Photo Animation Brings Scientists Back to Life in the Classroom†

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INTRODUCTION

The study of historical figures is not usually considered part of the typical undergraduate biology course curriculum. However, students do learn the names and brief biographies of famous scientists in the course of learning of these scholars’ seminal experiments. These biographical facts inform the experimental conclusions that are the source of lecture material. Many students are aware that Gregor Mendel tended pea plants in an Augustinian monastery and that Charles Darwin sailed to the Galapagos Islands aboard the HMS Beagle. Still photographs of important scientists, particularly historical ones, paired with a few written facts about their lives are often the only way in which they are introduced before students proceed to learn of their most important works. Here I describe a process by which static photos of scientists are animated and narrated in the first person for presentation to students. In this way, the scientists “speak” directly to students to describe their lives and works. These animations are generated by software which is easy to obtain and does not require significant technical ability. In a flipped classroom environment, students can create their own videos for presentation to their instructors or peers.

Multisensory learning aids in the recall of information (1). The use of teaching videos has been shown to increase student engagement as well as learning (2, 3). I observed that students paid close attention to the animations and expressed appreciation for the circumstances of the scientists’ professional lives when learning about them in this manner.

PROCEDURE

Photographs

Digital photographs are required for this exercise. Photographs of scientists are readily available through all Internet search engines. Images from textbooks may be scanned in using a flatbed scanner. Photographs reproduced for use in an educational setting do not infringe on copyright under the Fair Use doctrine (4). Engravings and drawings may also be animated, as long as a face is clearly visible (4).

Animation

There are numerous smart phone and computer apps which permit the animation of photographs. I used the FaceTalk app on an iPad (https://itunes.apple.com/us/app/facetalker/id451871237?mt=8). This app is free to download and very easy to navigate (Appendix 1). Similar apps are available for different devices and operating systems.

Script

The script for the animation can be as long or as short as desired. A script of 150 words will yield approximately one minute of narration. I attempted to include a mix of both personal and scientific facts about each scientist when composing scripts. Historical context is not always necessary but adds interest.

Narration

There are several strategies for narration. It is possible to simply narrate an animation using one’s own natural voice. In an attempt to be more authentic, a narrator might choose to affect an accent or attempt to speak like a person of the opposite sex. A second possibility is the use of a voice-changing app. These programs record speech and then digitally alter it according to user specifications. I employed the Celebrity Voice Changer app on an iPad (https://itunes.apple.com/us/app/celebrity-voice-changer-funny/id1111710488?mt=8). This app is free to download (Appendix 2). There are similar apps available for different devices and operating systems. A final method of narration involves the use of text-to-speech (TTS) software. These programs convert typed documents into spoken words. I used the NaturalReader software (http://www.naturalreaders.com/index.html). This software is free to download. It offers the user the choice of several different accents read in a male or female voice. Playback speed can also be adjusted (Appendix 3).
Distribution

Animations are easy to integrate into traditional Microsoft PowerPoint lecture presentations. They can also be posted on a video sharing site such as YouTube (www.youtube.com) or Vimeo (www.vimeo.com) (Fig. 1).

Safety

There are no hazardous materials employed in the creation of these animations.

CONCLUSIONS

The animation of historical scientists brings an added dimension to the study of their landmark experiments. Students routinely comment that they find the animations to be the most enjoyable part of lecture. Indeed, the use of animations during lectures can provide an engagement trigger, giving students a respite from considering conceptually difficult material while still learning relevant information (https://serc.carleton.edu/econ/interactive/triggers.html). The animations can also enhance learning, as motion leads to longer-term memory and students retain information better when lecture material is coupled with the presentation of animations (5, 6). Additionally, instructors can choose which scientists to animate. This can help emphasize diversity in biological research, if desired. An instructor might choose to primarily animate female historical scientists, or scientists of color, to acknowledge the contributions of these individuals to the modern-day body of learning.

The development of photo animations is not limited to the instructor of the course. Students likewise have free access to the software described in this work and are capable of making their own videos. Many students come to college equipped with handheld devices such as smartphones and tablets, with the expectation of using these technologies in their own education (7, 8). Active learning assignments in biology courses improve student motivation and learning (9, 10). Numerous other video-making techniques, such as the creation of animated GIFs and stop-motion animation, have been proposed as ways to encourage students to gain a deeper understanding of a particular topic (11, 12). Students prefer developing digital media to more traditional projects and self-report more gains in learning during video development (13). These photo animations can be assigned as individual or class projects, permitting students to select and research scientists of their own choosing with the aim of increasing student engagement and interest.

SUPPLEMENTAL MATERIALS

Appendix 1: Instructions for the use of the FaceTalk app on an iPad
Appendix 2: Instructions for the use of the Celebrity Voice Changer app on an iPad
Appendix 3: Instructions for the use of the Natural Reader Text-To-Speech Software on a computer

ACKNOWLEDGMENTS

Thanks to Karen Ruggles and Seran Goudsouzian for technical assistance. This work was supported by the Natural Science Department of DeSales University. The author declares that there are no conflicts of interest.

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