UNIT 9: SCIENCE COMMUNICATORS

UNIT STRUCTURE

9.1 Learning Objectives
9.2 Introduction
9.3 Who is a science communicator?
9.4 Training of science communicator
9.5 Let Us Sum Up
9.6 Further Reading
9.7 Answers to Check Your Progress
9.7 Possible Questions

9.1 LEARNING OBJECTIVES

After going through this unit, you will be able to understand

- various segments of science communication
- who are the science communicators along with their qualities and responsibilities
- various training avenues in India pertaining to this field

9.2 INTRODUCTION

Communicating science to the public means making complex ideas and concepts simpler without modifying scientific facts. It is considered as a great tool of development communication as it has the potential for societal transformation by enabling interfaces among scientist, public, policy makers, and industry and thus paves the way for public engagement in nation development. Dr. A P J Abdul Kalam once said, 'powerful communication is an asset to transform societies'. During the inaugural session of Eleventh International Conference on Public Science Communicators at New Delhi (2010), Dr Kalam said that 'the role of science communication is no longer limited to communication band-width, but the imagination band-width of scientists'. He proposed three important tasks for the people engaged in science communication. These are:

(a) to make all citizens, particularly those in remote and rural areas to feel enthusiastic towards science;

(b) to make all the citizens to know about the advances of science and their role in the society for economic and health development; and

(c) to make scientific achievements accessible for the people while being sensitive to sustainability of our planet and our responsibilities towards it.

Sarah Palmer and Renata Schibechi (2014), proposed four types of science communication:

- *Professional science communication:* associated with the professional practice of science (example: scientist).
- *Deficit science communication*: related to the knowledge exchange between scientists to "the public".
- *Consultative science communication*: It is a two-way communication where knowledge is exchanged from scientists to the non-scientific publics, and reverse, i.e. from the non-scientific publics to the scientists.
- *Deliberative science communication*: It is more democratic in nature. Like in *Consultative science communication* knowledge is exchanged between scientists and public in a two way process but in a more deliberative way. Here scientific knowledge and local knowledge are mutually respected.

Looking at other aspects of science communication, we find, science communication promotes use of appropriate skills, media, activities and dialogue to produce *personal responses* of public to science. According to Burns et al (2003), these 'personal responses' may be divided into five categories, viz. *awareness, enjoyment, interest*, *opinion sharing and understanding of science* (its content, processes, as well as social factors). As science communication today encourage not only communication but also 'engagement' of public, therefore, a science communicator has to play a decisive part in the process.

CHECK YOUR PROGRESS

Q.1 : What are the different types of science communication as given by Sarah Palmer and Renata Schibechi?

_____
_____
_____

Q.2 :Who was APJ Abdul Kalam?

_____
_____
_____

9.3 **WHO IS A SCIENCE COMMUNICATOR?**

A science communicator is a person who has interest in science and possesses skills in communication. Science practitioners, mediators, and other members of the general public (women, youth, children etc.) can work as science communicator with an intended action of communicating scientific knowledge or practices to non-scientists in an explicit and organised way.

Primary objective of a science communicator is to increase scientific temperament by targeting behaviour change of public. To achieve the objectives, a science communicator has to

i. Build trust both at scientists and public level
ii. Inspire interdisciplinary approaches from different branches of science
iii. Encourage the use of science stories for successful science communication
iv. Try to make the science personal
v. Promoting science communication and people's participation
vi. Boosting regional language in or mother tongue as language of communication for clear understanding of the content
vii. Understand the stage or level of audience understanding. Are they in *pre-knowledge stage* of knowing a subject? Do they stand at *knowledge stage* or in *acceptance stage*? Can the audience *advocate* about the topic? -The science communicator should ask before designing his strategy or message.

9.3.1 **(a) Scientists as communicator**

There is a prevailing nuance that scientists usually decline to respond to communication like skipping public hearing, ignoring discussions with policy makers and avoiding press. This, referred to as 'ostrich behaviour' of science communication, stands as a big challenge in public engagement. As such, the concept of 'scientist as communicator' has been grown worldwide. Alan Townsend, an ecologist and biogeochemist feels the it is not *what* a scientist says, but *how* one says it. Today, much attention have been paid to motivate scientist community that the results of

scientific research needs to be communicated for policy change and development of society at large.

