ISSN 0972-429X

Indian Journal of Science Communication

Communicating Science of Science Communication

The making of DD Kisan TV Channel: An assessment

Coverage of defence science in Indian press

Understanding scientific wisdom and culture

Volume 15 Number 1 January – June 2016

Indian Journal of Science Communication

Advisory Board

Chairman

Prof. M.A. Ansari
Chairman
Indian Science Communication Society
Lucknow, India

Members

Prof. Sung Kyum Cho
Dean of Social Science Studies
Chungnam National University
Deijeion, South Korea

Mr. Toss Gascoigne
Treasurer
International PCST Network
Brisbane, Australia

Dr. P. Iyamperumal
Vice Chairman
Science City
Chennai, India

Dr. Abdul Waheed Khan
Former Asst. Director General, Communication & Information
United Nations Educational Scientific & Cultural Organization
Paris, France

Prof. Krishan Lal
President
Association of Academies and Societies of Sciences in Asia
New Delhi, India

Prof. Bruce Lewenstein
Director, Science & Technology Studies
Cornell University
Ithaca, New York, USA

Dr. Maria Ines Nogueira
Vice Director, Science Centre
University of Sao Paulo
Sao Paulo, Brazil

Dr. V.K. Srivastava
President
Indian Science Writers' Association
New Delhi, India

Member Secretary

Dr. Manoj Kumar Patairiya
Addl. Director General
Broadcasting Corporation of India
Doordarshan, New Delhi, India

- The *Indian Journal of Science Communication* (IJSC) seeks to promote and disseminate knowledge and activities in the area of science and technology communication and provides a forum for addressing issues emanating from concept to research and practice.
- The phrase 'science communication' covers a broad canvas of communicating all basic and applied sciences, such as health communication, agriculture communication, environment communication, technology communication, innovation communication, etc. It also includes science and media interface with attitudinal, social and cultural implications.
- The IJSC is a peer reviewed half yearly international research journal published twice in a year in January and July.
- The IJSC is brought out and disseminated by Indian Science Communication Society (ISCOS) and catalysed and supported by NCSTC/ DST.
- The NCSTC/ ISCOS assume no responsibility for the opinions offered by the contributors.
- Address for submission of contributions for publication: The Editor, *Indian Journal of Science Communication*, Indian Science Communication Society, Chandrika Bhawan, 577-D, Near Dandahiya Masjid, Lucknow – 226022, India; E-mail: editorijsc@gmail.com; mkp@nic.in. Refer **Instructions for Contributors**.
- Address for subscription and advertisements: The Coordinator IJSC, Indian Science Communication Society, Chandrika Bhawan, 577-D, Near Dandahiya Masjid, Lucknow – 226022, India, Phone: +91-8090907153; E-mail: info@iscos.org. Payments may be sent by demand draft/ cheque issued in favour of Indian Science Communication Society, payable at Lucknow or online bank transfer. Refer **Subscription Form**.
- The IJSC follows **Open Access** (OA) policy and available online for reading and academic consultation only; it cannot be used for any commercial purpose. The print version is available on subscription.
- © 2016, NCSTC/ ISCOS. The contents of IJSC may not be used or reproduced in any form as it is or otherwise without prior written permission of the Editor/ Publisher.
- Price per copy for Individual:

  Inland: ₹ 300
  Overseas: US $ 15

Indian Journal of Science Communication
Indian Science Communication Society
Chandrika Bhawan, 577-D, Near Dandahiya Masjid, Lucknow – 226022, India
Phone: +91-8090907153; +91-11-26537976, Fax: +91-11-26590238
E-mail: info@iscos.org; mkp@nic.in; editorijsc@gmail.com
Website: www.iscos.org

Indian Journal of Science Communication

CONTENTS

PAPERS

3-15 **The making of DD Kisan TV Channel: An assessment**
Manoj Kumar Patairiya

16-24 **Coverage of defence science and technology in Indian press: A content analysis**
Phuldeep Kumar and Harish Kumar

25-31 **Mathematics popularisation through radio medium: A global assessment of applications and outcomess**
Ujjwala Tripti Tirkey and R Sreedher

ARTICLE

32-34 **Understanding scientific wisdom and culture**
Alka Muddgal and Kalpana Sangwan

CASE STUDY

35-38 **HIV-AIDS awareness through Doordarshan programmes: An analysiss**
Rachita Srivastava Roy

COLUMNS

2 **Editorial:**
DD Kisan: A step forward towards a science television channel

39 **News:**
AASSA Special Committee on SHARE Communication: IJSC Editor as Vice Chair

COVER

DD Kisan Channel
Prime Minister Narendra Modi launches DD Kisan TV Channel, Vigyan Bhavan, New Delhi, May 26, 2015

Scientoon
More planets in solar system
Bacteria do have personality

EDITORIAL BOARD

Editor
Dr. Manoj Kumar Patairiya

Associate Editor
Dr. Divya Srivastava

Layout
Ravi Agarwal

DD Kisan: A step forward towards a science television channel

A full-fledged TV channel devoted to science and technology has been a long cherished dream of one and all whosoever is interested in science and its communication among masses. The demand and desire have been raised from different corners for such a channel. A Kisan TV channel was started through Educational Media Production Centre (EMPC), Indira Gandhi National Open University (IGNOU) in 2001 but could not sustain. It is now a welcome effort of the government to have an exclusive 24x7 satellite TV channel especially dedicated to agriculture and farming community of the country. Prime Minister Narendra Modi, in his speech on June 8, 2014, stressed on the future of farmers with a spotlight on Second Green Revolution. Finance Minister Arun Jaitley in his budget speech for 2014-15 on July 10, 2014 announced a TV channel dedicated to agriculture sector with an outlay of Rs 100 crore for providing real-time information on various farming and agriculture issues to farmers.

The Prasar Bharti - India's Public Service Broadcaster, had been deliberating whether a single agriculture channel would suffice considering different languages and requirements in various states and regions of the country. Doordarshan and All India Radio - two broadcasting arms of Prasar Bharti already running programmes related to agriculture and farming under Krishi Darshan and Farm & Home respectively. The Prasar Bharati Act says that the public broadcaster should pay special attention to fields of agriculture and rural development along with areas like education and spread of literacy, environment, health and family welfare and science and technology.

The DD Kisan Channel was launched by Prime Minister Narendra Modi on May 26, 2015 in a function held at Vigyan Bhavan, New Delhi and flagged off Kisan Rath to go around in different states across the country spreading the message of DD Kisan. He emphasized on farmers' friendly programmes covering all facets of farmers' life ranging from information sharing to entertainment, skill development to marketing, and education to banking, including reality shows involving farmers! Agriculture Minister Radha Mohan Singh, Information & Broadcasting State Minister Rajya Vardhan Rathore, and Prasar Bharti Chairman A Suryaprakash, amongst other dignitaries were present on the occasion.

