

## **REVISITING INDIA’S SCIENCE COMMUNICATION AND JOURNALISM: ISSUES AND CHALLENGES**

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### **Abstract**

*India has been experiencing widespread diffusion of science communication activities due to various programmes initiated by the successive Central governments and other non-governmental organisations over the past three decades. As India is technologically advancing and entering into information age, the need for diffusion scientific information to the non-scientific community is also fast growing fast. This paper is an attempt to provide a fresh historical overview of growth of science communication in India. It also identifies some of the key obstacles confronting science communication and journalism in India.*

**Keywords:** Science, Communication, India, Problems, Prospects

### **Introduction**

India has made a phenomenal progress in science and technology in the past three decades. However, to what extent the science and scientific knowledge are actually transmitted to the common masses remains a tricky question in India? Several programmes and initiatives have been launched to promote science and communicate science by bridging the gap between science and common masses through diffusion of information. The primary concern is to help science and scientific cultures penetrate India’s diverse society, and to transform it into a nation of scientifically thinking and scientifically aware people (Patrairiya, 2002). Science communication, being a complex network of social channels, serves as a mechanism for bridging the gap between the scientific community and the lay public. It is also an effective

tool for extending scientific boundaries and gaining wide public support for important research and development, which are indispensable for society's development. Moreover, there are multiple challenges in the way science is communicated in a culturally diverse and complex social environment.

Science writing or science journalism remains undeveloped in India though it had a good beginning in the early 1950s, and there are many dimensions to the problems of science communication. It has not progressed to a desired stage. The larger segments of the populations even do not have access to scientific knowledge due to illiteracy and in absence of seriously planned agenda for disseminating scientific knowledge to non-scientific community whose curiosity have increased on science and technology over time. This paper is an attempt to understand the complexity of science communication in India. It gives a historical view of the growth of science communication, and linking it to emerging challenges and opportunities of science writing or science journalism in the country. It also gives a brief theoretical understanding of the concept of science and communication to throw a broad light on what constitutes science communicating.

### **Defining 'Science' and 'Communication'**

Science communication, relatively a new field of academic knowledge is currently emerging as an area of practice and research. The past two decades, witnessed a phenomenal growth in scientific activities, courses, and practitioners of science communication have increased. However, a basic question remains in the popular academic discourse: what actually is science communication? In what ways it is different to public awareness of science and public understanding of science, scientific culture, scientific literature etc. There is a wide range of discourse and scholarship on science communication today. Nevertheless, 'science' and 'communication' are two different terms differing in meanings and essence. To examine what science communication really is, one has to clearly define the meanings of both the terms. Each of the terms has however multiple meanings. There are other closely related concepts pertaining to science communication. The following brief description of each of the terms, though not satisfactory, explains how these terms are indispensable in understanding the relationship between science and communication.

## *Science*

Defining sciences is not an easy task. According to Webster's New Collegiate Dictionary, the definition of science is 'knowledge attained through study or practice,' or 'knowledge covering general truths of the operation of general laws, especially as obtained and tested through scientific method concerning the physical world.' It simply means that science refers to a system of acquiring authentic knowledge. This system uses observation and experimentation to describe and explain natural phenomena. The panel on Public Affairs of the American Physical Society, for example proposed a definition that some describe as pure science: "Science is the systematic enterprise of gathering knowledge about the world and organising and condensing that knowledge into testable laws and theories" (Burns, O'Connor and Stocklmayer, 2003).

## *Communication*

"Communication (together with its twin 'information) is perhaps one of the most loosely defined in contemporary media and cultural studies. It is because the term encompasses a multitude of experiences, actions and events, as well as a whole variety of happenings and meanings, and technologies (Kumar, 2010: 1). Dr. McFarland defined communication as a process of meaningful interactions by which meanings are perceived, and understandings are reached among human beings (Mishra and Singha, 2008:5).

