Lights, Camera, Action Potential: Student-Generated Videos in Online and Face-to-Face Physiology Education

Melanie Schroer, MS

Biology Program, School of Natural Sciences and Mathematics, Stockton University, Galloway, NJ, USA

Corresponding author: Melanie.Schroer@stockton.edu

Abstract

Student-generated videos (SGVs) are gaining popularity and have been increasingly incorporated into undergraduate curricula in many disciplines. Through the creation of their own educational digital videos, students learn course content and transferrable skills. However, the use of SGVs in anatomy and physiology (A&P) is virtually undocumented. In this mixed-methods study, students in online and face-to-face A&P courses independently created short videos about relevant physiological phenomena. The results indicate that perceived and actual learning, as well as enjoyment, were positively impacted by the creation of the SGVs. Though it was not required, students watched their peers' videos over 12,000 times in the online course and over 1,100 times in the face-to-face course. These findings demonstrate the value of SGVs in the A&P lecture classroom for the first time. https://doi.org/10.21692/haps.2024.001

Key words: student-generated video, prosumer, online, physiology education

Introduction

Though anatomy and physiology (A&P) courses are often a prerequisite for continuing in various allied health majors, students often struggle to succeed. Across gender, ethnicity, class standing, and academic major demographics, all groups of students perceive A&P as difficult or a "killer class" (Keller & Hughes, 2021; Lunsford & Diviney, 2017; Sturges & Maurer, 2013). Thirty to fifty percent of students fail, drop, or withdraw from these courses (Keller & Hughes, 2021; Sturges & Maurer, 2013), with the lowest grades correlating with a heavy courseload, outside employment, and/or insufficient science readiness (Harris et al., 2004). Fortunately, pedagogical shifts have been shown to improve the success rate, especially among students who find the course to be extremely difficult (Lunsford & Diviney, 2017; Sturges & Maurer, 2013).

Video, as one such pedagogical innovation, has proven to be an effective medium for teaching in A&P courses. Commercially produced dissection videos were first incorporated into the classroom with the increasing popularity of the VHS in the 1980s and became used more widely with the invention of CDs in the 1990s. With the development of YouTube in 2005, students now have access to a new source of video material (Hulme & Strkalj, 2017). Through evolving video technology, students can learn dissection techniques and study prosections without being physically present in the classroom. When required to watch professional instructional laboratory videos, students performed significantly better on assessments (Hulme & Strkalj, 2017; Mutch-Jones et al., 2020), and reported a higher level of confidence and comprehension (Mutch-Jones et al., 2020). Many courses offer dissection videos merely as a supplement to in-class instruction (Hulme & Strkalj, 2017). The use of publisher videos has expanded considerably as the high production and consumption costs (i.e., video cassettes and DVDs) have declined and the speed and capacity of the internet have expanded (Laaser & Toloza, 2017).

In addition to publishers' videos, A&P instructors have incorporated self-produced videos into their courses. With today's ubiquitous access to technology with video capabilities and digital platforms for posted content (e.g. YouTube and learning management systems), instructors can produce video content tailored to the needs of their students in both laboratory and lecture courses (Hulme & Strkalj, 2017). For example, instructors have created instructional lab videos to offer instruction during weather-related school closures (Rudolph et al., 2018). Miller (2014) found when a traditional lecture was replaced by a short instructor-made video, the class average on a relevant assessment increased by six percent, with the largest influence on at-risk students in the class. Even when instructional videos were offered as an optional supplement to the course, students who watched the videos scored significantly higher on the exam (Saxena et al., 2008).

While expert videos have been an important part of maintaining quality instruction through the pandemic, they are yet another variation of traditional instructor-centered pedagogy. Instead, higher education has shifted in recent

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years from instructor-as-information-transmitter methods to adopt the constructivist framework of pedagogy, in which students actively take the primary role in formulating their own understanding (Epps et al., 2021; Navio-Marco et al., 2022). Thus, many educators have transferred the responsibility of digital content creation to their students. This approach assumed that students, while producing the videos, must synthesize and internalize relevant information before communicating their deep understanding to others. For example, the creation of student-generated videos (SGVs) has been perceived positively among students enrolled in business, liberal arts, and STEM programs (Epps et al. 2021). Immersing themselves in the creative process of producing an academic video has been shown to improve learning outcomes across disciplines (Bakla, 2018; Gallardo-Williams et al., 2020; Greene & Crespi, 2012; Pereira et al., 2014; Ryan, 2013; Stanley & Zhang, 2018). Furthermore, these assignments have been shown to improve self-efficacy (Lichter, 2012), learner independence (Bakla, 2018; Navio-Marco et al., 2022), digital literacy, and many other cross-curricular competencies (Epps et al., 2021).