In a short span of time the DD Kisan channel has been able to attract some 20 million viewership and has touched almost all geographical regions of the country through coverage of programmes and participation of farmers and experts. DD Kisan covers latest information on agriculture and related subjects for the benefit of the target audience which includes farmers, cattle rearers, bee keepers, poultry owners, agriculture equipment makers and craftsmen, etc. The content is a mix of core agriculture programmes and documentaries as well as entertainment programmes with rural focus. There are special programmes on women empowerment, skill development, success stories, agriculture based reality shows, live Phone-in programmes, and discussions, etc., to cater to mainly the rural India. The channel also covers a wide range of programmes on a variety of subjects, i.e. health, environment, culture and current affairs. The channel enjoys excellent feedback from all stakeholders especially farming community. The DD Kisan is also available online at < webcast.gov.in/ddkisan > on mobile while on move.

Generally a majority of people think that India is a country of farmers consisting something like 70% population of the country, but it is a sheer miss-belief! As a matter of fact the population that lives in villages is around 70% (68.84% as per Census 2011) and all villagers are not farmers. The real India is known from her villages and farmers. Farmers and farming community are the backbone of country's economy but comprise only 22% population of the country as per Census 2011 and diminishing alarmingly. Moreover, this data includes a major portion of farm labourers who are without landholding. Today the farmers' community is poised with different challenges sometime resulting into unlikely events. The growing tendency for migration and moving to other professions leaving behind the agriculture is yet another big challenge and needs to be addressed with appropriate knowledge, awareness and motivation. Dedicated channels like DD Kisan can play a significant role in not only motivating and empowering farmers with appropriate knowledge and awareness to remain within the fold of agriculture but also attracting the forward looking youths to join the exciting and challenging profession of agriculture by employing modern and scientific farming techniques with the spirit of innovation and enterprise. Hopefully, DD Kisan may subsequently show the way to yet another television channel dedicated to science for which the thirst, desire and capability already exist in the country!

Dr. Manoj Kumar Patairiya

The making of DD Kisan TV Channel: An assessment

Dr. Manoj Kumar Patairiya
Additional Director General, Doordarshan
Head, DD Kisan Channel & Central Production Centre, Doordarshan
531, Tower A, Doordarshan Bhavan, Mandi House, Copernicus Road, New Delhi-110001

Prime Minister Narendra Modi; Agriculture & Farmers' Welfare Minister Radha Mohan Singh, Information & Broadcasting State Minister Rajyavardhan Rathore, Cabinet Secretary Ajit Sheth, and Prasar Bharti Chairman A. Surya Prakash at the DD Kisan Launch Ceremony; May 26, 2015

The *DD Kisan* Channel was launched on 26 May 2015 by Prime Minister Narendra Modi at Vigyan Bhawan, New Delhi in presence of large number of farmers from different parts of the country in their traditional dresses and costumes. The DD Kisan channel aims at providing quality contents on the subjects related to agriculture, rural development and farmers' welfare mainly to the Hindi heartland of the country in the form of infotainment, besides regional contents with Pan India approach. The channel offers a platform to the farmers and scientists for exchange of agricultural knowledge and expression of views. It has been instrumental in keeping farmers updated on agro-market scenario and

agro specific information on weather conditions, forecasts, and advisories, etc. It also showcases various government schemes related to agriculture and rural development. DD Kisan has been working as a bridge between agricultural scientists and farmers and helps improve the socio-economic scenario of the nation.

Prime Minister had given a number of ideas in his speech on the occasion of the launch of the channel, such as Reality Shows involving farmers in the line of reality shows telecast on different channels, Programme for creating an atmosphere to connect youth to farming sector, and communicating modern agriculture science and technology to reach the field level. Accordingly, a variety of programmes are created and telecast including reality show involving farmers, success stories of farmers, Self Help Groups, folklore and crop related songs from different regions. The channel has also customized and started two daily programmes on weather and Mandi Bhav respectively with help and inputs from India Meteorological Department and National Commodity and Derivatives Exchange (NCDEX), and Agricultural Marketing Information Network (AGMARKNET).

As mentioned by Hon'ble Prime Minister at the time of launch of the channel, best practices and successful experiments carried out in agriculture universities, information of progressive farmers and grass root innovators, etc., being disseminated to improve productivity and economy. The success of the project cannot be measured merely through any monitoring mechanism, as the channel performs in much larger perspective as a knowledge hub to farming community, the benefits of which will go a long way for overall growth of the nation.

Prime Minister Narendra Modi welcomed by MOS, I&B Rajyavardhan Rathore

*DD Kisan*Channel, the first of its kind in the world, fully dedicated to the farmers, was launched on May 26, 2015, the first anniversary of the new government. The unique and un-parallel content touching all facets of the farming and rural population of India, DD Kisan created a wide range of array of topics ranging from farming techniques togovernment schemes for farmers, from animal husbandry to floriculture and horticulture, from artisans' and women empowermentto skill development and tribal farming, etc. In a very short span of time a team of professionals with proven track record in the field of television production was mobilized, MOU's with knowledge partners signed, channel packaging designed and all procedures completed successfully to meet the deadline of May 26, 2015.Moreover, the Kisan channel has been launched with the purpose of benefiting farmers of the country with best practices from within the country and as well as from abroad through which their horizon would be widened and knowledge enhanced.

Overview

The farmers are the backbone of country's economy and comprise of 22% population of the country. Today the farmers' community is poised with different challenges which are to be addressed with appropriate knowledge and awareness.

Different regions have different agricultural practices, crops, sowing systems, and aggro-climatic diversity. The farmers, especially the new generation, have a deficit of appropriate knowledge and finding it difficult to have a balance between the custom approach and modern approach of agriculture. In addition, market driven overuse of chemicals – fertilizers, insecticides, pesticides, aesthetic agents, supply of inappropriate seeds by companies, etc., causing health and environmental problems.

Special attention is to be given to farmers with small landholdings and to remove misconceptions about organic farming, which has been our traditional system. The increasing cost of modern agriculture technology and implements need heavy investment and leaves farmers helpless. Inadequate knowledge and space available for proper storage leads to wastage of tons of food grains.

Fluctuating and extreme weather conditions, climate change, drought, floods, cyclones, desertification, and excess snowfall, etc., are the common causes of farmers' plight in the country. The bank loan was getting costlier for farmers and beneficial for bankers. The integrated efforts for promoting agro-forestry, animal husbandry, horticulture, crop rotation, alternative entrepreneurship, etc., can save the farmers from the perils of weather dependent agriculture. In addition, age-old mis-beliefs and superstitions prevail in rural areas.

The DD Kisan is an effort to address these challenges and gaps, fulfill the long felt need of the farmers and cater to the Hindi heartland of the country including major dialects of Hindi, i.e, Bundeli, Bhojpuri, Awadhi, Brij-Bhasha, and Rajasthani, etc.