Similarly, M.T. Myers and G.E. Myers defined that communication is 'a special kind of patterning which is express in a symbolic form. For any communication to take place between or among people, two requirements must be met namely, (a) a symbolic system must be shared by the people involved (we need to speak the same language or jargon or dialect, and (b) the associations between the symbols and their referents must be shared' (ibid. p.6). In nutshell, communication is described as an act of transmission of ideas, thoughts, beliefs, knowledge and opinion, etc (Kumar, 2010).

## *Communication and Information*

Communication and information are not similar concepts. Conceptually, 'communication' is not a mere process of sending or receiving in information in whatever form. Rather it is a whole situations and experience; a human relationship, in sum (ibid., p. 6). Whereas,

information is an abstract entity, has no separate existence on its own. It is made of bits of messages, which include both verbal and non-verbal forms. In its technical sense, information is a sequence of symbols that could be decoded or interpreted as a message. It can be recorded as signs, or transmitted as signals. Information is the message (utterance or expression being conveyed (Floridi, 2010)). The meaning of this concept varies in different contexts. Moreover, the concept of information is closely related to the notions of constraints, communication, control, data, instruction, knowledge, understanding, mental stimuli, perception, representation, entropy and so on.

### *Public Awareness of Science (PAwS)*

Public Awareness of Science are terms related to the attitudes, behaviours, opinions and activities that comprise the relation between the general public or lay society as whole to scientific knowledge and organisation.<sup>i</sup> Gilber, Stocklmayer and Garnett (1999) defined it as: “Public awareness of science and technology may be defined as a set of attitudes, a predisposition towards science and technology, which are based on beliefs and feelings and which are manifest in a series of skills and behaviour.”<sup>ii</sup> The primary meaning of “awareness” implies knowledge gained through one’s own perceptions or by means of information.<sup>iii</sup>

### *Science Communication*

In loosely defined terms, Science Communication (SciCom) refers to a public media presenting science related topics to non-scientists and non-scientific communities. It is the processes by which the scientific culture and its knowledge are incorporated into the common culture (Bryant, 2004:1). Likewise, Schirato and Yell (1997) propose SciCom as “...the practice of producing and negotiating meanings, a practice which always takes place under specific social, cultural and political conditions.” It involves use of appropriate skills, media, activities, and dialogue to produce one or more of the following personal responses to science: Awareness, enjoyment, interests, opinion forming, and understating (Burns *et al.* 2003).

SciCom includes ‘pure science’, mathematics, statistics, engineering, technology, medicine, and related field.<sup>iv</sup> Science communicators are those who bridge the communication gap between the complex scientific world and the simple information requirements of stakeholders or the masses. According to Burns *et al*, science communicators require

appropriated skills, media activities, and dialogue to produce one or more of the following personal responses (the vowel analogy):

- Awareness, including familiarity with new aspects of science
- Enjoyment or other affective responses, e.g. appreciating science as entertainment or art.
- Interest, as evidenced by voluntary involvement with science or its communication.
- Opinions, the forming, reforming, or confirming of science-related attitudes.
- Understanding of science, its content, process, and social factors, etc.

### **Communication Revolution in India**

To understand the basic nuances of science communication in India, it is pertinent to revisit the growth story of the Indian journalism and its changing dimension in the present context. Historically, the setting up of first a printing press in Goa in 1556 by the Christian Missionaries set the trend for communication in the country, but James A. Hicky's *The Bengal Gazette*,<sup>v</sup> an English newspaper published from Calcutta (now Kolkata) in 1780, dawned the age of communication and journalism revolution in India (Kumar, 2010). Other newspapers such as *the Indian Gazette*, *the Calcutta Gazette*, *the Madras Courier* (1785), *the Bombay Herald* (1789), etc. soon followed. Radio broadcasting started in 1927. Limited duration of television programme began only in 1959 and complete broadcasting followed in 1965. This period also saw publication of India's first monthly Hindi science magazine namely, *Vigyan Pragat* in 1952.

