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Using Student-Produced Videos to Communicate about Science

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Using Student-Produced Videos to Communicate about Science

Abstract

This professional development article provides a case study of the *Explore Research at the University of Florida* video project, conducted by University of Florida undergraduate and graduate students. Students take an advanced digital media production course where they develop videos documenting research at the university. The videos are then displayed at the Museum of Natural History and various online, broadcast, and cable television outlets. This article also provides suggestions for individuals who may want to develop their own partnerships with similar organizations in their courses.

Keywords

museum, video, course

Using Student-Produced Videos to Communicate about Science

The core of the land-grant university system is the three-part mission of research, extension, and education. Ideally, each part of the mission should benefit the other components of the mission. The *Explore Research at the University of Florida* video project at the University of Florida blends all three parts of the mission. University of Florida Department of Agricultural Education and Communication students take an advanced digital media production course where they develop videos documenting research at the university, and the videos then serve as an extension of research. The videos are then displayed at the Florida Museum of Natural History and various online, broadcast, and cable television outlets to fulfill the final part of the university mission, education. This professional development article provides a case study of the *Explore Research at the University of Florida* video project, conducted by University of Florida undergraduate and graduate students. This article also provides suggestions for individuals who may want to develop their own partnerships with similar organizations in their courses.

As part of broader science education efforts, many governmental and scientific organizations have called for better science communication with public audiences outside of traditional school settings (American Association for the Advancement of Science, 2016; National Academies of Sciences, 2016; Storksdieck, 2014). This means getting not only science communicators, but also practicing scientists involved in creating products that are meaningful to audiences who may not be aware of the breadth of scientific research in existence; scientists traditionally have not been well-supported in these efforts (Bauer & Jensen, 2011; Dudo & Besley, 2016; Stofer & Wolfe, 2018). While Americans continue to report trust in scientists over other groups, such as elected officials, these levels are still not high (Funk, 2017). In addition, polls still show gaps in understanding about topics on which scientists agree, such as climate change and genetically engineered food (Funk & Rainie, 2015). In agricultural sciences in particular, there may be a lower amount of trust, as well as gaps, in understanding (Lundy, Ruth, Telg, & Irani, 2006). Mere exposure to science and scientists may play a role in closing these gaps (Riegle-Crumb & Moore, 2014; Woods-Townsend et al., 2016; Zajonc, 2001).

In addition to the need to enhance opportunities to communicate science topics with various audiences, studies conducted with agricultural communication faculty, graduates, and professionals indicate that students in university agricultural communication programs should exhibit graduate-ready skills (Irlbeck & Akers, 2009; Morgan, 2010; Morgan, 2012; Morgan & Rucker, 2013), including effectively using technology and the ability to learn beyond a formal classroom (Morgan & Rucker, 2013). Experiential learning is one way of learning outside of a formal classroom. Texas Tech University agricultural communication students taught in a 12-day intersession semester photography course, which provided flexibility on how and where the course was taught, had higher mean cumulative assignment scores compared to students taught in a traditional classroom course (Kennedy, Akers, & Jackson, 2017).

Begun in 2011, the *Explore Research at the University of Florida* video project is a partnership of the University of Florida's Department of Agricultural Education and Communication, the Florida Museum of Natural History, and the University of Florida's Office of Research. The videos are titled *Explore Research*, similar to the Office of Research's *Explore Research* magazine. The two- to three-minute video stories, about a variety of science subjects researched at the University of Florida, are featured at the museum's permanent *Exploring Our World* exhibit (Figure 1). Videos are also posted to the museum's YouTube playlist and to other outlets, as explained later

in this document. As of the end of spring 2017, AEC students had produced 190 *Explore Research* videos. The purposes of this project are twofold:

- To produce high-quality videos about science topics conducted by University of Florida researchers so that the videos can be displayed at the Florida Museum of Natural History and other media outlets.
- To teach students how to translate complex scientific concepts into understandable language and visuals, using video as the medium.

Figure 1: Exploring Our World Display at the Florida Museum of Natural History.