Prasar Bharati has launched the full-fledged 24 hours Kisan Channel that was welcomed by the government. The Government's pro-active and public-participatory approach is to be followed for inclusive development of farmers and meet the national priorities as follows:

- Diversification of area from traditional crop to commercial crop where irrigation potential has been created.
- The farmers shall be motivated to produce organic vegetables without the use of pesticides and chemical fertilizers.
- Development of rain-fed areas through watershed approach on a large scale for efficient use of natural resources.
- Rain water harvesting is yet another area which will not only provide lifesaving irrigation to the crops but shall also recharge the ground water and check erosion.
- Increase in productivity through high yielding hybrids.
- Adoption of precision farming practices (Poly-houses and Micro-irrigation).
- Project on diversification of agriculture through micro-irrigation and related infrastructure.
- Organic farming shall be the one of thrust areas.
- Post-harvest management and efficient marketing system.
- Farm mechanization shall be given major thrust to reduce cost of cultivation in view of high cost

of labour.
- A strong research extension interface in problem areas with solutions to be covered.
- Extension reforms through public-private partnership.
- Agro processing and value addition.
- Increase in productivity and quality.
- Application of biotechnology in the field of agriculture.
- Soil testing and soil health cards.
- To cater to the farmers' population of the country to create overall awareness and a drive for development.
- To play a catalytic role for the prosperity and health of the farmers' community of the country.
- To provide authentic, quality and useful information and analyses in a language comprehensible to the farmers.
- To regenerate and rejuvenate the cultural ethos and spirits of the people of the country.
- To promote the cause of gender equality, weaker sections and differently able persons.
- To inculcate scientific temper, self-respect, self-confidence, and mutual trust amongst fellow citizens.

Objectives

DD Kisan was launched mainly with following objectives:

- To inform, educate, entertain and to involve the farming and rural community about the new research and technological advances in the field of agriculture and all allied activities such as animal husbandry, dairy, fisheries, weather, commodity, rural skill development, etc.
- It is also the objective of the channel to inform and educate the farming and rural community about various government schemes and initiatives.
- All such content should be developed to uplift the rural community economically.
- To motivate and encourage the young generation to take up farming as a profession through inspirational programmes and showcasing case studies of successful entrepreneurs in the field of agriculture.
- To utilize all modes of communications such as Satellite, DTT, Web, Mobile and all latest social media platforms to enable the content reaches the end viewer.
- Aggressive marketing for the social cause through the media platforms.
- To develop relevant good quality content in each activities for the farming community.
- To generate content in all regional languages of the country for better connect and achieve its objective.
- To reach up to the farmers of remotest corner and show content which is relevant to them through broadcasting, narrow-casting, web-casting and any other technologies available in future.
- To establish a two-way communication with the target audience to qualify and quantify the objectives.
- To create content as per agri-climatic zones.
- To create content related to regional folks, arts, and handicrafts, etc.
- Annual research to identify the key deliverables to the target audience.

Amitabh Bachchan was involved in DD Kisan campaign

Programme content

The content of the channel is a mix of in-house and outsourced through Self Financing Commissioning mode. Something like 70 % of fresh content is produced in-house and the rest, mainly consisting of rural fiction, is sourced through professional groups. The channel was launched with daily fresh content of 4 hours and subsequently reached 8 hours of fresh content.

In addition to normal programes, specialized programmes were conceptualized, planned and started: i) Kaise Hein Aap (Health), ii) Rajyon Se (Incorporating narrowcasting programmes from Hindi states to give Pan India approach), iii) Lok

Sl. No	Content Genre (In House)	Hours
1	Non Fiction Programme	33
2	Feature Films	6
	Total	***39***
	Content Genre (Self Financing Commissioned - SFC)	
1.	Non Fiction Programme	2.5
2	Fiction Programme	12
	Total	***14.5***
	Grand Total (In house+SFC)	***53.5***

Agriculture Minister Radha Mohan Singh at DD Kisan

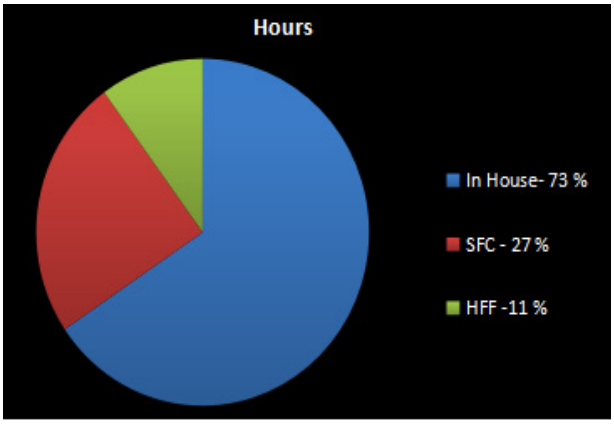
Programmes	Description
1) Kisan Samachar	News related with issues of the farmers of rural India including Mandi Bhav and agro – weather
2) Talks and Discussions	Experts from various fields offer solution to problems of farmers and suggest ways for overall improvement of farming and farmers
3) Kisan Prashn Manch	Addressing farmers' queries and arranges quiz programmes and awards to involve farmers.
4) Chaupal Charcha	Effective implementation of Govt. schemes is discussed under this programme.
5) Hello Kisan	Farmers can directly speak with experts and get answers.
6) Khet Khaliyaan	Enriches farmers with the information such as seeds, soil, vegetable market, weather and food processing etc. This is an infotainment programme. (one hour show)
7) Ghoomte Phirte	A mobile quiz show to enhance the knowledge of farmers in different aspects. (25 Minutes show)
8) Vaad Samvaad	An interactive show based on agricultural issues and **experts** from Ministry of agriculture, Ministers, Senior journalists and farmers participate in it. (one hour show
9) **Vichaar Vimarsh**	It glimpsed about the latest agricultural techniques, government schemes, new research etc. (one hour show)
10) Mandi Khabar	Provide information on rural market scenario as per data provided by NCDEX and AGMARKNET (Half an hour show).
11) Mausam	Describes about the latest weather conditions all over the country with advisories and precautionary measures. (Half an hour show)
12) Baat Rajyo Ki	Highlighting significant features of different regions in the field of agriculture and rural development

Rang (Culture/ Folklore), iv) Prakriti Ki Ore (Environment), adding hr fresh content.Kisan Darshan on DDKs, best of DD Kisan dubbed in regional languages; DD Chandana started to begin with. Krishi Darshan of DD National, now coming on DD Kisan also.

Some innovative programmes were also conceptualized: i) Shrimukh Se (a weekly programme in conversation with top policymakers), ii) Traditional Food Varieties (a weekly programme), iii) Agricultural Tourism (a weekly programme on visits to agri-institutes and places of agriculture significance, i.e. Kerala Spice Gardens, Assam Tea Gardens, etc.), iv) Apna Awishkar (farmers' and grass-root innovations in association with National Innovation Foundation), v) Cultivation of Medicinal & Aromatic Plants (weekly programme), vi) Vigyan Ki Rahein (a weekly programme on scientific discoveries and scientific temper), vii) Current Affairs Programme (covering current issues), viii) Aar Ya Paar (scientific debates on emerging issues of agriculture, i.e. GM crops, Bt Brinjal, Iodized Salt, Irradiated Vegetables, etc., ix) Samajik Sarokar (a programme on social aspects of rural folk), x) Darshak Deergha (a programme on viewers' response, including letters, emails, FaceBook, Twitter, WhatsApp, etc.), xi) Khel Gaon (a slot from DD Sports on rural/ tribal games), and xii) Mega Show (a weekly iconic programme in magazine/ feature format).