In the 1950s, at least 214 dailies newspapers were in circulation across the country. Out of which 44 dailies were published in English language, while the rest in regional languages. Nonetheless, until 1980s, there was no magical growth in the media industry. It was only in the 1990s that India officially entered the *Information and Communication Age* or the *Digital Age*. Obviously, the economic liberalization in 1991 flagged of the growth story of India media. Through economic liberalization, India officially acknowledged the new opportunities brought about by globalization and technological advancement.

Dismantling of stringent regulations of economy, which India followed since 1947, and subsequent reduction in customs duties brought in huge foreign capital and technology, giving a fresh oxygen to media industry, particularly the television and the Internet industry.

Entry of transnational media corporations, boom in the private domestic television channels and commercialisation of the national television channel ‘Doordarshan’ are the most obvious results of this reorganised competitive environment. “...by the mid-1990s, a growing volume of international advertising...both the cable and satellite TV, and the Internet captured the attention of a growing urban middle class eager for more media choice. All these things change media habits, transformed connectivity and created a new public discourse as television news channels, Websites and blogs blossomed” (Ninan, 2007: 13). Print media also got overhauled in terms of technology, contents, layouts and circulation. The key factors behind India’s newspapers revolution, as Jeffry (2007) pointed include, *improved technology, steadily expanding literacy, better purchasing power, aggressive publishing*, and, last but not least *political excitement*.

In 2011 ‘the Indian Media & Entertainment (M&E) Industry registered a growth of 12 percent to reach INR 728 billion. The growth trajectory is backed by strong consumption in Tier 2 and 3 cities, continued growth of regional media, and fast increasing new media business’ (FICCI-KPMG Report 2012). The digital technology continues to revolutionize media growth, enabling wide and cost effective reach across diverse and regional markets across the country. Today, India has the world’s third-largest internet user-base with over 137 million<sup>vi</sup> and it has seen phenomenal growth rate of 16 per cent in 2012.<sup>vii</sup> As of June 2012, there were 99 million Internet users in Urban India and 38 million in rural parts of the country (Economic Times, 2012). In addition, India is one of the few places on earth where newspapers still thrive and plenty of opportunities are available for journalists (Ram, 2012). India is the largest newspaper market in the world with over 100 million copies sold each day. There are over seventy-thousand registered and 690 satellites television channels of which 80 are news channels. (Biswas, 2012)

Nonetheless, ‘one-third of India’s total population is yet to be reached by any or all of the mass media put together....The social reach of the Indian press is not impressive – about 85 copies of dailies newspapers per 1000 population, a statistics that fares dismally in any kind of international comparison’ (Ram, 2012). Likewise, the dozens of 24 x 7 satellite television news channels that compete with the print media in English and the various Indian languages account for only about 10 per cent of the total TV market, which means they are decidedly not the dominant ‘organism’ in the Indian news media ‘ecosystem’ that they sometimes claim to be<sup>viii</sup>. Even in terms the Internet use, as on June 2012, only 11.4 per cent Indians have

access to Internet.<sup>ix</sup> This clearly demonstrate that the access to information, whither it is political, social or scientific, is alarmingly limited to urban populations. This remains a serious challenge to dissemination of information across the country, despite its high growth mode, as democratisation of information and communication is still to reach the rural India.

### **Strategies of Science Communication in India**

The most recent history of science communication in India dates back to the end of the nineteenth century, when the first imported books from Great Britain were translated into the main local languages and distributed among the upper echelons of society.<sup>x</sup> The government, non-governmental and voluntary agencies have been experimenting with various programmes, launched specifically to promote science cultures in order to penetrate India's socio-culturally diverse society, and to transform it into a nation of scientifically thinking and scientifically aware people (Patairiya, 2002). For instance, the preliminary works for science communication was initiated in the early 1950s when the Central government decreed the need to build the nation on the basis of widespread scientific knowledge and awareness.

