

Science Communication in India: Current Trends and Future Vision

Pawan Singh Malik¹ and Bharat Dhiman^{2*}

¹Associate Professor, Department of Communication & Media Technology, J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana, India

²Assistant Professor, Department of Communication & Media Technology, J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana, India

ABSTRACT

India has a rich scientific heritage. Scientific research in astronomy, medicine, mathematics, and material science has been carried out since ancient times. India is advancing technologically, and the need to disseminate scientific information to the non-scientific community is growing rapidly day-by-day. Over the last few years, India has experienced a large-scale proliferation of science communication activities through various programs initiated by the central government, state government, and NGOs. This article attempts to provide an overview of the growth and development of science communication in India. It also identifies India's current trends and future vision of science communication.

*Corresponding author

Bharat Dhiman, Assistant Professor, Department of Communication & Media Technology, J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana, India. E-mail: biddy88@gmail.com

Received: September 06, 2022; **Accepted:** September 13, 2022, **Published:** September 22, 2022

Keywords: Science, Communication, India, Trends, Future Vision, Diffusion

Introduction

India has made tremendous progress in science and technology in the last few decades. However, to what extent is scientific knowledge passed on to the common masses? The Government of India has launched several new initiatives and programs to promote science and technology through information dissemination. Science communication serves as a medium to bridge the gap between the scientific community and the lay public. It is an effective tool for significant research and development, which are indispensable for the development of society.

Defining Science

According to Webster's Dictionary, the definition of science is "knowledge acquired by study or practice" or "knowledge covering general truths about the operation of general laws, especially as they are obtained and tested by the scientific method concerning the physical world." It simply means that science refers to a system of obtaining authentic knowledge. This system uses observation and experimentation to describe and explain natural phenomena.

For example, the American Physical Society's Public Affairs Panel proposed a definition that some describe as pure science: "Science is the systematic enterprise of gathering knowledge about the world and organizing and condensing that knowledge into testable laws and theories" [1].

Defining Communication

Communication is defined as contemporary media and cultural studies. This is because the term encompasses a multitude of experiences, actions, events, and a whole range of events, meanings,

and technologies [2]. Dr. McFarland defined communication as a process of meaningful interactions through which meanings are perceived, and understanding is achieved between human beings.

Similarly, M.T. Myers and G.E. Myers defined communication as a special kind of patterning expressed in symbolic form. For any communication to take place between or among people, two requirements must be met, namely (a) the symbolic system must be shared by the people involved (we must speak the same language, jargon, or dialect, and (b) the associations between the symbols and their referents must be shared." (ibid. p. 6.) In short, communication is described as the transfer of thoughts, ideas, beliefs, knowledge, opinions, etc., [2].

Science Communication

Science Communication refers to public media presenting science-related topics to non-scientists and non-scientific communities. It is the process by which scientific culture and its knowledge are incorporated into the common culture. Similarly, propose SciCom as "...a practice of producing and negotiating meanings, a practice that always takes place under specific social, cultural and political conditions". It involves using appropriate skills, media, activities, and dialogue to create one or more of the following personal responses to science: Awareness, enjoyment, interests, opinion formation, and underestimation [1].

Science Communication includes pure science, technology, medicine, mathematics, statistics, engineering, media studies, and related fields. Science communicators bridge the communication gap between the complex world of science and the masses. According to [1], science communicators require appropriate skills, interpersonal communication, media activities, and dialogue to produce one or more of the following personal responses (the

vowel analogy):

1. Awareness of new aspects of science among people.
2. Appreciation of science as entertainment or art.
3. Interest, evidenced by voluntary involvement in science or its communication.
4. Opinions on the formation, reformation, or confirmation of scientific attitudes.
5. Understanding science, its content, process, social factors, etc.

Objective of the Study

1. To overview the diffusion of science communication in India.
2. To identify the current trends and development of science communication in India.
3. To explore the vision for the future of science communication in India.

The Growth of Science Communication in India

India's first Prime Minister, Jawaharlal Nehru, initiated reforms to promote higher education in science and technology. After independence, many government agencies and non-governmental organizations (NGOs) became involved in popularizing science. Scientific communication took place at the individual and institutional levels. The Indian Institute of Technology was conceptualized and launched in August 1951 in Kharagpur, West Bengal, to promote technical education in India. A series of communication activities were then initiated through the media, book publications, and translations of scientific books into local languages to convey modern ideas about medicine, physics, biology, etc. Most of these writings were for academic textbooks.

The National Institute of Science Communication (NISCOM) started publishing the popular Hindi scientific magazine Vigyan Pragati (Progress in Science) in 1952. Science Reporter (English monthly) and Science Ki Dunia (Urdu quarterly) soon followed. NISCOM today also publishes 11 professional scientific journals and publishes various popular science books (often in Indian languages).

Science communication was prioritized in India's Sixth Five Year Plan (the period between 1980 and 1985), and two years later, in 1982, the National Council for Science and Technology Communication (NCSTC) was established. The Council has the mandate to integrate, coordinate, accelerate and support science communication and popularization at the micro and macro levels. NCSTC programs include training in communication science and technology, software development, research, field projects, and the creation of information networks and databases.