Content Mix

In house V/s SFC program



Current Affair Programmes such as: IARI's Convocation, Science Day, Toilet Day, New Year were telecast. More News Bulletin(s) were planned in association with DD News and programmes with focus on underprivileged areas, i.e. Bundelkhand, Purvanchal, etc.; spots on best practices, good habits, civic sense, inspiring quotes, and useful information in day-to-day life of rural folks were started.

Special coverage and spots

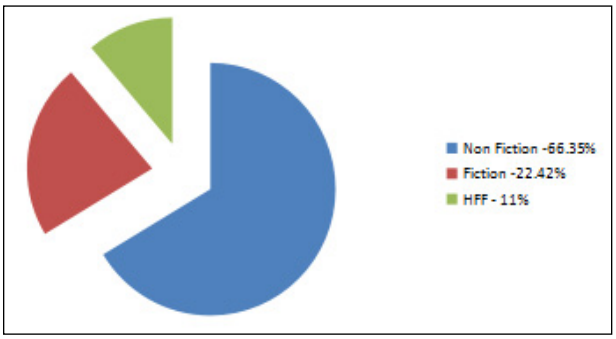
Special programs and events were produced and telecast on DD Kisan. Some of these events are as under:

- The LIVE event on the occasion of Sikkim being declared as Organic Farming State by Hon'ble Prime Minister. Special series on organic farming and telecast on the channel.
- Special programs on various aspects of Union Budget were produced and telecast.
- The LIVE event of Krishi Unnati Mela, inaugurated by Hon'ble Prime Minister was telecast on the channel. A series of special programs, studio discussions are also carried throughout the duration of the mela.
- A special documentary series on farming if difficult agriculture zones were produced and telecast. A high end documentary highlighting the difficult as well as aspirational stories from Sunderban, Gujart Creek and deserts of Rajasthan.
- A three month long campaign of success stories on drip irrigation was carried under the title "Boond Boond Paani Dharati Suhani".
- Spots to create awareness on "Pradhan Mantri Bima Yojna" was produced and scheduled in all breaks for three months. Special programs were produced to create awareness and inform the farmers on all aspects of the scheme.
- Special spots on "Neem Lepit Urea" were produced and carried on the channel.
- Special programs to inform and encourage farmers to produce more related crops during shortage of onions and pulses.
- During the unseasonal rains and hail storms, information was flashed throughout the day, informing the farmers of weather forecast and provided advisories for different crops and regions.
- A Krishi Kavi Goshthi was organized involving agriculture experts with a flair in poetry at CPC on 12 February, 2016 on the occasion of Basant Panchami and telecast on DD Kisan.

- A series of 15 episodes on agriculture was produced by DDK Itanagar and 10 episodes by DDK Gangatok.
- DD Kisan has initiated programmes through PGF Kendras.
- It carried Indigenous Games Festival live from Mizoram

Content Mix

Genre Share



Major thrust

The programme content and design mainly focus on the following parameters:

- To cover all aspects of farming and rural issues.
- The programmes are planned according to the crop calendar.
- There is due representation of content from all geographical regions of the country.
- To make the programme more relevant, advisories from experts and scientists are incorporated in all core agriculture related programmes.
- To have some programmes with live interaction with farmers.
- To create special content to inform and educate the farmers on natural disasters, special drive or any government initiatives.
- To create quality content to generate dedicated viewership among the target audiences.
- Some of the programmes are: Khet Khalihan, Chaupal Charcha, Kisan Prashna Mach, Vichaar Vimarsh, Vaad Samvaad, Mausam Khabar, Mandi Khabar, Hello Kisan, etc.

Knowledge partners

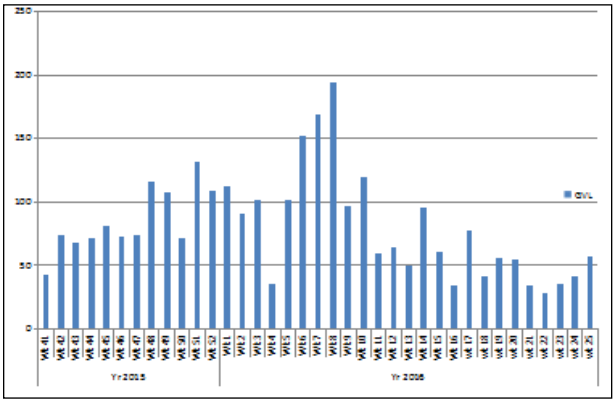
As the core agriculture content needs a lot of scientific input, DD Kisan has signed MOU's with institutions as such as ICAR, IARI, NDDB, IMD, NCDEX, IMD, etc. The editorial team has regular scheduled meetings with their representatives and takes relevant information and advice from their scientists.

Viewership

The channel was launched with a modest viewership of about 1 million. In just a short span of time, the viewership has peaked manifolds to a high of about 20 million. About 75 % of the viewers are from the rural areas, which is the priority target audience of the channel. The channel is expected to reach new heights as some fresh programs are being launched, along with aggressive campaigns on the social media.

Viewership Trend

Gross Viewership (in Lacs)



Technical framework

The DD Kisan is housed in the Central Production Centre, Doordarshan, New Delhi and has a plan to telecast in regional laguages subsequently. New projects for technical up-gradation are on the way and once implemented, the production quality and volumeof production will be enhanced substantially. Latest state of art digital production and transmission equipments have been envisaged for the Kisan channel. Some of the important initiatives are summarized here with futuristic approach to further strengthening the channel:

- A close coordination and involvement with

knowledge partners such as ICAR, IARI, NDDB, IMD, and NCDEX.
- To explore possibility to tie-up with like-minded international organizations for the benefit of Indian farmers.
- Technological support for quality production with sufficient automation.
- Dubbing facilities in regional languages.
- Regional and district-wise production centers and field reporters.
- Infrastructure for extensive production network.
- Manpower to achieve the above task.
- Marketing and Publicity support.
- Satellite network with narrow-casting and mobile application support.
- Financial support to achieve the task.
- Regional network infrastructure to produce content from all parts of the country. The regional DDK infrastructure already in existence could be leveraged for the same.
- Setting up of Regional dubbing centers to provide relevant content to the viewers.
- Setting up satellite/ lease-line networks to share content across the country on real time basis.
- To setup HD quality production facilities.
- All support facilities such as manpower, technology support along with marketing and publicity.
- To set up niche 24X7 channels for the benefit of farming and rural population such as Weather Channel, Animal Husbandry Channel, etc.
- The 'Kisan Channel' is envisaged to cover around 150 million TV Households through the satellite footprint and through various layers of programming planned on the terrestrial coverage of Doordarshan Channels.