India's first Prime Minister Jawaharlal Nehru, initiated reforms to promote higher education in science and technology. Western science came to be associated with the requirement of national building rather than being viewed entirely as a colonial entity, especially as it continued to fuel necessities from agriculture to commerce.<sup>xi</sup> Subsequently, the Indian Institute of Technology was conceptualised and launched in August 1951 at Kharagpur in West Bengal to promote technical education in India (Vrat, 2006). Thereafter, ample numbers of communication activities were launched through the media, public of books and translation of imported scientific books into local languages to transmit modern notions of physics, biology, medicine, etc. However, most of this writings were for academic textbooks.

Simultaneously, the National Institute of Science Communication<sup>xii</sup> (NISCOM) - previously the Publication and Information Directorate – also began publishing of the monthly Hindi magazine *Vigyan Pragat* in 1952. It envisaged as a newsletter disseminating information on scientific research activities and subsequently converted into a popular science magazine to inculcate scientific temper among the common people, helping them to ward off traditional beliefs.<sup>xiii</sup> The *Science Reporter* (an English monthly) and *Science Ki Dunia* (an Urdu quarterly) followed thereafter (Patairiya, 2002).

National Council of Science Museums, an autonomous society under the Ministry of Culture, was formed in April 1978 to popularise science and technology in cities, urban and rural areas for the benefit of students and for the common masses by organising exhibitions, seminars, popular lectures, science camps and various other programmes. Today it administers 25 museums and science centres, museums and planetariums spread across the country. It has established 22 Science Centres across the Indian states and Union Territories. These centres provide experiment based learning environment to inculcate a spirit of inquiry, foster creative talent and create scientific temper in the community. It also conducts 23 mobile science exhibition units throughout the country to create awareness of science and technology in rural areas and provides hands on learning opportunity to children and science lovers.

The major development came with the formation of the National Council for Science & Technology Communication in 1982, specifically launched to promote proper science education in the country. One notable achievement of the organisation was the utilisation of various media, both traditional and modern for promotion of science and technology.<sup>xiv</sup> In 1989, Vigya Prasar (an autonomous organisation of the Department of Science and Technology) was setup. As of now, it is one of most active organisations engaging in coordinating efforts among various scientific institutions, educational and academic bodies, laboratories, museums, industry, etc., for effective exchange and dissemination of scientific knowledge. The association also publishes a monthly newsletter titled *Dream 2047*. VIPNET (Vigyan Prasar NETwork)<sup>xv</sup> is another important project aimed at weaving all science clubs, societies, organisations that are already established, or are going to be established and are willing to work with Vigyan Prasar to strengthen the popular science movement in India. Moreover, the formation of Indian Science Writers' Association (ISWA) in 1985 re-fuelled science-writing profession in India. ISWA has undertaken a broad spectrum of activities including training courses, lectures and fellowships, and work with government agencies and NGOs.

National Centre for Science Communicators (NCSC), established in January 1997 is currently the only science-communicating organisation with national and international reach. The Centre was established to develop science communication by providing opportunities to explore and express their talents and creativity for better understanding of science. The membership includes science communicators from varied fields of communication- print and



electronic media, science centres, etc. Likewise, the National Institute of Science, Communication, and Information Resources (NISCAIR) came into existence in September 2002 with the merger of National Institute of Science Communication (NISCOM) and Indian National Scientific Documentation Centre (INSDOC) with an objective to collect and store, publish and disseminate scientific and technological information through the use of modern as well as traditional media.

The year 2004 was declared as the “Year of Scientific Awareness in India” to generate scientific awareness to all sections of the population through various programmes such as: i) organising debates on burning and controversial issues, ii) theme-based exhibitions, iii) radio and television programmes, iv) multimedia CDs, v) publications, vi) posters and wall-charts, vii) awareness campaigns on specific issues or themes, viii) puppet shows, folks-performances and popular lectures, ix) features and articles in newspapers etc., (Mohanty, 2004). These are some of the pioneering initiatives through which India has been attempting to communicate science to different state holders and the civil society. Many of these programmes have significantly contributed to development and promotion of science and scientific cultures among the people both in urban and rural areas.