Although the benefits of SGVs are plentiful, their use in the human A&P classroom is nearly undocumented (Doubleday & Wille, 2014). In A&P classes, students may benefit from creating videos in which they articulate and demonstrate physiological phenomena, content which is notoriously challenging for undergraduates to understand. To compose such a physiological narrative, students must reference multiple, often multimodal, sources, eliminate extraneous information, carefully construct images, and plan the sequence of events (Epps et al., 2021). They must construct a mental model and understanding of the physiology and create a valuable artefact through their own unique lens (Navio-Marco et al., 2022). Compared to a live presentation in front of the class, creating a video requires more rehearsal via multiple "takes" and replays as well as edits to assess quality and accuracy (Greene & Crespi, 2012; Ryan, 2013). Therefore, this iterative process may promote generative, meaningful learning of the relevant A&P content.

In this study, students enrolled in online and face-to-face A&P lecture courses were required to use their personal electronic devices to create videos detailing physiological processes. The research questions of the present study are:

- RQ1: What are student perceptions of making and watching SGVs?
- RQ2: Does the creation of a physiology video improve student perceived and actual cognitive learning?
- RQ3: Do SGVs promote engagement in face-to-face and online A&P courses?

The data presented here, which will document the use of SGVs in human A&P courses for the first time, are expected to suggest that students view these assignments positively, and that the videos can increase self-efficacy, academic performance, and engagement.

Materials and Methods

This project was approved by the Institutional Review Board of Stockton University, and informed consent was obtained from all participants. Students completed the following activities with the entirety of the class, regardless of the decision to participate in the study. Data were collected in three semesters (Spring 2021 A&P I; Fall 2020 and Fall 2021 A&P II).

Anatomy and Physiology I

SAMPLE

The subjects of this research were undergraduate students enrolled in an online course in A&P I for Health Sciences at Stockton University during the spring semester of 2021 (n=33). Most students were female (87.9%) and 3.0, 42.4, and 54.6% were of sophomore, junior, and senior status, respectively. All students were Health Science majors, with the exception of one Biology major and one Undeclared. Health Science majors have limited background in science, as their curriculum requires a single laboratory science, Chemistry I, prior to enrolling in A&P I.

ASSIGNMENT

As part of the standard Unit 1 curriculum for this course, the instructor used instructional slides and blackboard illustrations to introduce all students to two cellular physiology topics: protein synthesis and continuous action potential propagation. After the lessons, students were instructed to independently create a video-based explanation about one of these processes. The following general instructions were provided for all student videos:

- Include a diagram. You may narrate a diagram you have drawn or modified from a published source. You may NOT use my drawing directly from the lecture!
- You will earn the most points for speaking about these events in your own words, fluently and without simply/monotonously reading from your notes (see attached rubric for more details). Therefore, you should practice before you record, and become very familiar with the process. (This repetition will help you to learn the process in preparation for the upcoming Exam 1!)
- Videos should be less than 5 minutes long.

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Half of the class created videos on protein synthesis, and were given the following additional instructions:

- Begin your story with transcription of the mRNA. End your story with exocytosis of a vesicle from the Golgi apparatus.
- Be as thorough as possible, including abundant terminology (e.g. transcription, ribosome, etc.) and a coherent, chronological description of events. You are expected to use the level of detail presented to you on [date of lecture].
- In your telling of this physiological story, you must include a protein that is five amino acids long, and the DNA and mRNA sequences that code for it (don't forget the start and stop codons!). In other words, you will need the codon-amino acid chart! You may present your protein sequence like this: Met-Ala-Lys-Pro-Lys.

The second half of the class created videos on continuous action potential propagation, and were given the following additional instructions:

- Begin your story with the neuron at resting membrane potential (RMP); how does the cell maintain this charge? Your "story" should end with the "recycling" of acetylcholine (Ach).
- Be as thorough as possible, including abundant terminology (e.g. neurotransmitter, voltage-gated Na^+ channel, etc.) and a coherent, chronological description of events. You are expected to use the level of detail presented to you on [date of lecture].
- In your telling of this physiological story, you must identify different types of membrane transport: facilitated diffusion, active transport, and exocytosis.

