

Changing Paradigms in Science Communication in the Post COVID Era

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ABSTRACT

COVID-19 pandemic has brought about a sea of changes in our society and human civilisation. The respect and public acceptance for science gained more significance in the COVID-19 lockdown period. Science news has been placed on the front pages of all newspapers consistently for several months. The influence of the internet as a communication medium has gained more prominence and irrespective of age everyone used it to gain information about COVID-19. In science, new culture of collaboration and open access publications gained popularity. Similarly in science communication, conferences and seminars have been shifted to online mode and usage of VR and AR has been effectively incorporated. This review paper will discuss various new tools that have emerged for science communication during the COVID pandemic time.

Keywords: Science communication, post-COVID-19 era, OTT, virtual science museums

Introduction

Science communication is an important process to propagate scientific discoveries among the public and to develop scientific temper in our society. Communicating science with a layman is not an easy task. It involves considerable knowledge of various scientific concepts across scientific disciplines and also a good command of the language, either in regional languages or in Hindi or English. They should also understand the concepts of humanities and social science as they are communicating to the

members of society. Science communicators have been doing yeoman service through various media like print, electronic, art forms like puppetry, scientoons, drama, storytelling and poetry, science museums and of late through electronic media.

The presence of science in the media and the role of science communicators has regained top position once the pandemic struck humanity. Everyday news carrying the COVID-19 virus found places in the front pages of leading dailies. Common man started looking at science as their saviour. They glanced through the pages of newspapers to find out if some kind of solution has emerged from our scientific community in the treatment of the disease. Students also started showing interest in science seeing the boom in scientific research in public as well as private sector institutions. The COVID-19 pandemic created a new standard in the world, the physical distancing, wearing of masks, usage of sanitisers, marked as the new normality in the life of humans. During the lockdown period, new modes of science communication also emerged that were very well utilised by academicians and science communicators.

The usage of digital media increased tremendously during the initial months of the pandemic, as most people were contained in their homes due to lockdown restrictions¹. The increase in usage was noticed in social media and messaging apps and also in video conferencing apps. Nobel laureate Jennifer Doudna² in an article published in *The Economist* observed three fundamental changes that COVID-19 has brought to science:

More respect

The respect accorded to science has changed fundamentally because of the pandemic. People started valuing discoveries from laboratories, expecting a remedy for the deadly virus. Many entrepreneurs started investing in science seeing its huge investment potential.

More communication

The communication and dissemination of science have also undergone a sea of changes. The pace of publishing scientific discoveries increased during the pandemic times. The scientific

community became more open and shared most of their articles in the public domain. Publishing in pre-prints has become acceptable, as publishing in peer-reviewed journals takes several months. During the pandemic, the scientific community understood the importance of sharing their works as that would prevent others from unnecessarily repeating the same work. Publishing in the preprint servers like bioRxiv and medRxiv became a new norm in scientific circles. The information published in pre-prints were immediately communicated in media by the science communicators. Only a good qualified science communicator could succinctly communicate reliable facts and findings to the public.

More collaboration

Post-COVID era saw the emergence of collaborations between scientific communities across the globe, as everyone is keen on finding a solution to the pandemic. As Jennifer Doudna (2020) described, the combined efforts of corporations, scientists, and public health officials coming together to combat the coronavirus as “extraordinary”.

This extensive and open collaboration is accelerating the scientific process. It is this collaboration that helped countries develop vaccines against COVID-19. Many drugs that were used for the treatment of COVID-19 also became possible because of collaboration.

These changes that have been brought in scientific culture have made a tremendous impact on the modes of science communication also. The review paper also discusses the various types of science communication channels that became popular during the pandemic times.

New modes of Science Communication

The complete lockdown due to the COVID-19 pandemic across the globe has made humans similar to caged animals in zoos. All of us were forced to stay indoors in our residences, away from our workplaces, viz., universities, research centres, etc. For the first time, we understood the pain our fellow animal species feel when putting them in zoos. Research labs, academic institutions, and even our pillar of democracy the parliament has been shut

down for months without any activities, fearing the tiny coronavirus.

The world which was moving at a faster pace during 2018 and which all of us were comfortable with, has been changed to a new world on a fine morning. For better or for worse, communication: how we talk, who we talk to, and what we talk about has also changed tremendously. The human species has found new innovative techniques to communicate with fellow members of species through various digital platforms. The digital platforms have made knowledge dissemination easy, irrespective of geographical barriers. A person sitting in the high mountains of the Himalayas or deep inside tropical forests of Western Ghats can access the same knowledge a person in a metro city dweller will gather, provided they have the access to the internet. The digital platform has brought humanity closer than ever. Today's generation makes friends with people from different parts of the globe through various social media. Communication has become faster and easier, an email will reach the recipient within minutes from any part of the globe, which would otherwise take weeks if we rely on the postal service.

Through these digital modes, knowledge sharing became an easy task. A paradigm shift has occurred in science communication due to pandemics. The pandemic acted as a 'game changer' for science communication practitioners. The pandemic has made it evident how crucial it is for science communication to reach and engage everyone in society. The pandemic also forces us to rethink how we conduct science communication sitting in our homes. The major initiatives that have cropped up during the time are the following:

Webinars

Knowledge sharing through webinars has become a common phenomenon during the lockdown. Scientist's sitting in different parts of the globe communicate with one another and the public through various webinars. In the old world, pre-COVID world, people have been spending lakhs of rupees exclusively for travel. That cost has considerably come down. According to VOIP vendor WebEx, customers used over 5.5 billion meeting minutes in just the first 11 days of March 2020. That's nearly 10,500 years of a remote conference in aggregate. The emergence of

webinars has made science accessible to everyone on this planet. Webinars have made it possible for people from even remote corners of the world, to interact with internationally renowned scientists. The earlier version ‘seminars’ involved economic burden for the participants by way of registration fees and travel expenses. Webinars have made free flow of knowledge dissemination and interaction with peers.