### **Challenges to Science Communication**

India’s engagement in science promotion activities is multiplying and diversifying. But how does India fare in science communication compared to other developed countries is often debated in the academic discourse. India’s science promotion activities are happening mostly at the institutional levels and some need-based programmes are organised randomly, whereas, science journalism is yet to make any breakthrough. Despite witnessing a phenomenal growth in mass communication and journalism in the past three decades, the growth trajectory of India’s science communication is very much limited and does not look promising. Science writing is mostly concentrated among the scientific community and academic institutions, and shackled by complacency and over dependence on foreign sources (Patariya, 2002). There exists a lacuna in people’s passion about science and the diffusion of information about science in India.

The mainstream media coverage on issues related to science and technology is alarmingly poor and limited. The larger populations do not receive sufficient scientific data from the Indian laboratories and other scientific developments happening around the globe.

Conservative estimates show that science as a subject of human interests currently obtains only three per cent of the total mass media coverage in India (Mazzonetto, 2005). Despite mushrooming of institutions for promoting science and science education, publications of scientific materials have increased only marginally. Access to credible information on sciences is far from the desired standard. For instance, a large portion of funds is invested in sectors such as “secrete science”, including the military, defence, automatic energy and aerospace research. In these sectors where journalists have often difficulty in accessing information, and communication is complicated by some heavy red tape.<sup>xvi</sup>

Low priority in science writing in the mainstream media is also deeply rooted in the country’s journalism history. The press had always been obsessed in political affairs. For example, ‘prior to India’s independence, the press had a clear-cut- role to play in the nation’s struggle against the British rule. Press had put up a brave fight in its efforts to expose the brutality of colonial regime, particularly in its suppression of the freedom movement....many of the language press defied censorship regulations to keep the nation informed (and agitated) about the progress of the movement...’(Kumar, 2010:71). Even after Independence, there was no radical shift in news coverage of political events. It continued its fascination towards political events. There is a huge appetite for political news, and for entertainment (Ram, 2012). The other dominant themes such as, *cinema, cricket, crimes, corruption, fashion, high-end consumer products like smart phones, automobiles, etc.* get maximum media coverage. Whereas, some serious issues pertaining to India’s economy, poverty, health, medicine, agriculture, environment, or science and technology, etc., are either ignored or given a little media space and time.

The lack of interest among the mainstream media on issues related to science and technology stems from the fact that science writing, relatively a new field in India, requires proper trainings and skills in science and other related scientific matters. It is a lengthy, of course a laborious process that the communicator has to first understand the subject, simplify the scientific terms in non-scientific language and then communicate it in common men’s language. There is a necessity for appropriated trainings of science writers.

In a country like Australia, science communication is now a recognised profession; probably more so than in any other developed country (Mullahy, 2004, Metcalfe & Gascoigne, 2004: 1). Science journalism is yet to be materialised as a lucrative career opportunity in India.

There are only a handful of Institutes in the country that offering basic trainings on science communication and journalism. Many Universities in Australia and other European countries offer degree courses in specific science communication, which allows science communicators to improve their science communication skills and knowledge, while building better career. This is because the term science communicator encompasses a range of profession such as scientists, public relations practitioners, journalists, science centre workers, marketers and education officer (Mullahy, 2004). The type of science they communicate can be specialized or diversified, across any scientific fields such as physics, forestry, robotics, biology, astronomy, pathology or geography encompasses a range of professions such as scientists, public relations practitioners, journalists, science centre workers, marketers and education officers.<sup>xvii</sup>

One issue remains debated in the academic circle is that use of scientific language, which is never been the language of the masses, makes it difficult for the public to ascribe value to the importance of the scientific knowledge. Current science communication models operate on the premise that informed decisions must be based on solid science, to the exclusion of the public's values and identities (Nisbet, 2011). Unlike the western societies, the literacy rate in India is only 70.04 per cent.<sup>xviii</sup> The science literacy is even much lower compare to western society (Patariya, 2002). A large section of populations is not even aware of development in the frontiers of science and technology, though they are accepting latest scientific materials and making use them in their everyday life. Use of complex scientific language is perplexing even to educated populations. For the majority of the Indian population who are illiterate, scientific knowledge looks unattractive and unpalatable. Thus, any information relating to scientific matters sounds meaningless at times.

