NEW HORIZONS
IN ADULT EDUCATION & HUMAN RESOURCE DEVELOPMENT

ARTICLE

Using music and animations for COVID-19 prevention: The case of a scientific program

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Abstract
The use of music to sensitize, inform, and entertain for purposes of social organizing and public pedagogy is receiving increasing attention from scholars. This approach is usually selected because it allows a targeted message to reach large populations using varying mediums of transmission, such as social media, radio, television, and word of mouth. The lyrics can borrow from scientific information, political change messages, or a catchphrase common to many. It is also common to infuse a catchy line that most can remember, and markedly prominent musicians might come together to work on such a project to encourage fundraising or to push the message. The purpose of this article is to describe how a scientific organization based in the United States worked with budding musicians in Kenya to create music to inform communities in East Africa about prevention of coronavirus/COVID-19.

KEYWORDS
adult learning, animations, covid-19, Kenya, music

INTRODUCTION

Recent adult education and human resource development (HRD) literature has explored how music associated with social movements can have powerful educative functions related to social organizing and public pedagogy for discussions and debates on issues of the day (Bohonos et al., 2019b; Giroux, 2004; Habermas, 1962; Haycock, 2015). Emerging reports indicate that music is also being used in the fight against COVID-19 by some US hospitals to celebrate milestones in the process of patient's recovery (Coleman, 2020). In addition to communicating information about how combat the disease, music can facilitate resilience, faith, and hope (Darden, 2014). From neuroscience, field research has shown that music elicits emotional states and some musical pieces bring out strong emotions in listeners (Cahill et al., 1996; Ritossa & Rickard, 2004). All over Africa, musicians have released songs and music videos to alert and educate the public about COVID-19. For example, George Weah, the president of Liberia, collaborated with musicians to produce accessible music with public health tips using medically accurate lyrics (The Economist, 2020). In Uganda, pop musicians sing about preventing the spread of COVID-19 and not only getting help if one is infected but also combating stigmatization (Makwa, 2020). Music has been a powerful tool for educating the masses in countries with low literacy rates around the need for social distancing, mask wearing, and staying home (Baerendtsen & Lichtenstein, 2020; The Economist, 2020). This study builds on this concept by describing a case study that shows how social organizing to fight the COVID-19 pandemic can be facilitated through the merger of music and scientific education. A musical collaboration between two organizations was to educate adults in Kenya about COVID-19 pandemic prevention. The authors explore the production and dissemination of a song whose lyrics and accompanying music video provide an overview of public health practices associated with the fight against COVID-19.

Music is an aesthetic approach for telling a story that draws on sounds, movement, visual imagery, and language to define and communicate a message. Music is a form of passionate artistic engagement often created in the hopes of transmitting knowledge or emotion to others that facilitates social change. Previous research analyzing music associated with the African American freedom struggle has shown that music can function as a form of communication that helps organize social action (Rose, 2007) while stimulating critical thinking and challenging previously held assumptions and worldviews (Levy & Byrd, 2011). Creating, listening, and sharing music brings together a mix of feelings, thoughts, and behaviors that can be enacted individually or collectively. Research has explored how music can serve communicative, integrative, and symbolic roles (Rose, 2007) while working to educate, edify, and liberate (Moss, 2001) marginalized groups from social oppression. Music from other mass movements has been connected to emotional release, spiritual uplift, consciousness-raising, community organization, and communication across ethnic differences (Darden, 2014).

This paper draws on a framework for analyzing music education in terms of communicative, symbolic, and integrative functions (Bohonos et al., 2019b; Merriam, 1964; Rose, 2007). The communicative aspect of music education refers to the ability to communicate facts and concepts between concerned community members; the integrative part refers to music's ability to bring people together around a common cause. Music's symbolic aspect can be used to represent present dangers as well as to construct hopeful representations of the future (Rose, 2007). As a teaching strategy, music helps learners to connect to educational content without depending on print resources (Beyerbach & Davis, 2011), which is a potent advantage when disseminating information in low-literate environments.