Other initiatives of Indian Govt. belongs to Vigyan Prasar, an autonomous organization of the Ministry of Science and Technology established in 1989, which plays a crucial role in coordinating efforts among various scientific institutions, academic bodies, educational institutions, laboratories, museums, industries, and other organizations for effective exchange of scientific information. Vigyan Prasar also develops and disseminates software materials and organizes popular science events, including debates, workshops, and lectures.

The National Council of Science Museums is an autonomous organization under the Indian Ministry of Culture, headquartered in Kolkata. It is the largest chain of science centers or museums under one administrative umbrella worldwide. It is the coordinating body of 26 science museums and science centers across the country. Based in Kolkata, Science City has more than 1,000 exhibits and attracts around 500,000 visitors annually. Based on the popularity and good experience of Science City, other similar projects are

being developed across the country.

Several NGOs have also started working on communication programs. The Indian Science Writers Association (ISWA) was established in 1985 to promote the profession of science writing. ISWA has around 200 members and carries out various activities, including lectures, training, and scholarship programs. It also collaborates from time to time with government agencies and non-governmental organizations to support science communication activities.

Current Trends and Future Vision

Digital media has changed the way we exchange information and the society around us. It informs and entertains communities by providing them with easy access to various knowledge resources. With the help of social media, scientific knowledge can now reach more people in a short time than ever before. The world is now going digital with a variety of media tools available.

Communication has now become more engaging than ever before. Social media allows messages to reach the target audience. Social media platforms, like YouTube, blogs, video streaming, google trends, virtual reality, visual storytelling, gamification, and smartphone applications are current trends for disseminating scientific information worldwide.

With the help of digital media technology, the whole world has shrunk into a "global village," and today's society is now a "network society." The world is becoming digital, and people are now spending more time on digital media platforms to fulfill their needs, from daily information, education, and entertainment.

Social Media as a Popular Medium for Scientific Communication
Social media has revolutionized scientific information sharing and communication. Social media are like Facebook, Instagram, Twitter, LinkedIn, Pinterest, and blogs. These social networks have created a boom in the availability of scientific information in modern society. Information about and about science and technology is now available in various formats through social media, and access to this information is easy.

Facebook

Thousands of renowned scientists and communicators around the world are constantly communicating with people through their Facebook pages, bringing a wealth of scientific information into the public domain. Similarly, it is now essential for every research institute in the world to have a Facebook page to upload their programs and other outreach activities and get feedback from the online community. For example, the National Aeronautics Space Agency (NASA), USA, has around 20 million followers on its Facebook page.

Twitter

Most of the reputed research organizations in the world have their official Twitter account through which they connect with the masses across the globe. Twitter allows 280-character posts embedded with images, videos, live streams, etc. It sorts tweets into threads to make it easy to follow conversations. The commonly perceived advantages of Twitter are the size and diversity of the audience and the ability to engage the public.

Some of the Twitter Accounts That are Popular Among the Audience Are

The National Aeronautics Space Agency (NASA), the US space research organization, tweets via @NASA. NASA has more than 25 million followers.

Indian Space Research Organization (ISRO): ISRO tweets @ISRO and has over one million followers.

Live Broadcast

Live video is evolving as a real connection with the audience. Live news videos caught everyone's attention with the launch of Facebook Live. Similarly, Instagram introduced a live streaming feature in 2016, while Twitter introduced a 360-degree live video feature. Snapchat has also succeeded in introducing 24-hour live stories, and many new features are available on social media platforms.

Videos are an essential tool for communicating even the most complex science and technology concepts. Many scientific phenomena and events are broadcast live on the Internet via live streaming. For example, the 2017 solar eclipse was live streamed by many sites, including NASA and Twitter. Similarly, videos related to complex concepts such as Plasma Science are broadcast live on the Internet.

Virtual Reality

It's an advanced medium for new storytelling. Through VR, process scenes can be viewed in three dimensions, providing a window into the molecular or even subatomic world. VR helps tell scientific stories that are complex and highly abstract in a more meaningful and understandable way.

Google Trends

Google Trends is a public web feature that is based on Google Search. It has divided the search topics into different categories. One such important category is Science and Technology (Sci/Tech). You can see which S&T news/topics are most searched for by netizens and are trending on a particular day. This search can be done by country, for example, the top 10 Sci/Tech news/topics specifically searched for in India. You can also find the top charts or trending news of any previous year as far as the country is concerned.

Smartphone Apps

When it comes to communicating science with society, smartphones dominate. There are hundreds of apps available on Android and iTunes designed to deliver scientific information, news, stories, photos, and videos to mobile users. For example, Science Review Feed aggregates science news and the latest updates from other relevant sources such as Nature.com and Reuters.com. News fusion is an app for the Science Review Feed.

Gamification

In the current situation, games are popular tools for communication and understanding scientific phenomena. It is an effective tool to provide solutions to such research problems by introducing them to non-experts in computer games. The new generation of online games provides entertainment and helps scientists solve puzzle games as an effective tool for communication, understanding, and engagement in science. Eyewire, Fraxinus, Turbulence, and Cropland Capture are famous games among youth.