Kisan Channel content is available to consumers on DTH through DD Freedish, all private DTH operators to Cable and Satellite viewers through LCOs/ MCOs. The tangible benefits of 'Kisan Channel' is being generated through the various programmes of the channel for around 50% of the population engaged in the profession of agriculture. As a societal development programme, the measurable parameters would be applied i.e. the number of experts interviewed, farmers involved, projects covered, collaborations made, events organized, field based programmes produced and questions from audience addressed/ handled, etc., besides promoting high quality, interactive and public participatory programmes.

Key Deliverables	Target
Setting up of HD production facility at CPC along with automation	2016-17
To produce quality content and engage majority target audience	2016-17
Setting up of regional setups for PAN India content generation	2017-18
Develop a Mobile App for DD Kisan.	2017-18
To have dubbing setup for regional content	2018-19

Expenditure V/s Revenue (2015-16)

	(In Rs. Crore)
Expenditure under SFC	44.55
Actual Amount Paid	13.55
Liability	31.00
Revenuw	3.60

The DD Kisan in the making

Given the growing need of the diverse knowledge and information for the inclusive growth of the farmers' community, a full-fledged farmers' television channel has been planned as a new initiative of the government. This is a maiden project initiated as per the ideas and directives of Prime Minister. There was no project of Doordarshan in convergence with the objectives of the DD Kisan, however, a Krishi Darshan programme supported by the Ministry of Agriculture is available with a very small window for half an hour a day during week days, to cater to the agriculture field. Whereas, the Kisan Channel is envisaged as a full-fledged 24x7 channel dedicated to the farmers. The preparatory thought process involved the following:

- Augmenting in-house production.
- Re-editing, re-presentation, dubbing, subtitling of existing software produced by Doordarshan in collaboration with different Ministries and Departments. This has been projected as Optimization of Creative Resources (OCR) activity, as well as Same Language Subtitling (SLS) with re-packaging.

- For some high quality documentaries/ programmes requiring coverage of far reaching areas, outsourcing will be done, including some programmes requiring expertise in different domain areas related to the channel.
- Partial outsourcing was envisaged during implementation in the form of programme conceptualization, scripting, filming, production and post production.
- Some programmes may be procured from Ministries/ Departments, institutions, agriculture universities, state governments, non-government and international organizations, etc. i.e. Ministry of Agriculture, Ministry of Rural Development, Indian Council of Agriculture Research, Indian Grassland & Fodder Research Institute, ICRISAT and TERI, etc., and repackaged for Kisan channel.
- The agencies such as Educational Multimedia Research Centre, Devi Ahilya University, Indore, M.P. State Council of Science & Technology, Makhanlal Chaturvedi National University of Journalism & Communications, Educational Media Production Centre, IGNOU, New Delhi, Indian Science Communication Society, and Vikram University, Govind Ballabh Pant University of Agriculture & Technology, Banaras Hindu University, etc., were considered and contacted for new programmes. This would be implemented and formalized through bilateral or multilateral MOUs.
- To cater to the farmers' population of the country to create overall awareness and a drive for development.
- To play a catalytic role for the prosperity and health of the farmers' community of the country.
- To provide authentic, quality and useful information and analyses in a language comprehensible to the farmers.
- To regenerate and rejuvenate the cultural ethos and spirits of the farmers of the country.
- To promote the cause of gender equality, weaker sections and differently able farmers and rural community.
- To inculcate scientific temper, self-respect, self-confidence, and mutual trust amongst farmers.
- A dedicated Kisan TV channel is the need of the hour to support the farmers' overall growth and development and uplift agriculture.
- DD Kisan is dedicated to the interests of the agriculture and allied sector. It'll disseminate real time information regarding new farming techniques, water conservation, organic farming, etc., to the farmers.
- As India's largest broadcaster, with the maximum reach in the remotest areas of the country, the mandate under the Prasar Bharati Act (1990) outlines PB's dedication to serving the farmers as well as dictates the objectives behind undertaking this initiative.
- Doordarshan aims to inform, educate and entertain the public and to ensure a balanced development of broadcasting on radio and television, including special attention to the fields of agriculture, rural development, environment, health and family welfare and science and technology.
- The initiative is to create a dedicated channel which leverages Doordarshan's core competence to serve the farming and rural community in India and its reach in the remotest parts of the country, to better inform and educate the rural populace and work towards creating a holistic environment for sustainable and inclusive development.
- Doordarshan aims to inculcate and stimulate the national consciousness in regard to the status and problems of women and paying special attention to the up-liftment of women in the rural sector.
- Kisan Chanel offers a wider canvas and is not confined to agriculture only; it covers broadly all aspects of farmers' lives.
- A farmer requires agriculture, culture, market, banking, education, training, entertainment, sports, health, safety, transportation, environment, energy, housing, and so on.
- At the same time, today's farmer cannot be portrayed only as an illiterate, ignorant, or unaware of modern electronic gadgets; many of them are familiar with the modern approaches, however, there are many miles to go.
- Therefore, the Kisan Channel has to be well equipped and augmented to be able to not only compete and sustain but also play a leadership role in today's cutting edged scenario and vibrant atmosphere.
- A fine blend of knowledge, entertainment, and solutions with a government-proactive and public participatory approach holds the key.

The topics to be covered were classified in 3 cat-

egories with innovative programme formats and 4 - pronged delivery:

Expenditure V/s Revenue (2015-16)

	(In Rs. Crore)
Projected Expenses for SFC	33.00
Revenue (Till July 16)	17.56
Target (Including Krishi Darshan)	80.00

"Core Agriculture"

- Crops, food grains, oilseeds, pulses, fibres, etc.
- Agricultural practices, Region specific activities
- Animal husbandry, dairying, fisheries, sericulture, aquaculture, etc.
- Farm machinery, implements, innovation
- Irrigation and water management
- Pesticides and insecticides
- Fertilizers and manures
- Agri-clinic, Soil health, saline, alkaline soils, wetland, wasteland, desert
- Storage and warehousing
- Seeds, preparation and treatment
- Organic farming, herbs, shrubs, cultivation of medicinal and aromatic plants
- Horticulture, Floriculture, Nurseries
- Biotechnology, GMOs, Bt Crops
- Agriculture research, Weather forecasting
- Krishi Vigyan Kendras, Agriculture Universities, research institutions

"Critical Support"

- Health and Medicine, AYUSH systems of medicine
- Childcare and Women health, Seasonal diseases
- Sanitation, cleanliness, Lifestyle disorders
- Population and family planning
- Food, nutrition and malnutrition, Food adulteration
- Drinking water, Rivers, lakes, ponds, water harvesting
- Energy and non-conventional energy sources
- Natural resources mapping and management
- Waste disposal, recycling, management
- Weather, Climate change, Disaster management
- Environment, Wildlife, forests, Agro-climatic zones, Ecosystems
- Communication, IT, cyber connectivity, E-chaupal
- Rural development, planning and infrastructure development
- Model Village, Clean and Green Village, Farm Innovation, Indigenous Skills
- Rural tourism, Transportation
- Panchyati Raj, Panchyati Raj Institutions