The Class

Juniors, seniors, and graduate students in the *Advanced Digital Media Production in Agricultural and Life Sciences* course are the sole creators of *Explore Research* videos on campus. No other students, including those in the University of Florida's College of Journalism and Communications, create the videos. Students must have completed the department's introductory digital media course before qualifying to be enrolled in the advanced course. The course is currently taught only in the spring semester and typically has 10 to 15 students enrolled.

In late fall, the course's instructor requests a list of story ideas from sources around the University of Florida campus, including the Office of Research, the museum, University of Florida/Institute of Food and Agricultural Sciences (IFAS) Research, and University of Florida Health, among others. Students select stories from the list. Before contacting the researcher(s) for

their stories, students develop two "practice videos" on science topics so they are prepared to shoot video and interviews with the researchers later in the spring semester. Students schedule a "pre-interview" about a week in advance of the actual video shoot with the researcher – a time set aside without the video camera – to learn more about the topic. Students use this "pre-interview" to scout video possibilities and to explain them to the researcher the main purpose of the *Explore Research* videos: To inform a lay audience about (a) the problem the research addresses, (b) the process the researcher has undertaken to solve the problem, and (c) the impact of the research's results. The student returns to the researcher's laboratory, office, or location to shoot an interview and video footage. The edited videos are peer-reviewed and later instructor-reviewed at least twice before they are provided to the researcher for final review. The researcher must approve the video in writing before the video is added to the museum's YouTube channel and to the permanent exhibit's video-viewing queue.

The advanced production course begins with students practicing shooting and editing videos before they begin working with researchers. The production process that students use to create the videos is as follows: stories are assigned to students, students conduct pre-interviews with researchers as preparation for both the students and the researchers, the interviews are conducted, students edit their videos, the videos are critiqued by the course instructor and fellow students at least twice, the researchers review the videos, re-editing occurs if the researchers do not approve of the videos initially, final approvals are received from the researchers, subtitles are added to meet the Americans with Disabilities Act requirements, and videos are submitted to the museum (Figure 2).