Future Vision

The future of science communication is a topic of conversation among scientists, communicators, and journalists. The process of spreading "scientific awareness" must take place primarily through contextualizing data and knowledge into the needs of everyday life. Scientific research in India is making tremendous progress. Currently, there are more than 100 research institutes and over 150 university centers across India and a growing number of

private centers dedicated to research and development. Although India enjoys tremendous interest and offers many initiatives and activities dedicated to science communication, there is still an urgent need to streamline these activities qualitatively and quantitatively.

Conclusion

A multi-pronged strategy is needed to make science communication more effective in India. More creative platforms should be created to engage scientists and media professionals in scientific development. More and more activities related to science communication would be extended up to the village level. The future of science communication is going digital as more and more people gain access to the Internet. Digital media both democratize and decentralize scientific knowledge. The future of science communication would largely depend on how the policies and practices related to this field are shaped by new trends in the online ecosystem [3-22].

References

1. Burns TW, O'Connor DJ, Stocklmayer SM (2003) Science Communication: A Contemporary Definition. *Public Understanding of Science* 12: 183-202.
2. Kumar JK (2010) *Mass Communication in India*. New Delhi: Jaico Publishing House. <https://www.worldcat.org/title/mass-communication-in-india/oclc/1041602455>.
3. Bharat (2021) Social Media exposure and Psychological problems during COVID-19 outbreak: A cross-sectional study. *International Journal of Psychosocial Rehabilitation* 25: 346-351.
4. Bisbet, C Mathew (2011) Re-Defining Science Communication: Emerging Best Practices that Empower the Public. <https://bigthink.com/guest-thinkers/re-defining-science-communication-emerging-best-practices-that-empower-the-public/>.
5. Bonney R, Phillips TB, Ballard HL, Enck JW (2016) Can citizen science enhance public understanding of science. *Public Understanding of Science* 25: 2-16.
6. Dhiman D (2022) Condition of Women Prisoners in Model Jail, Chandigarh: A Communication Study. Condition of Women Prisoners in Model Jail, Chandigarh: A Communication Study. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4205096.
7. Dhiman B, Malik PS (2021) Psychosocial Impact of Web Series and Streaming Content: A Study on Indian Youth. *Global Media Journal* 19: 1-7.
8. Dhiman B (2019) Effects of Online News Applications for Android - A Critical Analysis. *European Journal of Business and Social Sciences* 7: 815-819.
9. Dhiman B (2021) The Practice of Media Education and Media Research: A Review on Five Asian Countries. *Global Media Journal* 19: 1-7.
10. Abid Ali, Bharat (2021) Impact of Smartphone: A Review on Negative Effects on Students. *PalArch's Journal of Archaeology of Egypt / Egyptology* 18: 5710-5718.
11. Abid Ali, Bharat (2020) Influence of Social Media in Developing Social Anxiety: A Study of Kurukshetra University Students. *PalArch's Journal of Archaeology of Egypt / Egyptology* 17: 1585-1592.
12. Dhiman Bharat (2022) Use and Impact of Social Media on Academic Performance of Kurukshetra University Students: A Case Study. <http://dx.doi.org/10.2139/ssrn.4212827>.
13. Kohli P, Dhiman B (2022) Use of E-Resources by Research Scholars of Kurukshetra University: A Case Study. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4205923.

14. Dhiman Bharat (2021) Newspaper Reading Habits among UG and PG Students of Kurukshetra University: A Case Study. International Journal of Interdisciplinary Organizational Studies <https://ssrn.com/abstract=4205920>
15. Dhiman Bharat (2022) Negative Impact of Television viewing on Academic achievements of students: A Case Study of Subhash Nagar. <https://ssrn.com/abstract=>
16. Dhiman Bharat (2021) Awareness of MOOCs among Students: A Study of Kurukshetra University. International Journal of Interdisciplinary Organizational Studies <https://ssrn.com/abstract=4205910>
17. Dhiman Bharat (2022) Usage of Whatsapp among students of Kurukshetra University: A Case study. <https://ssrn.com/abstract=>
18. Dhiman Bharat (2022) Identification of Psychosocial Issues among Researchers of Kurukshetra University: A Critical Study. <https://ssrn.com/abstract=>
19. Dhiman Bharat (2022) Snapchat, happiest and personal Social Media Platform for Research Scholars, A Critical study. <https://ssrn.com/abstract=>
20. Mazzonetto M (2005) Science Communication in India: Current situation, history and future developments. Journal of Science Communication <https://doi.org/10.22323/2.04010901>.
21. Patairiya Manjo (2002) Emerging Scenario of Science and Technology Communication. Indian Journal of Science Communication <http://www.iscos.org/ijsc/Vol11-No1/rp2.htm>.
22. Sørensen JJ, Pedersen MK, Munch M, Haikka P, Jensen JH, et al. (2016) Exploring the quantum speed limit with computer games. Nature 532: 210-213.

Copyright: ©2022 Bharat Dhiman. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.