(b) Women as science communicator

Women are the centre point of a family. A child learns everything from his/her mother. Therefore, it is essential to encourage mothers to be engaged in the process of science communication. Simple things like basic hygiene, sanitation, and respect for nature can be learnt at home, if a woman plays the role of a science communicator. Tales she tells to a child can make science as a component of the narrative. *Chipko movement* is a successful example of how women can become a change agent. Moreover, if women can be trained as a science communicator, probability of cultural barriers in the process of science communication gets reduced, as mother is the first teacher of a man.

(c) Youth – the change agent

Youth are enthusiastic, open for accepting change and implementing change. They are the next generation, inspiring audience in a society. For example, Greta Thunberg – a Swedish environmental activist has recently become the new face of the 'youth as a change agent' internationally for her voice on climate crisis.

(d) Children- the future hope

It is a universal truth that today's children are tomorrow's citizen. Children can be attracted easily with creative activities in science and hence will be involved in the organisational framework of science communication. School curriculum, science museums, fairs and festivals, planetariums, zoo may provide opportunities for children engagement. Face-to-face interaction with scientists or experts can germinate scientific temperament among children. For children, content of science should be fun for developing their imagination and engagement.

Aryabhatta Science Centre, an initiative of the Science and Technology Division of Assam Science Technology and Environment Council (ASTEC), Government of Assam is an example of how hands in science practise can be promoted for inculcating scientific temperament among children in Assam. Established in 2008, ASTEC had set up 219 numbers of Aryabhatta Science Centres in 219 development blocks of Assam. Objectives of Aryabhatta Science Centres are: (a) to build scientific attitude among the school students, (b)

to make science education exciting through experimentations and other hands-on-activities and (c) to promote basic science as a career option.

9.3.2 Qualities of a science communicator

There exists a great verity of approach, content designing, and communication philosophy that different organizations and communicators adopt as skills and to promote public engagement. It is an established fact that the science communication and public engagement demands best practice and better qualities from a mediator, called science communicator.

Considering the need of a common guideline, AAAS prepared a preliminary framework that outlines foundational science communication skills. This 'Foundational Skills for Science Communication-A Preliminary Framework' (2017), includes different skills and their component parts which a science communicator should possess for better connection and sharing of knowledge. These include:

(a) *Identifying and aligning engagement goals*: Science communicator should be capable of identifying the goals of the communication process. Accordingly, objectives should be made and strategy for communication should be prepared.

(b) *Adapting to communication landscape and audience*: The science communicator should be aware of the historical context of an issue, sensitivity of audience choice, values and core beliefs, need of expertise on the subject along with logistical challenges.

(c) *Messaging:* Message prioritization (i.e. identifying the core messages to communicate for audience), arrangement of supporting evidences for the message, understanding audience dimension and audience categorisation are some key issues that a science communicator needs to focus on. It is interesting to inform you that The AAAS Communicating Science program focuses their messaging instruction on the "3Ms" structure i.e, messages should be in miniature format (short and simple), memorable, and meaningful (particularly to the audience).

(d) *Language*: Language here has two folded meanings- i) the language of science and ii) language that is spoken by the audience. When considering the language of science, a communicator should use analogies, metaphors, descriptive examples, or other tools in support of the content. Inclusions of words, phrases, connotations from the speaking language of target audience make the message acceptable and understandable for the audience.

(e)Narrative: A common quality of all the good communicators of the world is that they are fine story tellers. Therefore, a science communicator should prefer to tell stories and includes tools like personal stories/anecdotes/analogies/metaphors/visual imagery etc. to connect with audiences.

(f) *Non-verbal communication:* A good quality of a science communicator is the knowledge of non-verbal communication in case of face-to-face communication. The communicator's poster, gestures, expression, vocal dynamics etc. play a crucial role in adding emotions and belongingness of the audience.

(g) *Writing /presentation style*: Writing/ style is the heart of all communication. Therefore, a good science communicator always knows the appropriate style of presentation for different audience and for different media (print, electronic, folk or new media). Use of active voice, present tense and clear, non-biased sentences are the golden keys for communication.

(h) *Creating Space for Dialogue; Listening, Empathy, and Audience Engagement*: Demonstration of openness and warmth by a science communicator opens the door for public engagement in science communication. Listening to what the audience has to say, respecting their culture and knowing the context of the matter are considered as good qualities of a science communicator.

In addition to these qualities, some other conventional norms for a good science communicator are:

(i) *Love for research*: Science is easy to understand but tough to explain. As such, science communicator should have openness for doing research on a subject, planning and preparing strategies for meaningful communication.