"Essential Ancillary"

- Commodity prices, Agro-entrepreneurship, marketing, markets
- Education, training, Career counselling
- Food processing/ preservation/ packaging, Seaweeds production
- Cottage industry, Self Employment, Self Help Groups (SHGs)
- Banking, loans, microfinance and insurance
- Rural and tribal art and craft, Artisans, heritage
- Cultural development, Early civilizations, Evolution of agriculture
- Customs, cultures, religions, festivals, rituals, Food habits
- Indigenous knowledge systems
- Law and order, Farmers' Rights, Civic sense
- Myths, miracles and superstitions
- National integration, Social harmony, Social justice
- Social welfare, differently able persons, weaker sections
- Youth affairs, rural sports, Anti-addiction
- Entertainment, Infotainment, folklore
- Governance, cooperatives, labour issues

"Innovative Programming Formats of Presentation"

- Quiz programme, Question answer
- Debate, Discussion, Talk show
- Talk, Oratory, Narration, Meet the Expert
- Drama, Theatre, Skits, Mimicry
- Ballet, Dance, Songs
- Puppetry, Cartoon (Farm-toon)
- Nautanki, Folklore, Music, Folk arts, Folk dance
- Court format, riddles, rhymes
- Storytelling, farmer-farmer communication
- Fiction and Non-fiction
- Poetry, Satire
- Seminar, Workshop, Conference, Farmers' Clubs
- Same Language Subtitling (SLS)

- Regular weather updates/ bulletins, Agro-met services
- Kisan Samachar/ News, promoting farm journalism
- Special Programme are being planned, such as – Kisan Goshthi, Rural
  Events, Festivals, Folklore, Phone-in, Hindi Feature Films, Songs, film based programmes with same language sub-titling (SLS) to promote adult education and cater to neo-literates as well.
- Interactive, entertaining, participatory and incentivized programmes.
- To begin with there would be 8 hours primary and 16 hours repeat telecast,
  which will be increased to 12 hours primary and 12 hours repeat telecast subsequently.
- Identifying priority needs and expectations of farmers and their families and
  promoting demand based innovative programmes.
- The programmes aimed at entrepreneurship, employment and income
  generation especially for marginal farmers/ farm labours preferably from side-activities, including inter cropping, crop rotation, agro-forestry, etc.

"The 4 Pronged Approach"

i) With the National Kisan Channel covering the vast Hindi heartland,
ii) Regional Kisan broadcasts- satellite and terrestrial, in Local Languages through Dubbing and Subtitling in regional languages,
iii) Narrow-casting in Terrestrial Clusters involving 36 LPT/ PGF Kendra for different Agro-climatic Zones, and
iv) The Last Mile reach through Internet, online delivery (webcast), Social Media, Community TV, Chaupals, existing Agriculture set ups, KVKs and NGOs connectivity.

- Tier 1: DD National Kisan Channel and Hubs in Hindi Belt
- Tier 2: Regional Sat. in Local Language and Terrestrial
- Tier 3: Niche-casting, Narrow-casting
- Tier 4: Last-mile through Internet, Community TV, Chaupals, agriculture setup and NGOs, etc.

Existing Manpower

Regular Staff	34
Contactual Staff	61
TOTAL	95

Consultation meets with stakeholders

National and Regional Consultation Meets with stakeholders were organized in New Delhi, Bhopal, Varanasi, and Ahmedabad prior to the launch of the channel with positive response. The channel has been launched successfully based on the suggestions and inputs received during consultations from policymakers, public representatives, scientists, media-persons, academicians, civil society, professionals and farmers, etc. The DD Kisan covers the entire population in general and the agriculture/ rural farmer community in particular, which is a major portion of entire demography.

The National Consultation Meet with Stakeholders held in National Media Centre, New Delhi on August 04, 2014 and chaired by Information & Broadcasting Minister Prakash Javdekar. Major outcome of the consultation suggests the changing face of today's farmers as many issues impact their lives; Indian farmer is now matured and progressive in thought and action; DD Kisan must cater to farm and non-farm viewers with effective edutainment; the channel should focus on programming, productivity, and value addition; Kisan Call Centre could be tapped for its knowledge of what farmers seek; brainstorming sessions to be organized to take inputs from all prospective stakeholders; Crowd-sourcing could be a means of a range of creative ideas; DD Kisan must emphasize on participatory and problem solving approach with use of modern technology. The name of the channel was selected through crowed-sourcing on social media.

Social Media Milestones

Facebook Likes	25102
Twitter Followers	13031
Tweets	6651
Youtube Views	153706
Youtube Subscribers	3363
Dailymotion Views	7029

Highlights

The farmers are involved in different programmes at 4 levels: a) they are encouraged totake part in the programmes during the visit of DD Kisan teams to different parts of the country in connection with coverage of programmes and events organized by agricultural institutions, etc., b) they are invited through the live shows in the form of telephonic conversation and studio based interaction, c) they are largely contacted by DD Kisan producers during filming and recording for field based programmes, and d) they are involved through their feedback, letters, and emails, etc.

DD Kisan is a 24 hours' channel dedicated to farmers of which 8 hours' programmes are original with two repeat telecasts. About 70% time is devoted to core agriculture.

Participation of Farmers

Baat Rajyon Ki	334
Vichar Vimarsh	50
Kisan Prashnotri	1600
Hello Kisan	4713
Krishi Darshan	50
Hamara Pashudhan	128
Ghumte Phirte	1117
Chaupal Charcha	4000
Vaad Samwad	40
Self Financing Commissioned (SFC)	50
Desh ki shaan kisan	288
Kamyabi ki Misalein	234
Gaon India	960
TOTAL	13564

At present, DD Kisan Channel is a national infotainment channel, being telecast in Hindi. The process of getting popular programmes dubbed into different regional languages for telecast through regional Kendras needs to be expedited; however, agricultural programmes of ½ hour to 1½ hour duration in a week are telecast by regional Kendras in various regional languages under narrow-casting with support from Ministry of Agriculture, Cooperation & Farmers' Welfare.½ hour programmes from North-East states in their languages are telecast on DD Kisan channel in the morning hours before 6 a.m. when usual telecasts begin, as northeastern region enjoys early sunrise.

The programmes are produced mainly in consultation with agricultural scientists from various prestigious organizations, such as, Indian Council of Agricultural Research (ICAR), Indian Agricultural Research Institute (IARI), and India Meteorological Department (IMD), etc., with a view to give maximum information to farmers with infotainment.

State-wise Percentage of Farmers

Himachal Pradesh	02
Punjab	05
Haryana	10
UP	24
Bihar	10
Rajasthan	16
Madhya Pradesh	13
Maharashtra	05
Chhattisgarh	03
West Bengal	02
Andhra and Telangana	02
Uttarakhand	08

The channel is gaining popularity amongst viewers and it may be mentioned that within a short span of time and in an extremely competitive electronic media scenario, the channel has recorded a high viewership in recent TRP ratings, besides encouraging feedback from farmers' community. A formal survey is being conducted with the help from Hindusthan Samachar to get the feedback from farmers and viewers.