Facilitating change using music and visual art

Our research regarding music and social learning also contributes to broader discussions regarding art-based and aesthetic adult education. This research has pointed to the power of art to facilitate education on social issues, including ecojustice, women's rights, and public health (Bell & Clover, 2017; Clover, 2015, 2018; Collins, 2012). Additionally, Karafillidis (2012) argued that visual and musical arts could reinforce one another to enhance a learner's artistic appreciation. Papadimitriou (2010) showed that visual art could enhance scientific learning in adults, particularly with regard to geography. Collins (2012) connected art education to public health by arguing that art can be used to reduce stigma related to living with HIV/AIDS.

Music and adult learning in Kenya

Using music to educate and inform adults is not new to Kenya. Music in Kenya has played the role of a public pedagogy. Subsequently, adult education through music history is peppered with different episodes where music was used to shape the minds of its citizens. In precolonial Kenya, music, folklore, dance, proverbs, and riddles were used by adults to educate their young and each other. In the mid-19th century, missionaries introduced the formal system of education and established hymnal singing in schools. In postcolonial Kenya, especially in the 1990s, music was used by the state to promote national unity. Then and now, music is used to facilitate adult learning on "topical issues such as government policies, epidemics, social experiences, good nutrition, afforestation, poaching of animals and patriotism" (Mindoti & Agak, 2004, p. 161).

Wenje et al. (2011) wrote that music was productive in sensitizing behavior change in youth against HIV/AIDS in Kenya. They also asserted that music influences how youth perceive themselves and others and how they enact their views (Wenje et al., 2011). These youth access music through radio, television (Gakahu, 2010), and now various internet social media platforms. According to Gakahu (2010), like other places in the world, famous musicians in Kenya are involved in making music to promote behavior change and sensitize the masses; for instance, celebrities use music to encourage the use of contraceptives. Also, universities in Kenya involve their students in activities geared toward creating HIV/AIDS awareness using strategies such as peer-to-peer counseling, skits, dances, songs, and drama (Gakahu & Kaguta, 2011; Owino, 2020). According to Ojwang (2017), through music produced by young people and messages on FM stations in Kenya, "Health authorities educate and entrust the media with essential health information which is then relayed to the public" (Ojwang, 2017, p. 21). Nyairo (2004, p. 189) asserted:

> The localizing strategies and contextual detail apparent in these forms attest to the agency of local audiences and to the way these forms serve local interests. Indeed, it is precisely because the discur-

sive practices of rap are so centered on local allegiance and representing domestic issues that the form has become so easily adaptable by Kenyan artistes, some of whom are doing a remarkable job in using the form to speak with local relevance.

With the recognition of COVID 19, Kenyans were bombarded on a daily basis by an unprecedented explosion of information to counter mistrust and misinformation about the disease. The government, nongovernmental (NGOs), and corporate organizations designed posters, radio messages, and online sources to publicize correct messages. Specifically, COVID-19 related music was one of the avenues for improving their overall quality of life. To spread awareness and inform the masses in Kenya, artists produced music and shared it on various social media platforms. This music is mostly in Swahili, English, and local languages. The lyrics of the music generally point to maintaining social distancing, washing hands, quarantine, national unity, giving hope, and following the recommendations from the World Health Organization and the government (Baerendtsen & Lichtenstein, 2020; WHO, 2020).

Music that sensitizes and educates in diverse styles and genres is important in Kenya because, with a population of 53.5 million, the literacy rate stands at only 60%. Markedly, Pathak et al. (2015) argued that these messages were crafted to suit those with both high and low literacy. Furthermore, in his study on Ebola related music in Liberia, Rivera (2017) observed that when composing medical health-related music, the local culture has to be considered. He also added that familiarity with the genres and instrumentation of music can also increase the peoples' connection to the songs.

Producing animations with music overlay

Scientific Animation Without Borders (SAWBO) is a US Midwestern university-based initiative specializing in creating animated educational videos on topics related to agriculture, health, and women's empowerment. The videos are empirically based in designs that are translated to be accessible to all people, regardless of literacy level and linguistic background. The animated videos are developed using international academic collaborators to ensure the content is scientifically accurate and culturally relevant (Bello-Bravo & Pittendrigh, 2018; Bello-Bravo et al., 2018). SAWBO recruits volunteer native speakers to translate and record the script and provide audio overlays in diverse local languages from countries and regions where the video will be deployed. SAWBO's videos are available free of charge via the Internet or distributed using Bluetooth technology from mobile phone to mobile phone.

