

# A new chance for online science communication education and learning through TikTok

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## Abstract

The COVID-19 pandemic practice of social distancing has led to an increased usage of social media, which has highlighted the importance and potency of social media for effective science communication. As a result, it is now just as crucial to educate and acquire the skills necessary to use social media for science communication in an accurate and efficient manner. In response, we created a task that models and develops 21st century science communication abilities using the social media site TikTok. During the COVID-19 outbreak, TikTok, a platform for sharing short videos, had a dramatic rise in popularity. We demonstrated efficient social media science communication strategies by employing the condensed, targeted video format of TikTok to instruct students in fundamental science ideas and lab procedures. Students were then given the task of practicing excellent science communication at the conclusion of the semester by making their own educational and entertaining TikToks about the research projects that their teams had been working on. Here, we provide our methodology, a number of TikTok best practices, and sample videos made throughout the process for science communication education that are both effective and interesting.

**Keywords:** online science; communication; education; learning; tiktok

## Introduction

Teachers have been incorporating social media into their teaching techniques more and more since its debut in the early 2000s. <sup>1</sup> Social media use for education enhances the educational experience for students <sup>2</sup>, particularly when the activity is relevant, easily accessible, and takes place on a platform that students frequently use. <sup>3</sup> Social media sites like Facebook, YouTube, and Twitter have been used for a variety of activities in STEM education, such as group projects, discussion boards, lecture-style content delivery, and the improvement of science communication abilities. <sup>3</sup> Social media use in education is growing as it becomes more and more ingrained in daily life. Social media use increased during the COVID-19 pandemic as a way to maintain connections while isolating oneself from others. <sup>4</sup> The pandemic has also brought attention to how social media may be used to disseminate both false and accurate information. It has demonstrated the value and influence of social media on STEM professionals' ability to communicate science and medicine in a clear, accurate, and interesting manner. We made the decision to encourage the use of social media in the classroom and laboratory of our course-based undergraduate research experience (CURE) since current events have brought attention to the significance of science communication in social media channels. The emergence of TikTok, a new social media site that allows users to share short videos and is well-liked by teenagers, was particularly noteworthy. According to CNBC, the number of TikTok users worldwide rose from roughly 507 million in December 2019 to 689 million in July 2020, and in September 2021, the user base reached 1 billion worldwide. <sup>5</sup> We used TikTok in a novel educational way to model and teach excellent science communication by concentrating on the platform that has generated the most development and relevance for our students. Students were able to use the information systems of their generation to practice and improve their science communication skills as a result.

## Process

In the second semester of a three-semester CURE program at Binghamton University, TikToks were employed as a teaching tool. This work was completed as part of the wider First-year Research Immersion (FRI) CURE Program, specifically in the Microbial Biofilms in Human Health research stream. Students in this program started their training in microbial biofilm research during the second semester by collaborating on a class research project and creating a team research proposal that would be carried out during the third and final semester.<sup>6</sup> This course met twice a week for 3-hour hybrid laboratory periods and once a week for a 1-hour lecture.<sup>7</sup> Under the guidance of the stream's Research Educator, the instructor of the three course sequence<sup>8</sup>, undergraduate peer mentors who had previously completed their FRI studies created and shot Teaching TikToks, which were then shown to students during pertinent class lectures and laboratories. While it's not necessary to watch TikToks, creating and posting videos requires a free TikTok account. The TikTok maker can share it on other platforms after downloading it as a MOV file on their device. In order to safeguard the privacy of teachers and students, TikTok accounts and individual videos can be made "private." Students and peer mentors were told not to share their TikTok videos on social media without first getting permission from the instructor. Students also had to abide by all social media policies established by the university, regardless of their privacy settings. Other TikTok users can interact with the content if it is made available to the public. Trending hashtags, keywords, or phrases that come before the "#" sign are used to index and tag content for improved searchability and discoverability. These are the organizing principles behind the public TikTok "Discover" page. Using popular hashtags like #science, #microbiology, #STEMlife, and #research might help in effectively communicating science. Furthermore, an algorithm is used to populate the personalized "For You" pages, favoring material that makes use of popular dances, sounds, transitions, and hashtags. For science communication on the TikTok platform to be effective, certain factors should be taken into account. Though it was easier to collect media directly using the app, peer mentor-created TikToks included images, videos, or both, either taken in the TikTok app or uploaded from the device library. TikToks were filmed in a variety of pertinent settings (lab, computer screen recording, campus, etc.) based on the learning objectives. Important elements were emphasized with the use of text and stickers. Either the creator's own original sounds or overlays from TikTok's sound collection made up the audio components. TikToks were created with the intention of quickly (initially less than a minute) sharing concepts and knowledge. Every instructional TikTok focused on a single, key subject and highlighted concepts that are best illustrated with pictures. The video subjects covered included frequent laboratory errors (#labfails), including incorrect aseptic procedure, instrument use, and fundamental research methodologies. Students were required to use the assignment instructions and rubric to create TikToks at the end of the semester about the research being done in the lab or their team's proposed research topics. The assignment's objective was to help students develop 21st-century science communication skills so they could use platforms like TikTok to effectively share their research with the broader public. The elements of science communication, including setting, timing, effectiveness, and memorability, were taught to the students.<sup>9</sup> In order to attract a larger audience, students were urged to use current trending sounds, challenges, and dances in their TikToks, with the goal of being accurate, approachable, and engaging. This task assessed students' science communication abilities as well as their comprehension of the course's general scientific principles, which covered both course material and research techniques. If a student felt uncomfortable being recorded or utilizing social media, they might work alone or with other students in their study group. Due to the visual and audio character of this teaching method, extra care should be taken to ensure that the content is understandable by both students and the intended audience. Use proofreading when using TikTok's autogenerated "captions" tool, which generates transcribed subtitles from audio. Text stickers can be utilized to add text descriptions for additional closed captions. For text-to-speech programs, video descriptions of key visual information can be pinned as a comment on the video or, if they are longer, added to the video caption.