A variety of programmes on folk arts and culture are telecast on the channel regularly as part of different programmes as Chaupal Charcha, Ghoom-

Prime Minister Narendra Modi launches DD Kisan and flags off Kisan Rath; Agriculture & Farmers' Welfare Minister Radha Mohan Singh, Information & Broadcasting State Minister Rajyavardhan Rathore, Cabinet Secretary Ajit Sheth, and Prasar Bharti Chairman A. Surya Prakash grace the DD Kisan Launch Ceremony, Vigyan Bhavan, New Delhi

te Phirte, and Baat Rajyo Ki, etc.

The DD Kisan channel has been declared as an "Info-tainment" and "mandatory must to air channel" by the Ministry of Information & Broadcasting and is available on all major DTH platforms including DD Freedish (4), Dish TV (136), Tata Sky (198), Sun Direct (800), Videocon (479), Reliance (565). Accordingly, its an statutory requirement for all Multi-System Operators and Local Cable Operators to must air the DD Kisan Channel. It is also available on Digital Terrestrial Television (DTT) mode and online through webcast mode at <webcast.gov.in/ddkisan> and accessible on mobile, laptop, desktop, I-Pad, Tab, Notebook and other such devices.

Folklore and crop related songs (harvesting songs) from different regions are the constituents of the channel including Akash Sutra (a programme giving weather and climate related information in folk forms, as per the directive from PMO) in different regional languages and songs pertaining to agriculture related festivals. A programme "Baat Rajyon Ki" portrays a segment on festivals from different states. The DD Kisan is catering to a wide cross section of farmers.

Acknowledgement

I gratefully acknowledge the encouragement and support from I&B Secretary Shri Ajay Mittal, Prasar Bharti Chairman Dr. A. Surya Prakash, CEO Shri Jawhar Sircar, DG Doordarshan Ms. Aparna Vaish, Member Personnel Mr. S. C. Panda, Member Finance Shri Rajiv Singh and entire Kisan Channel Team at CPC, Doordarshan who have given valuable inputs and suggestions.

■

Coverage of defence science and technology in Indian press: A content analysis

Phuldeep Kumar
Scientist, Defence Scientific Information & Documentation Centre (DESIDOC),
Defence Research & Development Organization (DRDO), Delhi-110006

Dr. Harish Kumar
Dept. of Journalism & Mass Communication,
Maharshi Dayanand University, Rohtak

This study focuses on coverage of defence science and technology news in16 dailies published from Delhi. Numbers of news items published were quantified, their sources or authors identified, formats of dissemination observed and content analysed. India had been vulnerable to wars from the time immemorial ranging from ancient and medieval to modern periods. In the current scenario, India being an emerging superpower poises more challenges to be at the best not only in the acquisition and development of advanced warfare and allied areas but also strong strategic planning and preparedness. According to Dr. APJ Abdul Kalam, Former President of India "unless India stands up to the world, no one will respect us. Only strength respects strength". Indian strategic sector with its 39 ordinance factories, 8 defence public sector undertakings, 53 laboratories of Defence Research and Development Organisation (DRDO), contributes towards making India a world superpower. The defence science and technology encompasses a wide range of processes, products and technologies, including strategic relations and political equations. These are widely covered and reported in mass media. The study is restricted to the coverage of news items related to these areas in newspapers. The authors could not find any such study available, though there are some studies available on science coverage in newspapers or alike. Since the Indian constitution promotes inculcation of scientific temper among masses and our science policies aim at public awareness of scientific developmentsso that a scientifically progressive and enlightened society with scientific bent of mind may emerge thereby reaping the benefits of science and technology towards inclusive growth of the nation including strategic sector as well. In view of the foregoing, the authors have undertaken the present study to assess the ground reality and understand how the press has performed its role in disseminating news about defence science and technology.

Objectives

1. To study the overall defence science and technology coveragein newspapers published from Delhi.
2. To compare various formats in which these news items are printed.
3. To ascertain the sources of these news items.

Literature review

Communication of science by various media, its efficacy, impact, presentation, treatment, relative importance, changes in behavior of public, level of interest, controversies, use, possibilities, and benefits have been the areas of study. Since the authors could not find any research specifically on devence science news, the science communication studies are included incorporating news items on defence science.

Retzbech and Maier (2015) investigated how the communication of scientific uncertainty in nanotechnology influences laypeople's interest in science and technologies, beliefs about the nature of science, and trust in the scientists. They found out that such communications build trust of science.

Bucchi andMazzaolini (2007) studied coverage of science and technology by two leading Italian dailies from 1946 to 1997. They found out that of all the news items, 52.7% were of biology and medicine, 14.7% deal with engineering. With period of time coverage of science increased. Scientists of medical field were most active in communicating their work for general readers. A general and increasing tendency among the journalists to represent science as consensual, linear, and uncontroversial was found. The scientists are more likely to refrain from presenting scientific issues as controversial.

Zhao (2009) found that media use for acquiring knowledge about science has increased awareness about scientific issues.

Lwin andSalmon (2015) studied health communication research articles from 2000 to 2013 published in Asia. They found that average number of health communication articles published about Asia were 3 articles in 2000 and have increased to 31 articles in 2013 and India being the most important country in this aspect.

Grantham and Vieira junior (2014) studied seven American newspapers between 1970 and 2010 for coverage of environmental aspects and found that national newspapers also carry national policies, whereas local newspapers carry only local problems.

Arulchelvan (2010) studied science and technology dissemination through Tamil newspapers and found that they published only 3.5% of science and technology news and they are mostly getting it from news agencies.

A survey conducted by Taleem Research Foundation, Gujrat in June 2000 sponsored by Vigyan Prasar studied science coverage in media through content analysis of 52newspapers, 31 in Hindi and 21 in English from November 1999 to January 2000. The findings were: the average number of science items published were 4.3% items in English and 2.5% articles in Hindi. Health-care (31.8%), information technology (9.8%), environment (8.1%), space science (6%).

Meenu Kumar (2005) compared coverage of S&T news in the Times of Indiaand Free Press Journal for the month of April 2004 and found that Times of India allocated 0.96% of the total space available and Free Press Journal allocated 1.32% of the total space available. The areas covered were health (35% for TOI and 31.03% for FPJ), space (22.5% for TOI and 17.24% for FPJ), information technology (17.5% for TOI and 13.8% for FPJ), etc.

Gaur (2015) studied science coverage for three Hindi newspapers and found that Rajasthan Patrika gives 3.58% space, Dainik Bhaskar gives 3.44% space, and Dainik Navjyoti gives 3.05% space for science related news items.

Meenu Kumar (2013) compared coverage of S&T in Hindi and English newspapers. She reported that Hindi newspapers provided 1.74% of the total space and English newspapers 2.34% of the total space for S&T. Health was most covered area with English newspapers (38.57%) and Hindi newspapers (57.58%), environment comes second in both English (31.78%) and Hindi (21.78%), other areas received very less coverage.

