Byte-Sized Learning: A Review of Video Tutorial Engagement in a Digital Media Skills Course

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This study seeks to explain how students interact with video tutorials offered as a complement to a digital media skills course in a Journalism department. Using YouTube analytics and a student opinion survey, the study seeks to determine if the students' descriptions of their video use match the actual metrics tracked by YouTube. The study serves as an exploration for future studies on the effectiveness of the tutorial videos on student learning in the class.

INTRODUCTION

Many educators have turned to video tutorials to help students learn material. The technology allows for distance learning, which has become more prevalent with the emergence of "Massive Online Open Courses," or MOOCs (Guo, Kim, & Rubin, 2014). Video tutorials also support moving some instruction outside of the classroom to free up time for more discussion and problem-solving in class. Bishop and Verleger (2013) define a flipped classroom as any combination of interactive activities in the classroom with "computer-based individual instruction" at home. These "flipped classrooms" have become more prevalent in undergraduate institutions in the last decade.

The authors of this paper produced a series of video tutorials for undergraduate students in a digital media skills course within the Journalism department. The project was intended to help instructors move toward a flipped classroom approach. The videos were produced to align with current best practices for video tutorial design. This study seeks to understand how students interacted with those materials in order to inform the development of future videos. Using YouTube analytics and a student opinion survey, the study tracks the correspondence between the students' descriptions of their video use, and the actual metrics tracked by YouTube.

LITERATURE REVIEW

State of Video Tutorials

While thousands of online instructional videos are posted on YouTube and massive online open course platforms such as Khan Academy, edX and Coursera (Guo et al., 2014; Pavel, Reed, Hartmann, & Agrawala, 2014), the type of video varies depending on factors such as course purpose and production facilities. Guo et al. outlined six different types of video production styles: Slides, Code, Khan-style, Classroom, Studio and

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Office Desk. The first three display computer screens or digital material to viewers in different ways, while the latter three include video of the instructor teaching in different physical settings (p. 4). The video styles are often combined in one single video lesson, but are sometimes used individually for instruction (Guo et al., 2014).

Videos may differ depending on the type of content being delivered. Specifically, instructional information is often delivered in tutorial form, while conceptual information is often delivered in lecture form (Guo et al., 2014). Tutorials "generated stronger and more numerous peaks than lecture videos" (Kim, Guo, Seaton, Mitros, Gajos, & Miller, 2014, p. 35), meaning there were spikes in the number of views at specific points throughout the video, as viewers navigated through the material differently.

Instructors looking to include video lessons in a class can opt to create their own, pull from an existing online course, or curate videos from video hosting sites such as YouTube (Maher, Lipford, & Singh, 2013). While each has its pitfalls and merits, the first option allows the most control to the instructors in the classroom. Developing and producing videos allowed the authors to make the content specific to the course material, brand the videos with the university and department details, and build in navigational tools to help students have more control over how they worked with the content. The branding helps add credibility to the videos (Morian & Swarts, 2012). Keeping the video content in line with specific assignments from the course helps keep students focused and engaged, as Pierce & Fox (2012) demonstrated in their study on the impacts of vodcasts on a pharmacology course. This study uses video tutorials as opposed to lecture videos as the purpose is to help instruct on the use of software.

Video production and content.
Strong video tutorial design requires a mixture of quality production and organized content. "The qualities that make instructional videos good are the same qualities that make good written procedures: Clear goals, a structure that supports reading to do, concrete details, and user feedback" (Morian & Swarts, 2012, p. 17). In their review of YouTube video tutorials, Morian and Swarts noted that higher ranking videos frequently used professional screencasting software, taking advantage of zooms and edits to focus attention on particular parts of the screen. The videos were often recorded in high definition, using professional microphones and extensive voice-overs that announced steps before they were demonstrated on screen. Past studies have found audio and video narration in tutorials is more effective than just one or the other (Winslow, Dickerson, & Cheng-Yuan, 2012).