(ii)*Plane for unexpected*: A good science communicator always prepares for any unexpected hurdles that might encounter the free and even flow of communication. Such hurdles may be political, legal, cultural, environmental, economic or logistic in nature.

(iii) *Evaluation*: Evaluation or scrutiny of a communication process builds the foundation stone for the next project. As such, a science communicator should practice SWOT analysis (Strength, Weakness, Opportunity, and Time) during evaluation for effecting science communication.

(iv) Reverence for the 7 Cs of communication i.e., credibility, context, content, clarity, continuity and consistency, channels for audience suitability, capability of audience understanding are basic qualities of science communicator to persuade the minds of audience and provide space for public engagement.

9.3.3 Methods and forms of science communication

Sam Illingworth, in the paper entitled *Delivering effective science communication: advice from a professional science communicator* elaborately discusses about various methods and forms that can be adopted by a science communicator for effective communication of science. These methods and form are:

(i) Traditional journalism (newspaper, radio)

(ii) Live or face-to-face events (e.g., public lectures, panel debates,science festivals) and

(iii)Online interactions (e.g., blogs, websites, videos, podcasts, social media interaction etc.)

Among all these methods, face-to-face events are considered as the most powerful way for establishing effective science communication. Face-to-face events can be divided into various categories like:

(a) Panel Discussions: This includes discussions or debates on a topic by several experts from the subject

(b) Science Festivals: Science festivals present science in a purely entertaining way by simplifying the contents. Such festivals, according to experts are useful to engage public.

(e) **Science Busking**: Science Street performances, where science is used to draw in a crowd and explain a topic to them (like street plays or magic shows) falls into this category. Science busking depends upon the skill of the performer.

(f) **Book Clubs**: Small reading groups for interested parties can be created to discuss scientific accuracy (or not) of a chosen book. Such initiatives can be promoted at school level also detailed and in-depth discussions on a topic of science, thus promoting young minds for embracing science as a profession.

(g) **Citizen Science**: These are activities that involve the public in scientific research.

(h) Workshops: Workshops are effective ways of science communication as a topic can be addressed in several ways by experts. In workshop, public engagements become higher.

(i) Folk media: Being an informal media and close to people's heart, use of folk media for propagation of message is crucial in developing countries in particular.

(j) Citizen Juries: Citizen Juries can play a significant role in sensitive issues like environmental assessment. It involves members of the policy members, experts and public coming together on a topic, using scientific research and public opinion to achieve the most effective set of recommendations for an issue like dam construction, conservation of eco sensitive zones, chemical or nuclear power plant establishment etc.

Science communicator can also use other platforms like museums, different events, science fiction and advertising, cinema (both documentary and fiction films) to reach each and every individual of a society.

CHECK YOUR PROGRESS

Q.3 : Who is a science communicator?

_____
_____
_____

Q.4 :What are the prime objectives of a science communicator?

_____
_____
_____

9.4 TRAINING OF SCIENCE COMMUNICATORS

Training programmes for communicating science in India have received preferred space in the recent years. Many institutes working in the field of science are offering training programmes individually or in a collaborative effort. For example, *The National Council for Science Museums* (NCSM) offers a two-year regular M. Tech degree programme in science communication in collaboration with BITS, Pilani. This four-semester, professional degree course aims to train science graduates as science communicators. 'History and Philosophy of Science to the art of Mass Communication with a focus to science dissemination and the application of the most modern technologies in science communication' is the basis of the course.

Vigyan Prasar (VP), an autonomous organization under the Department of Science and Technology (DST), Government of India also provides science communication

workshops, training programmes, that serve India's science popularization agenda. Vigyan Prasar has three folded objectives to fulfill this aim (These are : (i)- to create and foster a well-informed citizenry by highlighting dimensions of science and technology, (ii)- by promoting teaching and learning including education and other community centered interventions across the country and (iii) engagement of various stallholders and community.

CSIR-NISCAIR focuses on higher education and research. They introduced academic courses and research programmes leading to M.Sc. in Science & Technology Communication and research (PhD).

Indian Science Communication Society (a voluntary and non-governmental organisation established in 1994 by a group of self-motivated professionals, science writers and scientists driven by the visionary zeal and passions to popularise science and scientific temper among the Indian masses) offers One Year "Training Course In Science Journalism" (Through Online Education).

