effective technology adoption paths. Faculty have responded reasonably well to these offers, which may reflect a preference for talking with a support person over reading an email, the increased ease of asking questions in a conversation, and perhaps more broadly, the basic value of human interaction.

If we imagine retroactively applying this technique to the JIT video project, it might have involved inviting faculty to a meeting to discuss the new resource. Such a session would cover the basics, like the location of the videos and the topics they cover. It might also include techniques for using them. Short demonstration videos support spaced practice and self-testing (for their effectiveness, see Rawson, et al., 2013). Videos can be watched, in part or in full, followed by trying out the steps in a temporary course, followed by watching again and practicing again. We may tend to view the utilization of resources in these ways as reasonably obvious, especially for an educated audience, but they may not actually do those things unless we talk about it and demonstrate how natural and straightforward it is. Given their busy schedules, some may not be in the habit of using the temporary course available to them to try out LMS fea-tures. This type of session carries the potential for prompting the adoption of new learning practices.

Application of Theory

It is interesting to note that, having applied 12 of the 15 principles from Mayer's multimedia learning theory to the design of these videos, the extra step just described—if we had taken it—would have involved applying the generative activity principle, which is one of the three remaining principles (Mayer, 2021). The total number of unapplied principles would then be reduced from three to two. As it happens, the two remaining principles are not applicable to these videos. Thus, applying the generative activity principle would have completed the range of possible applications of Mayer's most recent list of empirically supported multimedia principles. The generative activity principle is similar to the more widely recognized active learning principle (Bonwell & Eison, 1991). Active learning is called upon routinely in the

VIDEO	VIEW COUNT
Tour of the LMS	754
Adding & Editing Content Items	409
Adding Folders & Moving Items	136
Adding Modules	271
The Course Menu	210
Creating Tests & Quizzes: Part I	200
Creating Tests & Quizzes: Part II	131
Creating Assignments	196
Grading Assignments	69
Creating Discussion Boards	203
TOTAL	**2,579**

TABLE 1. YouTube channel view counts for each video.

work of instructional designers, and so represents a natural learning design element.

You may also notice that the Design Process section of this case study does not include a step for reviewing multimedia learning principles. While I was familiar with some of Mayer's work and had applied aspects of it in other projects, I was not familiar with all 15 principles. If asked at the beginning of this project, I probably could not have named half of them. It may be the case that the signaling and modality principles, which are prominent in my design toolset—and matters of conviction for me about how people learn—suggest some of the other principles. Once one applies the modality principle through the use of audio narration, it is natural to synchronize audio with on-screen actions, thus applying the temporal contiguity principle. Having extensive experience with the target audience also suggests the pre-training principle. I knew that many could benefit from a high-level introduction to the interface, and thus I created a short first video as a pre-training overview.

It may also be the case that the design of the spotlight feature in Camtasia prompted the application of the coherence principle. Once I decided to use the spotlight feature for the first signaling level, it automatically shades the remainder of the screen for an additional coherence effect. The designers of Camtasia may have built multimedia principles into their software, resulting in the application by users like me.

On a similar note, Shulman's PCK model—and within it, the notion of representations relevant to the audience—was not something I had engaged with prior to this project. Applying it seems to have evolved in the midst of the work, through a combination of (a) my experience with this audience on these topics, and (b) a concern for brevity, drawing focus to the limited set of explanations I expected to be most helpful.

Collectively, this says a few things about the applications of pedagogy. Some learning principles are similar, such as the active learning concept associated with constructivism and the generative activity principle from multimedia learning theory, which is generally classed with the cognitive school. In the practice of design, I have become increasingly aware of convergences between elements of theory otherwise thought to belong to different schools of thought.

A second conclusion is the addition of a confirmatory data point to Shulman's model of the teacher knowledge base. He viewed a range of relevant representations as important for teaching, and he also suggested that an instructor's knowledge base becomes so complex, with experience, that the instructor may not be able to surface the relevant knowledge (Shulman, 1986). The project described here focused on a content area of strength for me, both in terms of knowledge of the platform and years of work with the target audience on that platform. I did not consciously set out to collect and filter that information, and indeed was not aware of Shulman or PCK during the project, but those concepts appear relevant to my design experience.

CONCLUDING THOUGHTS

This case examines the augmentation of existing faculty development resources through the addition of a set of concise JIT videos covering major features of the university LMS. The design process involved management deliberations to establish initial project goals, the assignment of several instructional designers with both faculty and multimedia experience, the selection of software, challenges in the recording process, the application of relevant pedagogies, adjustments during the process, review and revision, and promotion of the new resource.

Both the experience of development and resulting resources underscore the importance of prototyping before producing final products. They also focus attention on the significance of the promotion phase at the end of the project.

This experience can also contribute to deliberations on the relationships between learning concepts, research, and instructional design. Knowledge of a few multimedia learning concepts may prompt the application of others. The signaling and modality effects are candidates for basic concepts that could provide fertile ground for broader application. Also, in this case, extensive experience with the content and audience led to design frames that were consistent with some learning concepts that were, at the time, unfamiliar to the designer. If this dynamic occurs in other contexts, it adds weight to the value of experience in learning designs. For example, developers of education reforms could give greater weight to the contributions of working educators in the affected institutions. Those with both content and audience experience may have much to add about the selection of

effective strategies and the subtleties involved in implementation. Indeed, they may know more than they know they know.

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