Several studies (Meij & Meij, 2015; Guo et al., 2014; Hartman-Caverly, 2015; Kim et al., 2014) stress the need for short video lessons. Guo et al. reviewed roughly 6.9 million views of edX video lessons in 2014. Their study recommended "pre-production lesson planning to segment videos into chunks shorter than 6 minutes" (p. 2) because of higher rates of engagement with shorter videos. Hartman-Caverly notes that users of library resource tutorials watched only portions of video tutorials that averaged 3 minutes 38 seconds in length, with average view duration of 2 minutes 28 seconds, or 67%. Kim et al. note that the longer the video, the higher the "dropout rate," that is, the number of viewers who stop watching before the video ends (p. 31).

Video Navigation
Those using video tutorials often watch with a particular task in mind, and several studies have stressed the importance of allowing users to navigate through the videos to find specific content. Morian and Swarts (2012) noted videos with clearly structured information—with navigation tools such as title and chapter slides, and

rehearsed content—performed better on You-Tube rankings. Guo et al. (2014) recommend "support for rewatching and skimming" (p. 42) in tutorial videos. However, Kim, et al. (2014) recommend avoiding "abrupt visual transitions" (p. 39) that might move the tutorial past important title slides too quickly. Meanwhile efforts to make navigation of video tutorials even easier, through visual video digests that mirror textbook chapter organization, are underway (Pavel et al., 2014).

Effectiveness of the Tutorials

Meij and Meij (2015) compared video tutorials to high quality written instructions for middle school students learning how to format papers in Microsoft Word. Both were effective means of teaching the skill, but with different strengths. The paper tutorials had the benefit of allowing students to dive into the material at their own pace after seeing an overview of the material. The video tutorials, on the other hand, had the benefit of giving multiple layers of information at the same time, using both audio and visual cues to describe the same action. Videos also allowed for complete demonstration of tasks, instead of single screenshots (p. 118). Meij and Meij found that users of both print and video tutorials made "significant and substantial progress" (p. 125) on their ability to perform tasks related to the tutorials. But follow-up tests showed that while both groups retained the information one week later, "the users of the video tutorial had better retention than users of the paper-based tutorial" (p. 129). The study concluded that "video can only be a more effective instructional medium when considerable attention is given to its design, so that it can serve its purpose optimally" (p. 130).

Research Questions

In this context of best practices for video design, and with our set of video tutorials produced, we set forth with the following research questions:

RQ1. Did students choose to watch the videos when presented with the opportunity?

RQ2. How did students perceive the quality and usefulness of the video tutorials?

RQ3. What types of traffic did the videos attract?

METHODOLOGY

The Videos

In all, 17 videos on six topics were produced and published using the department's YouTube channel. The videos for this experiment were created using the software iShowU, which allows audio narration to follow video screencasts. The software supports higher resolution recording and the exporting of video for post production in professional video editing software. The professional screencast software helped build credibility into the videos (Morian & Swarts, 2012). It also helped make the tutorial demonstrations easier to follow, with each click of the mouse highlighted with a visual ripple and audio tone. The iShowU software records and displays any keystrokes as well, giving viewers help with any keyboard shortcuts used during the tutorial.

The videos were published on YouTube, a public platform, for two reasons. First, YouTube has the ability to easily embed captioning (2016b), a feature encouraged by the National Association of the Deaf for full accessibility (2002). See Table 1. Using voice recognition, YouTube automatically captions all videos, an option that can be turned on by the viewer through the video interface. YouTube also gives an option for the video creator to add custom captions, which more closely match the exact words being said in the video. Second, posting videos on YouTube will make them accessible to students after they take the initial class, and will make them available to general public. An added benefit of YouTube is that it gives access to robust analytics for further review of the videos, tracking number of views, how long users watch before turning off