Internet-based science Over-The-Top (OTT) TV channels

During the pandemic time, we have seen a steep rise in the usage of internet-based Over-The-Top (OTT) channels, especially the entertainment channels like Amazon Netflix, Amazon Prime Video, Sony LIV, Hulu, etc. One of the major advantages of OTT channels is that they can be viewed from anywhere using one’s smart phone. Many science channels that were streaming through cable networks like Discovery, Animal Planet, BBC Earth have started their OTT version. India Science, the national science channel of India is also telecasted through the OTT platform. In Science communication, popularisation and its extension the OTT can play a predominant role as it has a wide reach than conventional media sources like print or electronic. It's also more engaging as people can interact with the scientific community.

Digital classes

COVID pandemic has redefined our education system and communication channels. Physical classrooms were changed to digital platforms. And even a kindergarten student was forced to use smartphones. The routine classes from kindergarten to doctoral level shifted to an online platform. Science education has become more engaging and interactive through these online modes. Even science practical sessions were handled virtually, which was unimaginable during the pre-COVID period.

Digital publications

The pandemic time has seen the emergence of digital publications. From textbooks for students to popular science books, everything was available in digital form. The newspapers also started promoting digital subscriptions as the industry was

badly affected by the lockdown. Many science magazines including *Science Reporter* have started to promote e-magazines.

Interactive books were also brought out during the period. Popular science printed books have been incorporated with multimedia tools to make them more interactive. Using QR codes readers can get access to animations and even reading of the books. The '*COVID Katha*' published by NCSTC, Department of Science and Technology, Govt of India, is a popular science interactive book.

Citizen science

Due to the influence of digital media, the public started participating in scientific research. Citizen science activities received a boom during the lockdown period. This in a way helped science enthusiasts to keep themselves engaged. Various Apps have been developed for this purpose. Open Humans is a community of close to 9000 members who perform 'self-research' by sharing personal data for analysis by the community. The Corona Report app allows participants to connect and 'exchange their thoughts and stories' through diaries and reports.

Similar apps have been used widely in other fields of scientific research, to get people engaged in science and share their resources, e.g., e Bird, NASA GLOBE Observer app, Globe Observer, iNaturalist, Nature's Notebook, Zooniverse, etc.

Virtual science museums through virtual reality and augmented reality

Many museums and planetariums were badly affected during the lockdown period. In order to engage with young people, they utilised the power of Virtual Reality and Augmented Reality techniques. Virtual museums and planetariums can be accessed by people sitting in any part of the world, thereby reducing logistics. The virtual tour is more engaging and makes STEM education interesting to children. They can feel visiting outer space or the deep ocean through their computers.

Smart Phone Applications

The popularity of smartphones has brought the internet and information into the hands of the public³. People surf through the

pages of smartphones to gather information. Common man gathers information, be it daily news or health information through social media platforms like Whatsapp, Facebook, Pixstory, Twitter, etc. WhatsApp is one of the most popular messaging platforms with a user base of 2 billion around the globe. It can be used as a tool for communicating science. There are many apps that are specifically dedicated to scientific information like Science Review Feed, Researcher, NASA, New Scientist, Science News & Discoveries, General Science, etc.

Smartphones can also be used for researchers to document and analyse their research. Electronic notebooks like Elsevier's Hivebench are widely used by the scientific community to prepare, conduct and analyse experiments from their smart devices. It can also be used to monitor climate fluctuations in the lab or photograph the bacterial colonies in your Petri dish. Most of the high-end smartphones have inbuilt sensors like the accelerometer, gyroscope, magnetometer, GPS receiver, gravity and rotational vector sensors, and environmental sensors such as barometers, photometers, thermometers and for example air humidity sensors, microphone and cameras.

AI-based tools

Artificial intelligence technology-based gadgets like Amazon Alexa can be used to promote science among children. Even Robots can be designed to popularise science in interestingly. Today's city grown children may not like the traditional tools like puppets or drama. Communicating science among such urban children can be made interesting using AI-based gadgets.

The scholarly publishing industry that deals with research journals are using AI-based tools to address certain issues with the peer-review process.

Digital translators

One problem faced by science communicators is understanding the concepts explained in a foreign language. During early days translators proficient in a particular language were recruited for the purpose. With the emergence of digital technology digital translators are making way for human translators. Using these digital tools like Google Translate, SYSTRANET, DeepL Translate,

Google Lens, etc. one could translate scientific information's within seconds, making science communication faster.

Conclusion

Science communication has seen a revolutionary change during the COVID period. Traditional modes of science communication failed during the lockdown, and new modes of digital communication emerged. This paradigm shift will stay as a new norm in the post COVID world. Communicating science in the post-COVID-19 era would be a challenging task as digital internet platforms shall overpower human ingenuity. Creativity comes only from visualisation and dreaming. These digital platforms will take away our creativity skill from our youngsters if it's not used judiciously.

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