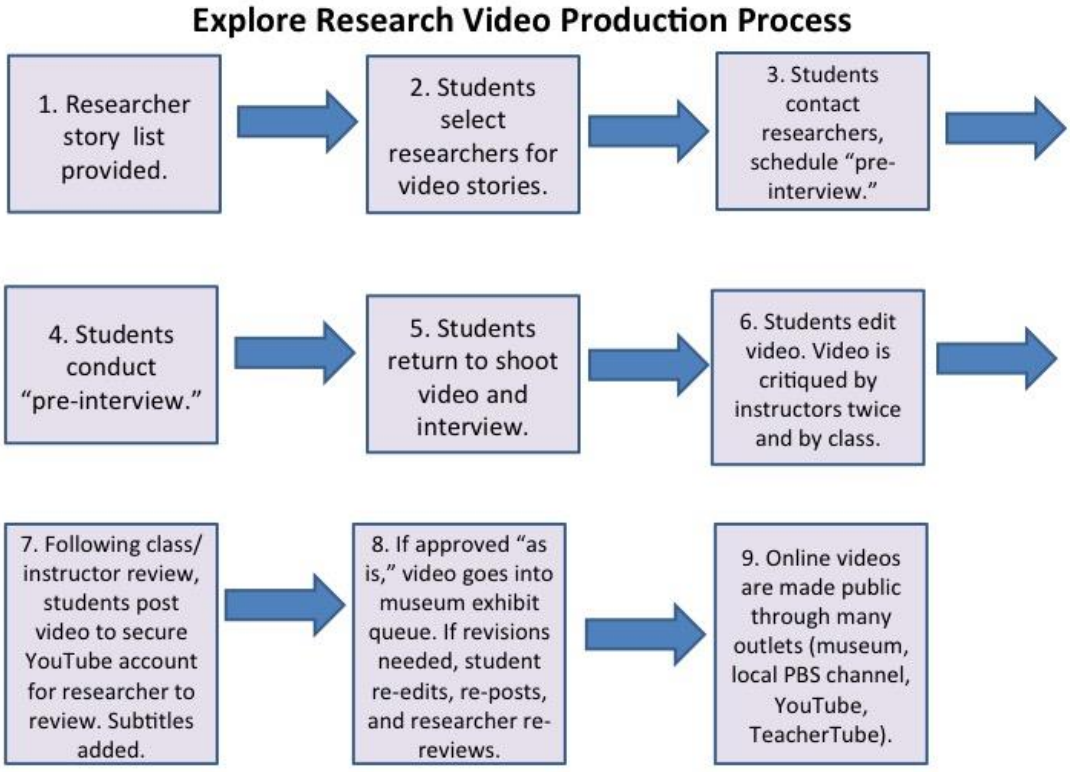

Figure 2: Explore Research Video Production Process

The Research and Scientists

The videos focus on explaining the practical impacts of scientific research being conducted at the University of Florida. The goal of the videos is to take what can sometimes seem like esoteric research and show how the research translates into real-world applications. Some examples include the use of algorithms to detect landmines, mapping cell phone use to track malaria, and manipulating light colors to affect plant growth. The researchers are able to tell the story of their research in their own words, in an understandable manner. They have realized increased exposure for themselves, their research, and their departments/centers due to the widespread distribution of the videos at the museum, online, and on the local PBS affiliate, based on researchers' comments provided to the instructor.

What Students Have Learned

Students learn not only about video production but also about the process of science communication – how to translate complex science topics into concepts that are understandable to laypeople. Students also learn how to "coach" researchers to explain their science in an easily understandable way, since the primary audience for the videos is museum visitors and online viewers who do not have a researcher's knowledge on the specific scientific topic. The course instructor has conducted a pre-test/post-test on students in the class over the past several years to assess their self-perceived video production skills and science communication abilities. Students have reported increased skills in video production, improved ability to coach interviewees, and gains in communicating science.

Over three semesters (spring 2013, 2014, 2015), students (N = 27) reported a mean score of 2.2 on a scale of 1 (low) to 5 (high) rating their knowledge of science communication before making the videos. Retrospectively, students reported on their posttest a mean score of 2.5 regarding their knowledge of science communication before making the videos. The change in scores between the two tests was not a significant difference, allowing retrospective pretest scores to be substituted for missing pretest scores for 2014 students. Students reported a mean score of 4.0 regarding their knowledge of science communication at the end of the class, a statistically significant difference from the pretest ($p < 0.001$; Table 1).

Table 1

Science Communication Knowledge Score Means

	Spring 2013 (n = 10)	Spring 2014[a] (n = 7)	Spring 2015 (n = 10)	All Semesters (N = 27)
Pretest Mean	2.0	2.3	2.3	2.2
Posttest Mean	4.0*	3.9*	4.2*	4.0*

NOTES [a] Spring 2014 semester is missing pretest scores; so retrospective pretest scores were substituted.

* Result from pre- to post-comparison are significantly different using Wilcoxon Signed Rank Test, ($p < .05$), and t test, ($p < .05$)

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For the open-ended responses, the most frequent category of responses to the question of science communication knowledge regarded communicating complex issues to the public/general science communication. Out of 27 surveys, 10 students (37%) listed that as their greatest change. For example, one student responded, "I learned how to effectively communicate research into a video." In the second-highest response, seven students (26%) described communicating with researchers and scientists as their most significant improvement in knowledge.

Scores showed that the class also made a statistically significant difference on the students' perception of their video production knowledge. Students reported a mean score of 2.9 on a scale of 1 to 5 rating their knowledge of video production prior to taking the course. When asked to rate their video production knowledge after taking the class, the mean over all surveyed semesters was a 4.3. Again, the difference in pre- and retrospective pretest scores were not significantly different (Table 2). Scores showed that the class had a significant positive relationship to the students' perception of their video production skills. All three semesters showed a significant difference between pretest and posttest scores on both the Wilcoxon and paired t-tests ($p = .00051$).