Students submitted their videos to be viewed by the instructor via the learning management system, email, or a phone application which was formerly called *Flipgrid* (at the time of publication, it is called *Flip;* see below for more information about this platform). Student videos were not shared with the class, but individuals may have shared their work with their peers outside of class. The instructor provided detailed text or video feedback privately to each student prior to the summative assessment.

Assessment of Knowledge

All students were tested on their knowledge of content from Unit 1 of A&P I via an online, time-limited, multiple-choice-question exam. Embedded within the exam were ten instructor-written questions about protein synthesis and ten questions about action potentials; all questions were randomly ordered by the learning management system. Individual student performance on all 20 questions was recorded and classified according to which video prompt they used.

Anatomy and Physiology II

SAMPLE

The subjects of this research were undergraduate students enrolled in A&P II at Stockton University in the fall semester of 2020 (exclusively online, n=33) and the fall semester of 2021 (face-to-face modality, n=27). The online students were 84.8% female and 15.1, 48.5, and 36.4 were of sophomore, junior, and senior status, respectively. All students were Health Science majors except for one Psychology major. The face-to-face students were all Health Science majors, 81.5% female, and 29.6 and 70.4 were juniors and seniors, respectively. Regardless of modality, all students had earned a C or higher in A&P I, and sixteen students were among the A&P I population assessed above.

ASSIGNMENT

Both A&P II courses were divided into three units, each covering three organ systems or major topics. The content is heavily based in physiology and students are required to learn dozens of processes and clinical conditions within each unit. The instructor composed eighteen physiological prompts, such as:

- **Cookies in the Oven**: You smell cookies baking, but you are not yet able to eat them. What phase of digestion does this aroma induce? Explain what part of the brain and the autonomic nervous system are engaged by this experience, and what changes they trigger in the digestive tract. Be specific about motility, secretions, and hormones.
- **Respiratory System and pH Balance**: Describe how the respiratory system can be used to balance the blood's pH. Your explanation could compare the responses of the respiratory system to metabolic acidosis (maybe you just worked out and your muscles produced a lot of lactic acid) versus metabolic alkalosis (maybe you have food poisoning and are losing a lot of stomach acid via vomiting). You should describe the chemical buffer system that the respiratory system can modify and how hypo-/hyperventilation can shift pH.
- **Cellular Immunity**: Describe cellular immunity, including the cells involved, where they are created and/or "trained," how the cells are activated, and how they work to recognize and rid the body of a potential threat.

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The instructor created a SignUp Genius webpage (https://www.signupgenius.com/) to provide students with the opportunity to choose which prompt they would answer. Up to two students could sign up for each prompt. In addition to the prompts, students were provided the following instructions:

- Once you have signed up, you will compose a description which answers the prompt. You will use a visual (a relevant graph, diagram, image) that you have found or drawn yourself to aid in your description, and you will point out the relevant features during your video. Videos must be 2-5 minutes long and use relevant terminology accurately. The most credit will be awarded for descriptions which are fluent and written in the student's own words. The title of the video must be the title of your prompt as written below. You may take a selfie or a photo of your diagram for the tile image before submitting.
- This video will count as both a form of assessment (2% of your grade!) and a resource for studying. Once the videos are created, they will be available to your classmates so that you all may learn this diverse content. The video must be completed and submitted to Flipgrid by [date and time]. The instructor will provide private comments to the video creator and may annotate the videos so that the class is aware of particularly good descriptions or any inaccuracies.

Students submitted their videos to the Flipgrid phone application or website, where they could view their classmates' responses. Flipgrid tracks hours of usage and number of views for each video, which were documented as engagement for this study. This activity was completed for each of the three units in A&P II.

Assessment of Students' Perceptions

At the end of the semester, students completed a survey on Qualtrics (https://www.qualtrics.com/) about their perceptions of the video activity. They answered the following questions using a Likert Scale (1=Not at all true; 5=Very True):

- I enjoyed recording videos on Flipgrid very much.
- I enjoyed watching videos on Flipgrid very much.
- I was most confident about the processes that I described on Flipgrid.
- I learned a lot by watching my classmates' Flipgrid videos.
- On the exam, I was able to answer questions about my chosen topic because I made a video about it.

