



SCIENCE COMMUNICATION IN THE DIGITAL AGE IN INDIA

Dr Prashanth Venugopal* **Dr PlavendranIrudayasamy****

**Head, Department of Journalism and Mass Communication, ST Pauls College, Bengaluru.*

***Associate Professor, Department of Journalism and Mass Communication, ST PAULS COLLEGE, Bengaluru.*

Abstract

Science communication has undergone a profound transformation in the digital era, characterized by new actors, participatory environments, and hybrid media practices. In India, the intersection of digital technology, media pluralization, and governmental initiatives such as Digital India and the National Science Communication Framework has redefined how science is disseminated and consumed. This study explores the dynamics of science communication in the digital age in India, focusing on its evolving ecosystem, the role of social media, the participation of scientists and influencers, and challenges such as misinformation and trust deficits. Drawing insights from global scholarship and Indian case studies between 2021 and 2023, this paper analyzes how digital tools particularly social media, YouTube, and government communication platforms have influenced public engagement with science. It concludes that while digitalization democratizes science communication in India, it also demands new literacy, ethics, and institutional strategies to strengthen public trust and inclusivity.

Keywords: Science Communication, Digital Media, India, Social Media, Public Engagement, Misinformation, Scientific Literacy.

Introduction

Science communication the process of making scientific knowledge accessible and meaningful to the public has become more complex and participatory in the digital age. The global digital revolution, accelerated by the Covid-19 pandemic, has blurred traditional boundaries between scientists, journalists, policymakers, and citizens. As Metag, Wintterlin, and Klinger (2023) note, digitalization has “pluralized voices in science communication” while simultaneously introducing challenges like misinformation, polarization, and “infodemics”.

In India, the democratization of information through digital media platforms such as YouTube, Twitter (now X), and WhatsApp has profoundly changed how citizens engage with science and health information. From government-driven outreach like Vigyan Prasar and India Science to citizen-led science explainers and educators on YouTube, India’s science communication landscape has expanded beyond conventional journalism and academic channels.

The period between 2021 and 2023 represents a critical juncture for Indian science communication. The Covid-19 pandemic, vaccination campaigns, and climate change discourses revealed both the potential and perils of digital science communication. This paper examines how digital media platforms, institutional initiatives, and grassroots actors together shape science communication in India’s digital ecosystem.

Review of Literature

Global Perspectives on Digital Science Communication

Globally, scholars recognize that digital media enhances participatory communication by lowering barriers between experts and the public (Neuberger, 2009). Metag et al. (2023) emphasize that the rise of online platforms has led to pluralization, fragmentation, and even polarization of science audiences.



During the Covid-19 pandemic, the world witnessed an “infodemic,” characterized by information overload, conspiracy theories, and mistrust toward science communicators (Scheufele & Krause, 2019). Xu et al. (2023) studied how multiple actors scientists, organizations, and citizens communicated about the Omicron variant on Weibo, finding that scientists and central media acted as key mediators while social media amplified public emotions and misinformation. This research underscores that effective science communication today must balance authority with empathy, accuracy with accessibility, and engagement with ethics.

Indian Context and Historical Background

Science communication in India dates back to the post-independence era when national leaders like Jawaharlal Nehru promoted “scientific temper” as a constitutional duty. Early efforts included government agencies like Vigyan Prasar, National Council for Science and Technology Communication (NCSTC), and Doordarshan’s science programs. However, for decades, communication remained top-down, focusing on dissemination rather than participation (Gupta, 2019). With the proliferation of digital media, the paradigm shifted from information transmission to public engagement. The Digital India initiative (2015) and the National Science and Technology Communication Policy (2020) strengthened the digital infrastructure for scientific outreach. Indian citizens increasingly accessed science information through YouTube explainers, Instagram educators, and vernacular online platforms.

Studies on Science Communication and Public Engagement in India

Recent studies highlight how digital technologies reshape public understanding of science in India. Thomas (2021) notes that social media encourages participatory engagement with scientific issues, though it also facilitates misinformation during crises like Covid-19. Raj and Raman (2022) argue that Indian audiences trust science more when information is presented through relatable narratives and local languages.

Furthermore, research on *India Science Channel* and *MyGov.in* suggests that government-led digital communication can foster inclusivity if interactive and multilingual strategies are adopted. However, scholars warn that online science communication in India is often urban-centric and English-dominant, limiting rural outreach (Kumar & Seshadri, 2022).

Objectives of the Study

This research aims to:

1. Analyse how digital media has transformed science communication practices in India.
2. Examine the role of new actor’s scientists, journalists, influencers, and citizens in online science communication.
3. Identify challenges in combating misinformation and building trust in digital environments.
4. Suggest strategies for inclusive, ethical and effective science communication in India.

Methodology

This study adopts a qualitative and interpretive approach, synthesizing data from scholarly literature, government reports, and media case studies between 2021 and 2023. It integrates findings from comparative global studies with Indian contexts, including campaigns such as Har GharDastak (Covid-19 vaccination drive), Mission LiFE (environmental sustainability), and the use of YouTube science channels and Twitter by Indian institutions.