SAWBO 's mission was inspired by the fact that there are upwards of one billion low-literate learners on the planet, who are nonetheless fluent in highly divergent (sometimes spoken-only) languages. One of the challenges of making videos maximally accessible stems from the need to translate them into local languages spoken by video recipients (Miresmailli et al., 2015). Many of these individuals live in rural areas and do not have access to the critical life-improving knowledge that exists in academic literature and print documents (Bello-Bravo et al., 2015). Studies show that these kinds of scientific video animations foster positive learning outcomes— for instance, behavior change and preventing panic due to misinformation for Ebola in West Africa (Bello-Bravo et al., 2017; Pathak et al., 2015; Rivera, 2017).

Working in various countries abroad, SAWBO provides an interesting lens through which to view collaborative efforts across social and cultural boundaries.

SAWBO now works with young musicians to produce music with scientific messaging and video access to music through new and old digital portals such as YouTube and FM radio stations (in urban and rural settings). Recently, SAWBO has engaged in producing music for information on malaria prevention, postharvest loss prevention, and now COVID-19 prevention.

METHOD

Case study research and qualitative methods of inquiry afford robust findings into complex social phenomena (Eisenhardt & Graebner, 2007; Stake, 2000; Yin, 2003). For this study, the authors employed and explanatory case study as it is rich in explaining qualitative phenomena. According to Yin (2003), case study describes a case based on facts, considers alternative explanations, and gives a conclusion based on the facts. Case study research calls for acquiring multiple sources for triangulation, thus increasing the veracity of any explanation (Creswell, 2014; Rombo et al., 2020). Here, we collected published guidelines from leading public health organizations (Centers for

Disease Control & Prevention, 2020; WHO, 2020), scientific animations and a script produced by SAWBO's team, as well as song lyrics inspired by the other sources mentioned as sources of data.

Below, we first briefly discuss author positionality and then provide background on how partnerships established during an anti-malaria effort served as the foundation for the study's anti-COVID-19 case. We then describe how the anti-COVID-19 effort developed and analyze the educational song (and its accompanying music video) that emerged from that effort.

Author positionalities

The three authors of this paper, work in higher education in the United States and are interested in adult learning using learning technologies. Two are faculty members, and one is a research associate. One has worked as a semi-professional musician for about a decade and has published on music as a tool for social justice. Another is Kenyan and has directly experienced music for mass education and sensitization in that country. Two of the authors also are members of SAWBO, which is involved with the production of the music video that drives this case study, while the third is an outside researcher.

PRESENTATION OF THE CASE

Background: Anti-malaria efforts in music-based education

In 2015, SAWBO collaborated in a music-based scientific education collaboration with Global Youth Groove (GYG), a Kenya/United States based organization whose vision is to increase the talent and skills of youth worldwide. This pilot initiative incorporated music and lyrics from the country where the animation was going to be deployed. The first step included working with 14 students at Maseno University in Kenya. These 14 students comprised music students and those interested in music who were now members of GYG. They participated in creating lyrics in Swahili and English and music for a malaria prevention animated video (as well as another for using jerrycans to store grains to prevent postharvest loss). SAWBO provided the students with scientifically based anti-malaria scripts that the students would then creatively develop into lyrics in line with the goal of the script's scientific messaging. Members of this initial effort described personal motivations to participate in the project as including their passion for music and being part of the creation of music that could help communities to prevent disease.

Creating music to fight COVID-19

Building on the 2015 collaboration established in this anti-malaria project, two former Maseno University students (now working as freelance musicians but still affiliated with GYG and the founder of GYG engaged in a second collaboration aimed at fighting the spread of COVID-19. Specifically, SAWBO and GYG collaborated to produce music for "Protecting Yourself Against Coronavirus." This scientifically based messaging was in line with Center for Disease Control and Prevention (CDC, 2020) and World Health Organization (WHO, 2020) guidelines for COVID-19 prevention but put in the students' own creative words. As stated previously, SAWBO team developed a scientifically grounded coronavirus script in English vetted by scientists and medical doctors to ensure that it conveyed a scientifically sound message about COVID-19 prevention measures. The script was then translated into various languages, including Swahili, together with voiceovers by volunteers.