The survey also included the following open-ended question: "You may type any additional feedback on the lecture Flipgrid videos here."

Data Analysis

All data was analyzed using Microsoft Excel and ASTATSA Online Web Statistical Calculators for Categorical Data Analysis with a significance value of 0.05. See the Results section for specific tests performed.

Results

RQ1: What are student perceptions of making and watching SGVs?

The face-to-face students indicated significantly lower enjoyment of both recording and watching student-generated videos compared to the online students (Table 1). The average Likert scores for each question are nearly equal, but, in each class, 7 students ranked their enjoyment of recording higher than watching and 7 students ranked their enjoyment of watching higher (the remaining students responded with the same value for each experience, 19 online students and 13 face-to-face students). On the survey, one student discussed the value of watching other student-generated videos:

> ***"These assignments make it easier to understand some topics because it's other students discussing it so instead of just talking straight up they are more likely to break information down into pieces and sections that we can understand."***

RQ2: Does the creation of a physiology video improve student perceived cognitive learning?

Both online and face-to-face A&P II students indicated that making a video about a topic enabled them to answer exam questions (Table 1), although feedback from the online students was significantly higher than the face-to-face students ($p=0.005$, Mann-Whitney Test for discrete data). The students were also most confident about the processes they described in the videos they themselves made, with no significant difference between online and face-to-face students (Table 1). Compared to their feedback on generating their own videos, the average score for "I learned a lot by *watching my classmates' videos*" was lower, particularly in the face-to-face class (Table 1). Written feedback was consistent with the higher perceived value of creating the videos, though feedback was mixed. Sample responses are below:

> ***"Though recording the actual Flipgrid isn't my favorite, reviewing the topic thoroughly really helped me understand my topics."***

> ***"Flipgrids helped me so much for my personal topic but learning from others was difficult."***

> ***"The flipgrids were the most valuable assignment for this course. Taking the extra time to thoroughly learn and be able to explain a process excelled my learning. It also helped me learn other concepts easier as well."***

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Survey Question	True (4) or Very True (5) [% of class]		Neutral (3) [% of class]		Average ± Standard Deviation		p-value
	Online	F2F	Online	F2F	Online	F2F	
I enjoyed recording videos on Flipgrid very much.	42.4	25.9	45.5	37.0	3.42 ± 0.97	2.70 ± 1.17	0.023*
I enjoyed watching videos on Flipgrid very much.	48.5	25.9	39.4	25.9	3.39 ± 0.97	2.70 ± 1.35	0.023*
I was most confident about the processes that I described on Flipgrid.	84.8	12.1	74.1	14.8	4.24 ± 0.79	4.00 ± 1.11	0.545
I learned a lot by watching my classmates' Flipgrid videos.	63.6	21.2	25.9	18.5	3.67 ± 1.05	2.67 ± 1.14	0.001*
On the exam, I was able to answer questions about my chosen topic because I made a video about it.	90.1	9.1	66.7	14.8	4.61 ± 0.66	3.85 ± 1.13	0.005*

Table 1. *Student perceptions of student-generated videos in online and face-to-face A&P II classes (F2F = face-to-face). Mann-Whitney Test for discrete 5-point Likert Scale data. * indicates significance at α=0.05. Online 2020: n=33. F2F 2021: n=27.*

"Though I don't really like recording the Flipgrid videos, I do understand the content better after recording them. I don't view the other students' Flipgrid videos."

"I found that I knew a lot about the topic I chose for my flipgrid because I sat down and took time to go through that specific topic and learn details about it. I personally did not watch other peoples' flipgrid videos."

"The topics I chose to make the Flipgrid about definitely stuck with me the best and become the most recognizable topics on exams, quizzes, and other assignments."

"Some of the videos were hard to understand and made it a little more confusing."

RQ2: Does the creation of a physiology video improve student actual cognitive learning?

On average, students in A&P I scored significantly higher on exam questions about the topic of their own student-generated video. Students who created a video about protein synthesis scored 8.9% higher on protein synthesis questions than their peers who did not create a video on this topic (Figure 1, p=0.048, Mann-Whitney Test for non-normal distribution of scores). Students who created an action potential video scored an average of 9.5% higher on related exam questions compared to their peers (p=0.041, Mann-Whitney Test for non-normal distribution of scores). Individual students answered more questions accurately on the topic of their video (H_0 = with video – without video score = 0; p=0.002, 2-tailed one-sample t-test) regardless of topic (protein synthesis: p= 0.039, Mann Whitney Test for non-normal distribution of scores; action potential: p=0.029, Mann Whitney Test for non-normal distribution of scores).