Oflate, Post Graduate and Graduate courses on Science Communication are becoming an integral part in various academic courses (for example: Devi Ahilya University, Indore; Lucknow University; Anna University, Chennai; Makhanlal Chaturvedi National University of Journalism and Communication (MCNUJC), Bhopal, Madurai Kamaraj University (MKU), Madurai, Gauhati University, Guwahati and Tezpur University, Tezpur. National Council for S&T Communication (NCSTC), Department of Science and Technology, Government of India has supported many universities for offering science journalism or Science Communication as a paper/semester course as part of the syllabi of journalism and mass communication of such institutes).

Apart from these courses, different government and nongovernmental organisations and agencies conduct workshops and training courses in different times.

9.5 **LET US SUM UP**

- Communicating science to the public means making complex ideas and concepts simpler without modifying scientific facts. It is considered as a great tool of development communication as it has the potential for societal transformation by enabling interfaces among scientist, public, policy makers, industry and thus pave the way for public engagement in nation development. Different types of science communications like *professional science communication, deficit science*

communication, Consultative science communication, *deliberative science communication* have opened up avenues for working in this field.

- It is an established fact that the science communication and public engagement demands best practice and better qualities from a mediator, called science communicator. A science communicator is a person who has interest in science and possesses skills for communication. Science practitioners, mediators, and other members of the general public (women, youth, children etc.) can work as science communicator with an intended action of communicating scientific knowledge or practices to non-scientists in an explicit and organised way.
- There exists a great verity of approaches that different organizations and communicators adopt as skills and to promote public engagement. Various methods and forms that can be adopted by a science communicator for effective communication of science.
- For effective science communication, training is a prerequisite for a communicator. Such programmes for communicating science in India have received preferred space in the recent years. Many institutes working in the field of science are offering training programmes individually or in a collaborative effort. Post Graduate and Graduate courses on Science Communication is becoming an integral part in various academic courses in Indian Universities. Apart from these courses, different government and nongovernmental organizations and agencies conduct workshops and training courses in different times

9.6 **FURTHER READING**

1. Burns, T. W., D. J. O'Connor, and S. M. Stocklmayer. 2003. 'Science Communication: A Contemporary Definition'. Public Understanding of Science 12 (2): 183–202.
2. Dutta, A., & Ray, A. (2011). Science communication in Assam.
3. Horst, Maja, Sarah R Davies, and Alan Irwin. 2017. 'Reframing Science Communication'. In The Handbook of Science and Technology Studies, edited by Ulrike Felt, RayvonFouché, Clark A Miller, and Laurel Smith-Doerr, 4. Cambridge: MIT Press.

4. National council for science & technology communication NCSTC | Department of science & technology. (2021, September 23). Department Of Science & Technology. https://dst.gov.in/scientific-programmes/st-and-socio-economic-development/national-council-science-technology-communication-ncstc
5. Palmer, Sarah E., and Renato A. Schibeci. 2014. 'What Conceptions of Science Communication Are Espoused by Science Research Funding Bodies?' Public Understanding of Science 23 (5): 511–27.

Websites:

CSIR-NISCAIR. https://www.niscair.res.in/
Indian Science Communication Society (ISCOS). https://www.iscos.org/
Vigyan Prasar Science. https://vigyanprasar.gov.in/
Assam Science Society. https://assamsciencesociety.in/

9.7 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: Different types of science communication are : Professional science communication, Deficit science communication, Consultative science communication and Deliberative science communication

Ans to Q. No 2: APJ Abdul Kalam was the former President of India. He is also considered as one of the finest science communicator of the world.

Ans to Q. No 3 : A science communicator is a person who has interest in science and possesses skills in communication. Science practitioners, mediators, and other members of the general public (women, youth, children etc.) can work as science communicator with an intended action of communicating scientific knowledge or practices to non-scientists in an explicit and organised way.

Ans to Q. No 4 : The prime objectives of a science communicator is to increase scientific temperament by targeting behaviour change of public.

9.8 POSSIBLE QUESTIONS

A. Short Questions (Answer each question in about 150 words)

Q.1 : Write about the various tasks for the people engaged in science communication.

Q.2 : Write short notes on-

(a) Women as science communicator

(b) Youth – the change agent

(c) Scientist as science communicator

(d) Child as science communicator

B. **Long Questions (Answer each question in about 300-500 words)**

Q.1 : Highlight on the qualities of a science communicator

Q.2 : Discuss about the various methods and forms of science communication

Q.3 : Briefly mention about the scenario on training of science communicators in India.