Table 1
Duration of Viewer Interaction with Tutorial Videos

Video title	Video length (minutes: seconds)	Average % of video viewed
Adobe Audition Tutorial: Working with multitrack sessions	5:29	56.79
Audition: Editing Tools	6:20	70.48
Audition: Exporting Files	5:16	51.76
Excel Sorts and Formulas Tutorial	9:29	43.02
Excel Tutorial: Working with Charts	6:56	54.27
HTML Basics	7:01	39.19
Image sizing in Photoshop	5:35	52.51
InDesign Creating a Document	5:38	39.38
InDesign Text and Type	6:06	27.43
Photoshop Layers	6:00	66.75
The InDesign Toolbar	6:28	41.95
The Selection tools in Adobe Photoshop	6:10	51.90
Tutorial: Final Cut Pro	7:20	38.39
Wordpress Tutorial: Adding Photos to Blog Posts	6:13	75.23
Wordpress Tutorial: Embedding Content	5:39	56.76
Wordpress Tutorial: Getting Started	3:49	64.72
Wordpress Tutorial: Posts, Links, Categories and Tags	5:41	48.16

the video, and on which devices they view the videos.

Exposing students to the videos.

In Spring 2016, students in four sections of Digital Media Skills were offered access to the online video tutorials. Class sections were taught throughout the semester as they have been in the past, with one change: The video tutorials were made available on the course's Learning Management System, and the instructors informed students about the videos in class. The instructors were free to integrate the videos however they deemed necessary. One instructor, for example, used the videos as study guides for quizzes each week. At the end of the semester, all students received a standardized questionnaire to determine their use of the videos and their feelings about how the videos impacted their learning. The questionnaire included qualitative responses regarding the quality of the online video tutorials, in addition to some questions that sought to quantify their reactions to the videos.

Gathering the data.

This review tracks the interaction with the department's 17 video tutorials between Jan. 1 and April 25, 2016. These dates allow for review during the semester time period. While the target is how students in the class interacted with the videos, it is possible that non-students accessed the videos during the same time period. For the purposes of this study, outside use is acceptable because this study seeks to determine how people interacted with the videos in general.

The opinion survey was administered to students in the last week of class, after they had finished all sections dealing with the video topics and had taken tests and quizzes on the material. Students were able to opt out of participation in the study, and were informed that any identifying information about them would be stripped from the data for analysis purposes. The survey asked them to identify which videos they watched, and their reasons for watching. It also asked them to rank the overall quality of the videos using a five-point Likert scale. Three open-ended questions

sought qualitative feedback on the quality of the videos.

RESULTS

Opinion Surveys

Of the 84 students in the four sections of the course, 54 indicated they watched the videos on the opinion survey. This helps answer RQ1, in that 64% of students who were given the opportunity to watch tutorial videos opted to do so. As indicated by the survey, the most-viewed videos by the students were InDesign and Photoshop, with 84% and 76%, respectively, indicating they viewed those videos.

The top reason cited for using the videos was a desire to use the programs correctly (53%), followed by missing a class session (29%). Sixteen percent said they watched because they didn't understand the program, while 15% said they used the video to study for quizzes in the course. Students could select more than one reason for having viewed the videos, however most listed only one reason. See Figure 1.

Students ranked the quality of the videos, using a five-point Likert scale. See Figure 2. A ranking of 1 indicated that the videos were "not helpful at all," while a ranking of 5 indicated that the videos were "very helpful." Students ranked
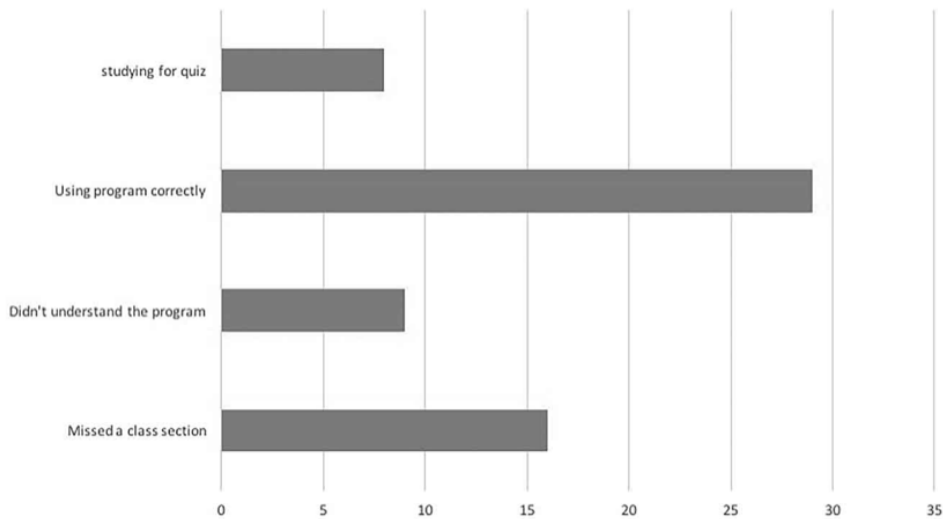