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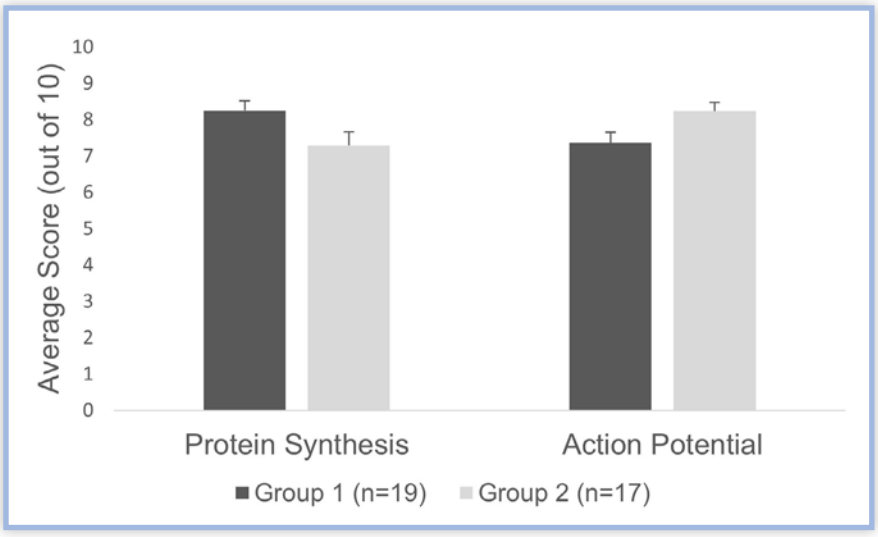

Figure 1. *Student-generated videos and accuracy on lecture exam questions. A&P I students in Group 1 (n=19) created a video about protein synthesis and Group 2 (n=17) created a video about action potentials. Average and standard deviation of student performance on ten questions about each topic is presented.*

RQ3: Do SGVs promote engagement in face-to-face and online A&P courses?

In A&P II, online students viewed the student-generated videos more often than the face-to-face students (12,375 vs. 1,111 views; 716.9 hours vs. 69.6 hours) (Table 2). Both classes engaged with the videos most in the beginning of the semester. In both the online and face-to-face classes, engagement was highest for unit 1 videos compared to unit 3 videos (195.56 vs. 76.29 views per video online, 24.62 vs. 4.5 views per video face-to-face).

Discussion

According to constructivist theory, when students are no longer merely consumers of content transmitted by educators, but instead, producers, they engage more deeply with course content to construct their own meaning and understanding (Navio-Marco et al., 2022). In this study, A&P students assumed the role of teachers and created valuable instructional videos (SGVs) on physiological phenomena. To create a video, students were required to not only research their topic thoroughly, but actively construct a sequence of events, carefully eliminate any extraneous information, and

	Online A&P II				Face-to-Face A&P II			
	Views	**Videos**	**Hours**	**Average Views/ Video**	**Views**	**Videos**	**Hours**	**Average Views/ Video**
Unit 1 Videos	6258	32	335.5	195.6	714	29	43	24.6
Unit 2 Videos	3752	31	239.5	121.0	280	26	16.2	10.8
Unit 3 Videos	2365	31	141.9	76.3	117	26	10.4	4.5

Table 2. *Student engagement with student-generated videos in online and face-to-face A&P II classes. Usage was recorded by the Flipgrid application, where these videos were posted. Views, hours spent watching videos by students, and average views/video for a unit prior to the relevant lecture exam. Note that the instructor watched each video once for grading purposes.*

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develop visual representations of the steps (Bakla, 2018; Epps et al., 2021; Gallardo-Williams et al., 2020). Although these methods may be required to develop a research paper or live oral presentation, the creation of a video has the intrinsic added value of repetition (Greene & Crespi, 2012; Ryan, 2013). That is, to be most successful, students had to compose a script, practice it, revise it, record their video, and finally return to their clips to correct or edit the content. In this study, one student stated, ***"Taking the extra time to thoroughly learn and be able to explain a process exceled my learning,"*** and another reflected, ***"I found that I knew a lot about the topic I chose for my [SGV] because I sat down and took time to go through that specific topic and learn details about it."*** Campbell et al. (2022) also noted that students spent abundant time with the content and that they "had to learn the subject matter to better teach it to someone else" (pg. 1150).