Case examples and textual analyses of online content (e.g., tweets by Indian scientists, Ministry of Health advisories, and educational YouTube videos) were reviewed to identify dominant patterns, frames, and communication strategies.

Science Communication Ecosystem in India

Institutional and Policy Frameworks

India's institutional ecosystem for science communication comprises Vigyan Prasar, Press Information Bureau (PIB), National Council for Science and Technology Communication (NCSTC), and MyGov. During 2021–2023, these bodies utilized digital platforms to popularize Covid-19 updates, climate awareness, and space science initiatives.

The India Science OTT Platform, launched by Vigyan Prasar, offers multilingual science programming accessible on mobile devices bridging entertainment and education. Similarly, MyGov.in and PIB Fact Check used social media to counter misinformation during the pandemic, promoting fact-based awareness.

Media and Journalistic Transformation

Traditional science journalism has gradually integrated digital tools. Indian news outlets such as The Hindu Science, Down To Earth, and The Print expanded online coverage of Covid-19, environment, and technology issues. Digital storytelling formats infographics, podcasts, and interactive explainer videos enhanced accessibility.

However, resource constraints and limited specialized reporters remain challenges. As Dutt (2022) observes, Indian media often sensationalize science or fail to contextualize it, leading to misinformation or oversimplification.

Scientists and Influencers as New Communicators

A new generation of Indian scientists has embraced social media for direct communication. Astrophysicist Dr. Priya Abraham, biologist Dr. SoumitraPathare, and science YouTubers such as “Indian Science Guy” and “Curious Harish” exemplify this trend. Platforms like YouTube and Instagram allow scientists to share experiments, explain vaccines, and clarify environmental phenomena in vernacular languages.

This aligns with Xu et al.'s (2023) observation that scientists are “the most important actors” in digital science communication, though their communication is often mediated by central media. In India, however, the rise of independent creators decentralizes communication, enhancing public participation but also exposing audiences to unverified sources.

Public Participation and Citizen Science

Citizen science initiatives in India have grown substantially. Projects like India Biodiversity Portal, iNaturalist India, and MigrantWatch involve citizens in data collection and environmental monitoring. Digital tools and mobile apps make scientific contribution participatory, embodying what Bucchi and Trench (2021) call the “dialogue model” of communication. During Covid-19, online volunteer groups like COVID India Tracker and Vaccine Warriors used open data visualization to inform citizens—showcasing collaborative digital science communication.

Digital Media Platforms and Public Engagement

Social Media Platforms: Social media has become the principal site for science communication in India. Twitter, YouTube, Facebook, and Instagram host science explainers, fact-checkers, and official



advisories. During 2021–2023, hash tags like #India Fights Corona, #Vaccine Maître, and #Science For Life dominated national discourse.

The Ministry of Science & Technology and Department of Biotechnology utilized Twitter for real-time updates on vaccines, while the Press Information Bureau employed fact-checking posts to debunk myths. However, WhatsApp misinformation ranging from pseudo-scientific cures to vaccine fears revealed the need for digital literacy programs.

YouTube and Vernacular Science Communication

YouTube has emerged as India’s most influential science communication platform. Channels like Practical Engineering India, The Curious Harish, and Aasoka Education have millions of subscribers. They mix humor, animation, and storytelling to explain complex concepts in Hindi, Tamil, Kannada, and Bengali.

These digital explainers embody what Metag (2021) calls the “tension between visibility and invisibility” while they make science visible, they also risk oversimplification. In the Indian context, their multilingual approach fosters inclusion, yet inconsistent accuracy remains an issue.

Podcasts and New Formats

Podcasts such as The Intersection, India Asks Why, and Mission ISRO combine narrative journalism with science communication, reaching younger audiences through Spotify and Google Podcasts. Such initiatives contribute to popularizing science beyond traditional classroom learning.

Challenges in the Indian Digital Science Communication Landscape

Misinformation and “Infodemic”

As observed globally, India experienced an “infodemic” during Covid-19. False claims about vaccines, Ayurveda remedies, and virus origins spread rapidly on social media. The government responded with PIB Fact Check and collaborations with platforms to flag misinformation. Yet, structural challenges such as low media literacy and algorithmic amplification persist.

Scheufele and Krause (2019) warn that misinformation undermines public trust in science. In India, this is exacerbated by linguistic diversity and unequal internet access—resulting in uneven information verification capacities.

Accessibility and Digital Divide

Despite rapid digitalization, India’s rural–urban and gendered digital divide restricts equitable access to science information. The Internet and Mobile Association of India (IAMAI, 2023) reported that rural women remain the least connected demographic. Consequently, online science communication often excludes the very populations most in need of accurate health and environmental knowledge.

Trust Deficit and Political Polarization

Public trust in scientific institutions fluctuated during vaccine rollout controversies and environmental debates. Digital echo chambers and politicized narratives have polarized discussions on climate change, genetically modified crops, and Covid policies. As Kaiser and Puschmann (2017) note, such counter publics may challenge scientific consensus and institutional authority.