For the COVID-19 prevention song in Kenya the musicians received the translated script in both English and Swahili. The musician then used the transcript creatively to develop the lyrics, taking care not to deviate scientifically from the message while also relating to what was going on in Kenya (it was mandatory to wear masks in public places) (Owino, 2020). During the production of the music and its video, the musicians were asked to adhere to social distancing rules; therefore, they recorded, in turns, at the studio and shooting locations in different towns in Kenya. One of the musicians also put on a mask to emphasize the message about wearing a mask and thus not touching the mouth, nose, eyes, and face. After the music was produced, it was sent to the music animation team to embed the music into the animation. Subsequently, the song was shared with radio stations, on various social network platforms, and by individuals sharing.

Analysis of an anti-COVID-19 song

We analyzed the song using a pedagogical framework that Rose (2007) developed based on Merriam's (1964) 10 social functions of music. Rose argues that social movement music from the US Civil Rights movement did pedagogical work by engaging in the communicative, representational, and integrative functions of music. The communicative function of music is to inform those who understand the embedded language about the message, while the integrative function involves uniting the public for one purpose, and the symbolic function works to curate an image and vision for the future.

Communicative function of the COVID-19 song: Lyrics of this song demonstrate the capacity music has to serve a communicative function amid the COVID-19 pandemic given how they clearly articulate life-saving scientific concepts. These include discussions of COVID-19′s symptoms as well as preventative measures and treatment options. The lyrics focus on messages that social distancing measures—such as staying at home, washing hands, not touching one's face, covering the mouth with a mask, and disinfecting surroundings—can help slow the spread of the virus:

> The World Health Organization advises us to stay at home
>
> To wash our hands for twenty seconds using soap and hand sanitizer
>
> Avoid touching your eyes, nose and mouth, all these lead to being infected
>
> Cover your mouth and disinfect your surroundings

Symptoms described in the song include, "Coughing, difficulty in breathing, dry throat, and high body temperatures." By raising the awareness that these common symptoms are associated with the pandemic, the song functions as public pedagogy helping spread the word that symptoms that are often not considered serious need to be monitored closely. Similarly, the song educates the listeners regarding preventive measures, including hand washing, sanitizing, avoiding crowds, staying home, and refraining from touching the eyes, nose, and mouth. All these measures are relatively simple for most people to follow as long as they realize their importance, and the song clearly makes the connection between self-quarantine, hygiene, and the preservation of life. The song, however, does not describe the death rates, other severe effects of the disease, or critical risk factors.

Integrative function. As in other social movement songs, kinship terms are used to produce feelings of integration, community, and solidarity (Bohonos et al., 2019b; Darden, 2014). Invocations of "Brother, mother, sister" and "father" emphasize that the human family needs to find solidarity in its fight against COVID-19 while also communicating that the disease threatens life regardless of gender or life-stage. The song also consistently uses collective pronouns such as "us" and "we" to emphasize the need for unity, while also strategically using the singular "you" in reference to taking personal responsibility if sick to avoid infecting others.

> Stay away from crowds, to avoid being exposed to the virus
>
> Many have contacted the virus, for not following the instructions
>
> Brother, mother, sister, father let us pay attention to this pandemic

Symbolic function. Symbolic representations of music in social movement songs are used to both underscore the danger of the threat as well as to create hopeful visions of a coming victory (Rose, 2007). The coronavirus song does a strong job of creating a hopeful vision but is lacking in its attempt to underscore the danger posed by the threat. In the following passage, we can see the lyricist acknowledging the pandemic and assuring the listeners that they need not worry.

> This pandemic has hit us, a great pandemic that is corona
>
> I urge you to be strong, do not worry we will defeat this…
>
> We will defeat this pandemic

The song could be improved with a more in-depth explanation of the dangers associated with COVID-19. One approach could be symbolically invoking other threatening diseases of past pandemics to help drive home the danger. One could also question the invocation that people "not worry" as the pandemic is inherently worrisome. From the perspective of public pedagogy, one might suggest that some nuance is added that validates the concern about the pandemic, while still projecting hope regarding the community's final victory. As mentioned above, these short comings could be addressed with the production of additional songs that emphasize the serious of COVID-19 or through a remix of the original song.