Creating a video enhanced perceived learning and self-efficacy. In both online and face-to-face classes, students indicated that they were most confident in their understanding of the processes they filmed and that creating a video on a topic helped them to answer exam questions on that topic. Lichter (2012) revealed a similarly positive perception of SGVs' value in preparing for a chemistry exam. Because females' lower self-efficacy is an important factor in the gender gap in STEM courses (Kalender et al., 2020), active learning exercises like SGVs may aid in promoting female students' success in STEM by increasing their self-efficacy. In contrast to the results of the current study, over half of the nursing students studied by Pereira et al. (2014) were neutral about SGVs improving their subject-specific competencies. Race, native language, economic status, first generation college student status, and incoming GPA may account for the variability in perceptions, as seen in work by Stanley and Zhang (2018). Therefore, future research should consider the influence of demographics, behavioral characteristics, and general academic competency on student perceptions of SGVs.

Not only was perceived learning increased after making an SGV, but actual student learning increased, as well. In this study, when A&P I students created a video explaining protein synthesis or action potential propagation, they scored significantly higher on relevant multiple-choice exam questions than their peers who did not create a video on that topic. While many studies on SGVs did not assess performance directly (Epps et al., 2021), those that did demonstrated a positive impact of SGVs on exam scores (Greene, 2014; Lichter, 2012; Pereira et al., 2014; Stanley & Zhang, 2018). Lichter (2012) revealed that learning is not only improved in the short term, but that chemistry students who made an SGV answered a question on the final exam more accurately than students who did not create a video.

Previous studies have suggested that SGVs may improve learning the most in students historically marginalized by the education system. Ralph et al. (2022) found that students without access to high-quality secondary education, particularly people of color, scored in the bottom quartile of traditional assessments. When the emphasis of a chemistry assessment was shifted, instead, to the mechanistic reasoning of phenomena, the equity gap decreased by about 10% and the predicted pass rates of the marginalized students increased from 75 to 93%. Huang et al. (2020) noted that low-achieving students' pretest scores were significantly lower than their peers' scores, but after creating a video, there was no significant difference in scores.

In the sample studied here, students entered A&P classes with a scant science background. In Anderton and colleagues' (2016) analysis of over 400 A&P students, previous math and science exposure was significantly linked to performance in A&P. Therefore, A&P SGVs, which inherently promote a more conceptual or mechanistic understanding of physiology, may also help to close the gap between groups of students (such as my students and others without extensive exposure to high-quality STEM education prior to A&P) and create more equitable access to education for all. Future research should disaggregate the data to explore SGVs through an equity lens.

Responses to the project differed between online and face-to-face students, though perceptions varied between individual students. Firstly, online A&P II students in 2020 reported a significantly higher level of enjoyment of both watching and recording the videos. Secondly, online students agreed with the statement "I learned a lot by watching my classmates' Flipgrid videos" significantly more than the face-to-face students. Thirdly, when SGVs were available to all class members, online students elected to watch their self- and peer-made videos over 12,000 times during the semester while the face-to-face students watched fewer than 1200 times.

There may be multiple factors influencing the difference between the two groups of students. First, the face-to-face students returned to campus for the first time after 18 months of exclusively online learning. During this time, students learned primarily through videos; synchronous classes were held by videoconferencing, asynchronous lessons and supplemental material were often delivered via video on the learning management software or social media platforms such as YouTube, and many classes incorporated video discussion boards or projects for the

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first time. The novelty and excitement of a new learning activity, such as that seen when an SGV podcast project was first introduced to an information technology class in 2006 (Frydenberg, 2008), had most likely waned after a year and a half of using video so often. A marketing class found an SGV assignment to be the most valuable in the course (Greene & Crespi, 2012), but video assignments and their use in face-to-face classrooms was not as common and new as in post-COVID education. Future research should assess trends in student perceptions of SGVs over time.

A second factor in the difference between classes may reflect students' sense of isolation during the COVID-19 era of online learning. SGVs have been used in online course discussion boards for decades to increase the sense of community in distance learning (Fehrman & Watson, 2020). At the beginning of the COVID-19 pandemic in spring 2020, the author's A&P I course reported that one of the best takeaways from an SGV assignment was the ability to see their peers (unpublished data). The online students in this study may have watched and enjoyed the SGVs more due to their isolation from their classmates, while the face-to-face students interacted in person with their peers multiple days every week.