Lack of Professional Training: Science communicators in India often lack formal training in digital communication, leading to gaps in visual storytelling, data journalism, and ethical standards. Few



universities offer specialized science communication courses, and journalists rarely receive mentorship in fact-checking scientific claims.

Discussion

The Indian case mirrors the global trends highlighted by Metag et al. (2023) and Xu et al. (2023) digitalization has expanded participation in science communication but also multiplied its challenges. Scientists, journalists, influencers, and government agencies coexist as communicators, often overlapping in function and audience.

Digital platforms have transformed science communication into a dynamic “networked ecosystem,” where information flows are multidirectional. During the 2021–2023 period, India witnessed a surge in collaborative campaigns blending official information with citizen participation for example, Vaccine Seva (Ministry of Health), Har Ghar Tiranga (using digital platforms for civic science), and climate awareness drives through Mission LiFE.

However, unlike Weibo’s relatively centralized environment studied by Xu et al. (2023), India’s science communication is highly decentralized and linguistically fragmented. This diversity creates both resilience and risk multiple voices enhance inclusivity but complicate standardization and verification.

Moreover, cultural narratives play a vital role. Indian audiences respond better to contextualized stories that connect science with daily life be it explaining monsoon variability, food safety, or space achievements like Chandrayaan-3. The narrative approach also aligns with social identity and emotional resonance, crucial for building scientific temper.

Future Directions for Effective Science Communication in India

1. **Institutional Strengthening:** Establish dedicated digital science communication units within ministries and universities. Encourage collaboration between Vigyan Prasar, media houses, and educational institutions to produce verified, engaging multimedia content.
2. **Capacity Building:** Introduce structured training in digital storytelling, data visualization, and science journalism for communicators. Integration of science communication courses at the postgraduate level is essential.
3. **Vernacular and Inclusive Communication:** Prioritize regional languages and local dialects. Utilize community radio, short-form videos, and WhatsApp bots to reach rural populations.
4. **Fact-Checking Ecosystems:** Expand PIB Fact Check partnerships with independent organizations like Alt News and Boom Live to cover scientific misinformation comprehensively.
5. **Citizen Science and Participatory Platforms:** Promote open-access data and citizen participation in scientific projects (e.g., biodiversity monitoring, climate adaptation).
6. **Ethics and Transparency:** Develop codes of conduct for scientists and influencers communicating science online to prevent sensationalism and conflict of interest.

Conclusion

Science communication in the digital age in India is both a transformative and contested space. The study period (2021–2023) illustrates how digital technologies expanded access, participation, and creativity in communicating science, yet simultaneously introduced misinformation, polarization, and ethical concerns.



India's experience underscores that digital media are not mere channels but cultural environments where science must compete with entertainment, ideology, and emotion. Therefore, effective communication requires interdisciplinary collaboration, cultural sensitivity, and institutional innovation.

As India advances toward becoming a knowledge-driven society, strengthening digital science communication is essential to cultivating scientific temper, social trust, and informed citizenship. The digital revolution has democratized Indian science communication but sustaining its credibility will determine whether the promise of "Science for All" becomes a reality.

References

1. Bucchi, M., & Trench, B. (Eds.). (2021). Rout ledge handbook of public communication of science and technology (3rd ed.). Rout ledge.
2. Dutt, B. (2022). Making science public: Indian media and scientific literacy in the digital age. Oxford University Press.
3. Gupta, A. (2019). Communicating science in India: Historical evolution and challenges. *Science Reporter*, 56(9), 10–15.
4. Kaiser, J., & Puschmann, C. (2017). Alliance of antagonism: Counter publics and polarization in online climate change communication. *Communication and the Public*, 2(4), 371–387.
5. Kumar, A., & Seshadri, S. (2022). Digital inequality and access to science communication in India. *Asian Journal of Communication*, 32(3), 256–270.
6. Metag, J., Winterlin, F., & Klinger, K. (2023). Editorial: Science communication in the digital age—New actors, environments, and practices. *Media and Communication*, 11(1), 212–216. <https://doi.org/10.17645/mac.v11i1.6905>.
7. MaC 11 (1) - Editorial_Scienc.
8. Neuberger, C. (2009). *Internet, journalism and the public sphere: Analysis of the media transformation*. Springer.
9. Raj, M., & Raman, S. (2022). Science communication, language, and trust: Lessons from Covid-19 outreach in India. *Indian Journal of Science Communication*, 21(1), 35–48.
10. Scheufele, D. A., & Krause, N. M. (2019). Science audiences, misinformation, and fake news. *Proceedings of the National Academy of Sciences*, 116(16), 7662–7669.
11. Thomas, A. (2021). Social media and public understanding of science in India. *Journal of Communication Studies*, 43(2), 78–93.
12. Xu, J., Guo, D., Xu, J., & Luo, C. (2023). How do multiple actors conduct science communication about Omicron on Weibo: A mixed-method study. *Media and Communication*, 11(1), 306–322.