Table 2

Video Production Knowledge Score Means

	Spring 2013 ($n = 10$)	Spring 2014[a] ($n = 7$)	Spring 2015 ($n = 10$)	All Semesters ($N = 27$)
Pretest Mean	2.9	2.7	3.1	2.9
Posttest Mean	4.4**	4.3**	4.2**	4.3**

NOTES: [a] Spring 2014 semester is missing pretest scores, so retrospective scores were substituted.
** Result from pre- to post- comparison are significantly different using Wilcoxon Signed Rank Test, ($p < .05$), and t-test, ($p < .05$)

Other positive, though unintended, results of this project have occurred. Eight students received internships or employment at the Florida Museum of Natural History, the University of Florida/IFAS Center for Public Issues Education in Agriculture and Natural Resources, and the University of Florida Office of Research as a result of the video production work they performed in this course. Another student was hired by a University of Florida professor who was conducting a study abroad trip to Europe to video record the semester abroad. Still another student turned his experiences in the course into a business starting his own video production company that focuses on agriscience topics.

Extending Science Communication through Video Outlets

The videos are featured daily at the *Exploring Our World* display at the Florida Museum of Natural History. The museum places five to 10 videos into the queue each month; videos are changed out monthly. Videos are also added to the museum's YouTube playlist. Videos are uploaded to TeacherTube, a commercial video site that features videos for educational purposes (http://www.teachertube.com/). As noted previously, from 2011 through the spring 2017 semester, students had produced 190 *Explore Research* videos. The total views on the museum's YouTube playlist, as of June 28, 2017, was 195,255, an average of about 1,000 views per video, with the most popular videos being Coleus Breeding (35,570, produced in 2012), St. Augustine: The First

Colony (25,028, produced in 2014), and Food Sensory Testing (13,984, produced in 2012). On TeacherTube, the videos have received almost 400,000 views or over 2,000 views per video on average.

Videos that feature research funded by the National Science Foundation are uploaded to the NSF's *Science 360* website. Because of the number of NSF-funded projects at the University of Florida and the high quality of the videos, *Science 360* created an *Explore Research* channel on its website: https://science360.gov/series/explore-research/4ce2de9c-b2cb-4b88-ba69-eeeb2a67433b.

Videos are provided to the University of Florida's public television channel, where they air several times a day after short PBS programs or weather updates. The public television station shows 10 videos 35 times a week, for a total of 350 total weekly airings. University of Florida/IFAS Communications has included *Explore Research* stories with the videos they produce and disseminate to community cable access channels across Florida.

Recommendations for Implementing Similar Programs

To implement a similar program at another university, it is recommended to identify and work with a real client, such as in this case, the Florida Museum of Natural History. At other universities, it may be producing videos for a university's Office of Research or Experiment Station as a first step. It is also worth considering specialized centers at your university as potential clients. Examples at the University of Florida include the Water Institute, Climate Institute, and Center for Public Issues Education, though more exist. It is also important to note these programs are not meant to supplant college and/or university communications centers. The programs should exist to provide students with learning opportunities, while also benefiting the universities' other functions.

Recommendations for Incorporating Students

It is important to make the course worthwhile for the students, providing them with something more than a grade. Students should feel that they are beneficially contributing to a client, with an end product that will be used, while at the same time, students should gain important knowledge and skills in the process of meeting the needs of the client.

This particular course utilizes a real client with a real end-product. This is contrasted with courses that develop projects for a real client, but the client does use the finished product, or with courses that have students create products that have no purpose. It is important for the projects to be client-driven, to provide students with the real-world experiences they face upon graduation.

Setting a high bar of professional expectation is also necessary for success. Students need to know that they are expected to create as close to a professionally produced project as possible. It is the experience of instructors of this course that students have risen to the expectations that are explained to them at the beginning of the semester.

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Rachel DeConna was an undergraduate in the University of Florida's Department of Agricultural Education and Communication when she assisted with this project.