Despite the differences in engagement between online and face-to-face courses, both groups of students accrued hundreds to thousands of views on content they were not required to watch. This high level of engagement may be explained by the perceived benefit of the experience, which included learning from their peers. The positive impact of watching SGVs was even more pronounced in the study by Pereira et al. (2014), who found that 97% of nursing students found watching SGVs to be useful. In their review of 29 SGV studies, Epps et al. (2021) highlighted the way student videos explained material in a relatable and understandable way for their peers, a sentiment reflected by one student in the current study who said, ***"…instead of just talking straight up they are more likely to break information down into pieces and sections that we can understand."*** Achievement itself has been improved by merely watching the SGVs rather than making them (Lichter, 2014), and the use of peer videos as a study resource has been shown to reduce cognitive load (Epps et al., 2021).

Although the engagement with the videos was high and, on average, students perceived their peers' SGVs as helpful, many students were also critical of the videos' value. Biochemistry students also reported learning much more from making their videos than from watching other SGVs (Ryan, 2013). In addition to the unclear explanations in some videos, students may have trusted the SGVs less, and therefore found less value in them, out of concerns over accuracy of the message (Bakla, 2018). Regarding the creation of SGVs, some students reported that they didn't enjoy recording the videos. Although they are regularly on social media, these students may feel fear, shame, and/or anxiety over presenting videos to their classmates as seen in Ryan (2013) and Pereira et al. (2014). Others reported a concern with the time required to both learn the technical aspects of video production and the generation of the product itself (Epps et al., 2021; Greene & Crespi, 2012). A lack of existing digital literacy has been linked to lower impressions of creating SGVs (Greene & Crespi, 2012; Epps et al., 2021).

Despite the few criticisms of the assignment, both making and watching SGVs has been shown to be beneficial to undergraduate students. In this study, perceived and actual learning, engagement, and enjoyment were all positively impacted by SGVs. Students scored significantly higher on exam questions testing the material they were responsible for presenting. Additionally, high levels of engagement and enjoyment were measured. Tangible student soft skills such as communication (Navio-Marco et al., 2022; Pereira et al., 2014; Ryan, 2013), project management (Ryan, 2013), and technological competency (Pereira et al., 2014) have also been shown to be improved through similar learning opportunities. Finally, SGVs can be used as formative assessments (Gallardo-Williams et al., 2020), maximize class time for discussions and activities (Lichter, 2014), and improve accessibility to learning (Gallardo-Williams et al., 2020).

Limitations

Participants in this study may not be a representative sample of all A&P students. For example, they were mostly female and had minimal science background. Although the sample size (n=93) was larger than in many studies of SGVs [see Epps et al., 2021 (biology studies ranged from N=19 to N=44) and Pereira et al. 2014 (nursing study with N=29)], a larger sample of the population would help to elucidate the effects of pandemic exhaustion, demographics, and other variables influencing the effectiveness of the activities. Future research may also consider a comparison of performance and retention in courses with and without SGVs. The researcher was also the instructor of these students; her enthusiasm for the assignment may have influenced the students' perceptions. Finally, learning outcomes were assessed only through multiple-choice questions on exams. Essays or case-study questions may have produced different results.

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Conclusions

These data collectively highlight the value of student-generated videos in the A&P lecture classroom. There is minimal research on SGV usage in anatomy laboratories (Doubleday & Wille, 2014), and these data may be the first published instance of this tool in A&P lectures. The process of creating a video about a physiological process was most valuable in that it encouraged students to learn through a constructivist framework, actively synthesizing concepts into a concise physiological story. Most students enjoyed the process, and even if they did not enjoy it, they recognized the value of the exercise in terms of perceived and actual learning. In fact, students scored significantly higher on exam questions about the topic of the videos they created. Furthermore, students engaged with their peers' SGVs and felt they learned from them, though this response was stronger among online compared to face-to-face students.

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About the Author

Melanie Schroer, MS, is an Instructor of Biology at Stockton University. Since 2015, she has taught primarily human anatomy and physiology to health science students, but also teaches general biology, endocrinology, and ecology to biology majors. In her spare time, she owns and operates an organic farm, supplying the community with sustainably raised poultry and pork products, and livestock feed since 2012.

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