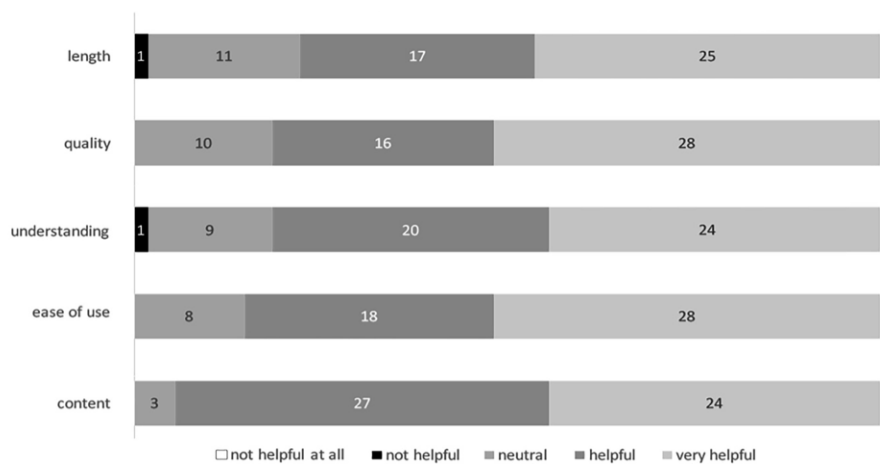*Figure 1.* Exposing students to the videos.

Figure 2. Reason for use.

the helpfulness based on video content, ease of use, impact on understanding, video quality and length. The results were overwhelmingly positive, with at least 78% of students finding the videos "helpful" or "very helpful" on each point. In terms of content, 94% ranked the material as "helpful" or "very helpful." Only two marks of "not helpful" appeared in the survey—one for the length of videos, and one for impact on understanding. A small percentage, ranging from 5 to 20%, of students responded in a neutral manner on the questions.

Qualitative responses to open-ended questions resulted in additional feedback on the videos. Twenty-four percent noted the videos should be "more in-depth," with some repeating the request in two of the open-ended questions. Meanwhile 15% said the videos should be "more basic." While the length of the videos received an average score of 4.2 on the Likert rating, in the open-ended questions, 9% specified that they thought the videos should be shorter in length. Students indicated they wanted to see more topics, including videos on iMovie, Sound-Cloud, and additional videos on Final Cut Pro and Photoshop.

Traffic Sources

The videos drew viewers from the digital media courses, and potentially viewers from the general public. While YouTube tracks the total number of views for each video, that figure does not necessarily correlate to the number of individuals who watched the videos, as some users may have watched more than once or from more than one device. The results listed in this section refer to the number of views, which could include a single person who watched a video more than once. YouTube tracks demographics for any logged-in users who watch the videos on any device (2016a). However, YouTube's analytics page is not clear how many viewers or views were included in that sample of logged-in users, so we have opted to not look at demographic information (age and sex) as part of this study.

The majority of views (70%) came to the videos through an external website, while 10% came to the video through a YouTube channel, 9% through the YouTube suggested video feature, and 5% through YouTube search. Search terms included software names and functions. For example, 22% of the views that came through search had searched for "InDesign toolbar." Some searches included identifying features of the university, indicating that students who were assigned the videos in class were searching for the videos instead of going to the Learning Management System to access the videos.