## Concerns about safety

To make sure that ASM's Laboratory Biosafety Guidelines for the use of electronics or personal devices in the laboratory were being followed, caution was utilized when filming TikToks in the lab.<sup>10</sup> If students are required to utilize personal devices in the laboratory, they should be clearly informed on ASM's Biosafety Guidelines. Additionally, we advise adhering to university social media policies for any TikToks that are housed on university social media accounts or publicly associated with the university. Additionally, IRB approval was acquired for the use of student materials with informed consent in order to protect the human subjects participating in this study. The Institutional Review Board at Binghamton University granted an exemption for this study (STUDY00003286) in accordance with Section 45 CFR 46 104(d) of the Code of Federal Regulations.<sup>3</sup> Due to the hasty development of this pedagogical approach in response to the difficulties of teaching during a pandemic, there was not enough time to put in place a comprehensive assessment process. Anecdotally, learners said that instruction before attending the lab, TikToks were a useful resource for remotely learning new material. They particularly liked the #labfails (laboratory blunders or hurdles) that undergraduate peer mentors shared, as it helped them learn from and feel less alone when faced with the difficulties of failures in their study. The TikTok scientific communication assignment was the best example of this approach's value. Submissions made it possible to evaluate students' proficiency in science communication as well as their fundamental comprehension of the course material and their research. Students expressed enthusiasm and comprehension of the assignment's goal in

their end-of-semester reflection essays, writing, "...[it] would be something to not only help me understand what I was learning about in science but allow me to explain what I learned to others." In creating their TikToks, students showed that they had a firm understanding of science communication principles: "I chose a trend that was trending on TikTok and created lyrics that would fit the trend and support the scientific message I was trying to convey." Students were also given creative outlets through assignments to laugh through their learning errors and discuss their problems by making their own #labfails TikToks, which humorously and educationally recounted past mishaps. In general, this exercise encouraged students to consider using their generation's information systems to share their research with a larger, non-scientific audience. Additionally, it compelled them to use their imagination and consider how science communication ideas might be applied to social media. We intend to carry out this exercise in upcoming semesters and on other social media channels to assist students in practicing science communication in a way that is enjoyable and relevant. In subsequent iterations, though, we hope to provide students with further guidance on how to effectively communicate their findings on social media while striking a balance between accuracy, professionalism, and fun. Furthermore, we hope to take advantage of this chance to educate them on communication accessibility concerns and provide them with the resources (alt text, captions, color contrast, accessibility checkers, etc.) to enhance the accessibility of their message. Maintaining the use of social media sites like TikTok in higher education is an excellent approach to educate content and foster the communication skills necessary for 21st-century science. Not just a CURE class can benefit from the teaching resources and student assignments posted here. Proficiency in science communication is crucial for STEM practitioners in general, not only researchers. Therefore, adding these techniques to any STEM course could be beneficial for developing these communication skills for discussing significant issues or current events that are connected to the course material. Due to its popularity and adaptability, TikTok may readily include the science communication concepts of effectiveness, memorability, timing, and setting to produce unique educational videos that may be viewed by millions of people.<sup>9</sup>

### Conclusions

TikToks are an excellent approach to engage students and support science outreach projects since they can be simply created, edited, and shared from a single application. This makes it easy for new content creators to get started. Researchers have an ethical obligation to promptly share their discoveries with the public. As the COVID-19 pandemic has demonstrated, meeting that responsibility requires excellent science communication. Motivating the upcoming cohort of science communicators will sustainably enhance science communication, rendering fascinating discoveries attainable for anyone.

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