Combining functions. The song combined the three functions of social movement music. Both the chorus and the first, second, and third verses combine the communicative, symbolic, and integrative functions (see Appendix B). The communicative function is achieved by repeating the word "corona," encouraging people to participate in self-quarantine and state-driven quarantine. Notably, in Kenya, the state is involved in quarantining those who arrive from abroad and the ones found outside during curfew hours. The use of "Let us…" in the chorus also plays the role of the integrative function because it invokes solidarity, togetherness, and community needed to mitigate COVID-19. The use of "Let us avoid this pandemic" presents a symbolic image that conjures this image of COVID-19 as something that can be avoided, making it almost tangible.

> Corona, corona, corona, corona
>
> Let us avoid this pandemic, it is our responsibility to quarantine (×2)

Music video as an enhancer of the song's educational effectiveness

Analysis of the music video shows that it enhances the communicative and integrative effects of the music, but does little to address the symbolic domain. While the analysis of the song lyrics alone reveals a collection of strengths and weaknesses regarding the information conveyed using the communicative function of music, many of the weaknesses were addressed in the complimentary music video. For example, when the song lyrics indicate that "high body temperatures" are a corona symptom, scientific specificity is added by the video showing a thermometer and indicating problematic temperature ranges. Similarly, the lyric directing the listener to "disinfect your surroundings" is complemented by images that suggest which surfaces—such as tabletops and doorknobs—should be cleaned regularly. The video also augments these lyrics by depicting a variety of household cleaning supplies that can be effective in reducing the spread of corona. In each of these examples, we can see the power of a music video to clarify or enhance the presentation of life-saving scientific information discussed in the song.

The music video also used images to clarify some potentially unfamiliar medical terms. For example, images of animated people avoiding crowds and staying in their homes help to visually define "quarantine." Similarly, the introductory graphic of a virus covering all of Africa—as well as much of the world—helps to provide a visual definition of the spread of the pandemic.

Another strength of the complimentary video is that it allows some new information to be presented that was not presented in the song. For example, a visual storyline is introduced that discourages people from covering their coughs with their hands while encouraging the use of masks and covering coughs with elbows or sleeves (See Appendix C).

The integrative function of the song was also enhanced by the video that—in addition to scientific imagery—featured engaging videos of musical performers. Frequently framed in ways reminiscent of a selfie, these clips created feelings of intimacy that help the viewer to feel socially engaged. The video also gives considerable screen time to both men and women, underscoring the need for collaborations across gender lines. Additionally, the featured female vocalist used eye contact with the camera to reduce perceived social distances between her and her viewers.

With all the ways that the video strengthened the overall presentation of educational content relative to COVID-19, there were still some areas for improvement, mostly comparable to the symbolic domain of music for social organization. Most notably, neither the song nor the video discusses death rates or risk factors. It thus may not fully underscore the danger of the pandemic nor help to identify those who are most vulnerable. More could have been done to create powerful imagery related to COVID-19's destructive potential. The song projects hope regarding eventual human victory over COVID-19 with lyrics such as "I urge you to be strong, do not worry, we will defeat this." However, the image of hope seems to be a secondary concern with both the song and video. Future efforts related to music videos and public health could work to create a sense of drama by symbolically invoking a narrative that moves from danger to hope while transmitting lifesaving scientific information.

DISCUSSION

The shutdown caused by the coronavirus pandemic has affected social relationships. Nevertheless, the social distancing required to contain the coronavirus has not shut diminished down the creativity of artists who incorporate music and lyrics to a COVID-19 educational video as a symbol of solidarity, cultural identity, and coming together for a common goal: to avoid coronavirus. Music is often useable as a powerful way to alleviate the stresses of anxiety, depression, and distress (Castrodale, 2019).

The information delivered through the narrative of general COVID-19 recommendations was transformed by the musicians into familiar lyrics to reinforce the message for those who listen to and enjoy music. The logic behind this project was to create associations between listeners and the music so they could accept the message and take action. Castrodale (2019, p. 42) asserts, "music is implicitly said to have a role in shaping individuals' mental health, shaping their mood and mind in some way" and adds that music holds pedagogical value that can be educative. The lyrics of the song were instructive about COVID-19 prevention—particularly around not touching the eyes, nose, and mouth—and urged listeners to cover the mouth with an elbow and to disinfect surfaces.

Approaches to music during the COVID-19 pandemic disrupt traditional spaces and socialness of young musicians but create new forms of connection among musicians and their community with a unique message: "let's all together act on the message to fight this virus." The song portrays a mission, focusing on the spotlight of the current measures to control the pandemic, and redirects listeners toward following scientific experts' recommendations as well as the local experts' implementation, including cooperation, responsibility, reason, and kindness.