During the review timeframe, the majority of activity came from those using their computers to watch the videos. Of the 964 views, 884 (or 92%) were on a computer, while 47 (or 5%) were on a mobile phone, and 32 (or 3%) were on a tablet. One video view was from an unknown device. Only 2% of the views used the subtitle feature.

View Time

The video lengths range from 3 minutes 48 seconds to 9 minutes 29 seconds. The average percentage viewed on the videos ranges from 27% to 75%. Audience retention reports on YouTube analytics, which track the moments during a video when more or fewer views occur, indicate that viewers are using navigational tools to find particular content within the video. For example, the "Wordpress: Getting Started" video saw peaks in traffic at 3 minutes 5 seconds, right as a title screen announced instructions on how to create a new blog. The video jumped from a 77% audience retention rate to 91% at 3 minutes 12 seconds, immediately following the title marker. In a review of more than 39 million video views in an edX course, Kim et al. (2014) found that 61% of video peaks happened right before or after a visual transition (p. 37).

DISCUSSION

The opinion survey results showed a high level of engagement with the videos, with 67% of the

students opting to use them (RQ1). We suspect that the varied presentation of the videos per class section might have been a deciding factor in whether students watched the videos. This is demonstrated by the high level of views by students in the one section that were quizzed on the video material.

Opinion survey results indicate that students found the video tutorials helpful to their learning (RQ2). In addition to high rankings on the Likert scale, 20 of the 30 who answered open ended questions with feedback (67%) said the videos were "very good" or "very helpful." The opinion survey also provided helpful feedback on how to continue producing future videos. Students wanted more in-depth videos, but also shorter videos, which has prompted plans for adding more topics across several individual videos to the catalog. We'll also create troubleshooting videos based on feedback on the surveys. The YouTube analytics reinforce existing research in terms of the video design. That is, videos that are concise, short, carefully planned, with high production quality will be received better by users.

The high percentage of views on computers versus mobile devices was interesting, as the videos were created with mobile habits in mind. Large title screens identify new topics at points throughout the videos, as a way to help users looking at small screens easily navigate through content. While more people watched the videos on computers than on mobile devices, those who watched on their phones or tablets actually stayed in the videos longer. Those who watched the videos on mobile phones stayed for an average of 74% of the video, while those who watched on tablets stayed for 84% of the video on average. Meanwhile, those who watched from computers only stayed for about 50% of the video on average. More study is needed to determine why students opted to watch on computers, and whether that should have a factor in future design.

LIMITATIONS

Because all four sections were taught by different instructors, the application of the videos varied. It was left up to the individual instructors as to how to require or encourage the videos and how that information was then integrated into the classroom structure. That said, there was a clear connection between the number of views on certain videos and the timing of assignments in the class.

Reviewing the YouTube data is helpful to gain some insight into how the students are using the videos, however the sample of videos views and the number of students who reported watching the videos (54) is limited. The sample will grow as the experiment continues. The authors are encouraged by similar results in a much larger study of 3.9 million views conducted by Guo et al. (2014).

GOING FORWARD

This initial inquiry leads into a follow-up study which seeks to determine: Will students who use the video tutorials show larger gains than students who did not use the video tutorials? In their review of academic research on flipped classrooms, Bishop and Verleger (2013) found only five of 24 studies used an objective performance test to evaluate the effectiveness of the flipped model. Four of those five paired the test with a survey to also assess student perceptions of the flipped classroom (2013). Our own review of the literature has found a bias toward opinion surveys as a method for evaluating a flipped classroom approach. This may be because of the challenge of isolating the effect of the videos outside of teaching styles and other instruction. There is a clear research need for more evaluation of flipped classroom methods—in particular, the impact of video tutorials on learning—using performance tests.

A future study is planned by the authors that will take advantage of two sections of the course being taught by a single instructor. The planned study seeks to determine if the videos play any

role in their learning the material, and if so, how much. The study will offer video and paper tutorials to one section, and only paper tutorials to the other. Students will be tested before on their knowledge before the course gets underway, and again after reviewing the tutorial material. Having the same instructor, and testing the students before any in-class instruction takes place will mitigate the in-class teaching style as a factor in comparing the data.

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