There are also other important factors, which are major obstacles to science writing. Cribb (2007) identified several obstacles to science communication, which are significant even in the Indian context such as: 1) communication gap among journalists, 2) lack of proper planning for communication, 3) cultural and political opposition, 4) scientific community's fear of media distortion, 5) bureaucratic and legal obstacles, 6) difficulty in translating in local languages, 7) scientists wanting to keep secrecy of their knowledge, 8) scientists discouraged from communicating by their managers, 9) science communication seen as a waste of resources, 10) lack of strong political will, etc. Obviously, some of these factors, either directly or indirectly contribute to unpopularity of science communication.

## Conclusion

A multi-prolonged strategy is required to make science communication more effective and to address obstacles associated with it. Scientists should be trained in the art of science communication while journalists must be oriented towards at least the basic understanding of sciences and its methodology. More platforms should be created to engage scientists and media practitioners to have close dialogues on issues pertaining to scientific developments. When the journalists and the scientific community exchange communication on issues related to science, it creates a mutual understand, which in turn yield positive outcome. More seriously planned agenda and policies for science communication in a truly transparent manner are a pre-requisite to engage and speed-up science communication. Last but not the least, the issue of professional dialects and departmentalism is a serious problem that must be fixed strategically to enhance free flow of scientific information to the non-scientific community. While transmission of information remains important, the challenge remains to develop transaction modes of science communication.

## Endnotes:

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<sup>i</sup> Public Awareness of Science, available at [http://en.wikipedia.org/wiki/Public\\_awareness\\_of\\_science](http://en.wikipedia.org/wiki/Public_awareness_of_science)

<sup>ii</sup> "Mental Modeling in Science and Technology Centres: What are Visitors Really Doing?", by J.K. Gilbert, S.M. Stocklmayer, and R. Garnett in *Proceedings of 'Learning Science in Informal Contexts'*, ed by S.M Stocklmayer and T. Hardy (Canberra: Questacon, 1999).

<sup>iii</sup> The Free Dictionary

<sup>iv</sup> Ibid, P 185

<sup>v</sup> Hicky's Bengal Gazette was the first English newspaper published in India from Calcutta in 1780. It ceased its publication on 23 March 1982.

<sup>vi</sup> Report on Internet Usage in Asia June 2012.

<sup>vii</sup> Report of the Internet and Mobile Association of India (IAMAI) and IMRB June 2012.

<sup>viii</sup> Ibid.

<sup>ix</sup> Internet World Statistics, June 2012

<sup>x</sup> Ibid.

<sup>xi</sup> History of Science and Technology in the Indian subcontinent, [http://en.wikipedia.org/wiki/History\\_of\\_science\\_and\\_technology\\_in\\_the\\_Indian\\_subcontinent](http://en.wikipedia.org/wiki/History_of_science_and_technology_in_the_Indian_subcontinent)

<sup>xii</sup> NISCOM BRINGS out 11 professional scientific journals and publishes various popular science books in Indian languages.

<sup>xiii</sup> Vigyan Pragati has over lakh readers across India.

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<sup>xiv</sup> Notes taken from the Department of Science and Technology, Ministry of Science and Technology  
[http://www.dst.gov.in/about\\_us/intro\\_DST.htm](http://www.dst.gov.in/about_us/intro_DST.htm)

<sup>xv</sup> Till April 2000, VIPNET had 1600 clubs. The single largest district membership is from Ratlam of Madhya Pradesh with 107 clubs while single state with maximum club is Utter Pradesh with almost 350 clubs.

<sup>xvi</sup> Ibid., P 5

<sup>xvii</sup> Ibid.

<sup>xviii</sup> 2011 Provisional Census Report

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