Music and lyrics in the language of the country have the power to affect our feelings, strengthen our knowledge, and entertain us in our daily new routine. Some preventive measures like social distancing may be especially hard for younger people deprived of the community spaces where they feel connected. The song and lyrics were created by young people and disseminated in Swahili to make the song accessible to those in rural and urban settings and attractive to the young.

Suggestions for additional music education interventions

Additional resources at the nexus of education and music could help to provide a more complete understanding of the pandemic. In terms of communicating about treatment options, the song instructs people with COVID-19 symptoms to report to the nearest health center, but it does not communicate that there is presently no cure, for the disease. The lack of focus on the potentially fatal consequences of contracting the disease, as well as the fact that there is no cure could be critiqued in that the song does not adequately drive home the dire effects of COVID-19. This likely derives from the pop format used in the song, which generally requires words to be used sparingly. This, in turn limits the amount of educational content of the song.

This limitation of educational content could be addressed in one of two ways. First, a series of songs could be produced that each address different aspects of COVID-19. Under this model, the current song would remain in circulation as a good introduction to preventative measures related to COVID-19. Next, at least one additional song would be produced that focuses on the dire aspects of the pandemic. An alternate approach could be a "remix" of the current song, which adds additional lyrics. Given the need to add significant amounts of educational content to the existing song, a rap section might be an especially potent approach as this generally allows lyricists to pack higher word-counts into a song than is generally favored in other varieties of pop music. Dense lyrical content is currently used by Ugandan musicians engaged in anti-COVID-19 music making (Makwa, 2020).

Implications for researchers

Analysis of this song and video demonstrates the potential of music and music videos to raise awareness related to public health in ways that parallel how these media have been used to raise awareness in social movements (Bohonos et al., 2019a, 2019b; Rose, 2007). By communicating scientific information, developing feelings of community, and projecting a vision of a better world to come, this song addresses cognitive and affective aspects of learning. It has the potential to save lives in the global fight against COVID-19.

Additionally, analyzing the lyrics of this anti-COVID-19 song, using a framework initially developed to understand social movement learning related to the African American freedom struggle (Rose, 2007), shows connections between social organizing in pursuit of systemic reforms and social organizing for public health. Given the degree to which systemically marginalized groups are disproportionately affected by a variety of health crises, including COVID-19, this research suggests the power of music to unite education efforts around public health.

One limitation of the present study is that we are analyzing the song and music video primarily as social movement pedagogy, without a discussion of the stand-alone artistic merit of the work. This mode of analysis does not do justice to the artistry involved in creating the work, but only the potential educational outcomes associated with awareness. Put another way; we analyzed the educational value of a piece of art where another approach could have been used to explore the artistic value of an educational resource. We suggest that future research develop a model for analysis and evaluation of music-based educational resources that explores in detail whether or how artistic and educational contributions of the work interact. Future research could also include assessment of this and other songs' effectiveness for raising awareness about social distancing in Kenya and measuring of the songs' impacts on listeners. Future studies could also survey professional music educators about their perceptions of this music's educational quality. It could also be informative to get listeners' impressions of the song at multiple stages—when they first hear it, after they have heard it 5–10 times, and after they have incorporated it into their lives in some fashion (if they did). Having listeners describe what they did in response to hearing the song repeatedly could give further insight into its actual effects, especially if a control group could be added.

CONCLUSION

Our findings provide important insights on the capacity of social movement music to perform communicative, representational, and integrative functions. We have explored how musicians in Kenya drew from provided scripts of scientific knowledge to produced music for COVID-19 public pedagogy. Future research could take a comparative approach to examine how science, art, and music are evaluated. Such a project could have a goal to develop a model that reflects the values of each group of stakeholders. Additionally, further research that connects musicians and how they transform scientific knowledge into music might increase the understanding of music and scientific knowledge of public pedagogy. Admittedly, the findings are tempered by the limitations of transferring the song from the scientific script to music lyrics and the use of the case study method. Specifically, this study only focused on one song produced in Kenya on COVID-19 with reference to a scientific script. The findings may be relevant to music such as COVID-19 prevention lyrics that are informed by scientific knowledge. Such music may close the gap between scientists and the public and democratizes scientific knowledge.

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