Dayal and Monga (2015) compared Times of India and Hindustan Times coverage of science related news items from October to December 2008, it was found that the Times of India covers more news items as compared to Hindustan Times.

Dutt and Garg (2012) have studied 37 English newspapers and found that Times of India covers maximum science content.

Patairiya (1999) has found that science coverage in the print media was 3.4%, TV 2.18%, and

Radio 5.8%.

Research design

Sixteen newspapers published from Delhi have been selected for study:Mail Today, Business Standard, Economic Times, The Hindu, Indian Express, Times of India, Pioneer, Tribune, Hindustan Times, Deccan Herald, Asian Age, Statesman, Navbharat Times, Jansatta, DNA, and Punjab Kesri. The duration of the study was 1 January 2013 to 31 January 2013. Every news item consisting of the following keywords was selected: army, navy, air force, defence, war, DRDO, tank, fighter aircraft, armoured vehicle, gun, propellant, explosive, LCA, missile, Agni, Prithvi, Akash, Nag, Trishul, radar, electronic warfare, UAV, mortar, landmine, helicopter, warship, cyber security, spy satellite, Brahmos, Tejas, parachute, chemical warfare, nuclear bomb, armour technology, soldier as system, bullet proof jacket, Kaveri engine, military bridge, frigate vehicle, encryption, navigation system, electro-optical system, night vision devices, laser guided bomb, submarines, early warning systems, maritime radars, recce vehicle, sonar, SNR radio, torpedo, interceptor missile, inter continental ballistic missile, IRBM, SRBM, LACM, infantry, artillery, amphibious vehicle, Pinaka, Marrech, Dhruv, Chetak, Nishant, Sarvatra, Virat, Vikramaditya, sea harrier, Kiran, Jaguar, Phalcon, Hecules, Mig-21, CISF, ITBP, BSF, SSB, NSG, DSC, etc.

Best efforts have been made to cover all the news items published, but same news items published in different newspapers were omitted. Every news item was analysed for the following fields: date, day, newspaper, format, area of coverage, approach, presentation, bias, illustration, source of the news, main actor/subject, and level of reporting.

Results

Total 190 news items were found in all sixteen newspapers pertaining to defence science and technology and defence strategy. The results obtained after compilation of data and feeding it in SPSS software are as follows:

(i) **Occurrence of defence science and technology news (Newspaper wise):** Out oftotal 16 newspapers covered, 13were in English and 3in Hindi. The percentage-wise contribution of Hindi newspapers is 9.5% and English newspapers 80.5%. However, the number of English newspapers are far more, hence thelrage difference. Quantity wise number of news items covered by Hindi newspapers are equal or more than a leading English daily Hindustan Times. During this period of study Tribune has been the leading newspaper in terms of news items covered (17.9%), followed by Times of India (12.6%) and Hindu (11.6%). The Economic Times and DNA covered only one news item each, which is very low. This may be because of the nature of these newspapers. As it is an area where everyday news are less expected and keeping it in view the overall coverage seems reasonable. The more number of news items covered by some newspapers points to the fact that these newspapers may have dedicated defence beat and reputed experts writing for them, their liaison with reputed news agencies might be another good reason.

Table1. Occurance of defence science news (Newspaper wise)

Newspaper	Frequency	Percent
1. Mail Today	11	5.8
2. Business Standard	8	4.2
3. Economic Times	1	.6
4. The Hindu	22	11.6
5. Indian Express	11	5.8
6. Times of India	24	12.6
7. Pioneer	16	8.4
8. Tribune	34	17.9
9. Hindustan Times	3	1.6
10. Deccan Herarld	12	6.3
11. Asian Age	16	8.4
12. Statesman	13	6.8
13. Navbharat Times	7	3.7
14. Jansatta	8	4.2
15. DNA	1	.5
16. Punjab Kesri	3	1.6
Total	190	100.0

(ii) **Specific topic of news item:** While studying the news items covered, keywords are identified that broadly tell what the news item was about? It is elaborated in Table 2. The defence (country's overall defence preparedness) is most covered (8.9%), this is followed by China (8.4%) and Pakistan (8.4%).

This shows our media has keen interest in following the defence related developments in these countries. Among the three services Indian Air Force was covered most (7.3%), followed by Indian Armed Forces (4.2%), and Indian Navy (3.2%). Among the weapon category the missiles and nuclear weapons are covered equally (4.2%). This is followed by aircraft and cyber security (3.7%).

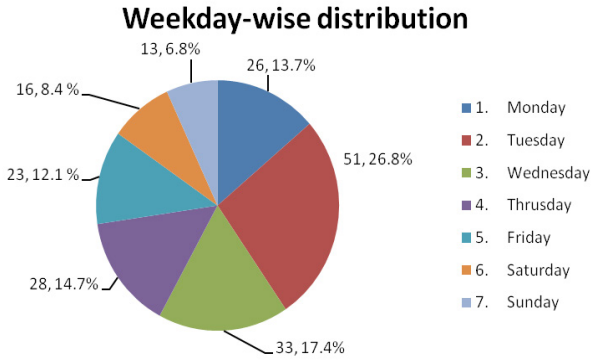
Table 2. Specific Topic of News Item

Keyword	Frequency	Percent
Agni-v	1	0.5
Aircraft	7	3.7
Airshow	1	0.5
Arihant	1	0.5
Arjun	1	0.5
Arms	1	0.5
Army	8	4.2
Australia	3	1.6
Bofors	1	0.5
Brahmos	3	1.6
China	16	8.4
Cyber Security	7	3.7
Defence	17	8.9
Defence Budget	4	2.1
Defence expo	1	0.5
Defence Minister	1	0.5
DRDO	5	2.6
Explosive	1	0.5
France	1	0.5
Gorshkov	1	0.5
HAL	1	0.5
IAF	14	7.3
Information Technology	1	0.5
INS Saryu	1	0.5
Iran	7	3.7
Israel	3	1.6
Japan, China	1	0.5
Kaveri Engine	2	1.1
LCA	3	1.6
LoC	3	1.6
MG	1	0.5
Military	5	2.6
Missile	8	4.2
Myanmar	1	0.5
Navy	6	3.2
North Korea	7	3.7
Nuclear Weapon	8	4.2
Pakistan	16	8.4
Pinaka	1	0.5
Rafale	1	0.5
Raw	2	1.1
Russia	3	1.6
Security	1	0.5
Submarine	2	1.1
Submarine Missile	1	0.5
Sukhoi	1	0.5
Suveillance	1	0.5
TATRA Truck	1	0.5
Training	1	0.5
UAV	1	0.5
UK	1	0.5
US	2	1.1
US, China	1	0.5
Warship	1	0.5
Total	190	100

(iii) Maximum number of news items appeared on Tuesday (26.8 %). This is followed by Wednesday (17.4%) and Thursday (14.7%). The least news were covered on Sunday (6.8%). This points to the fact that newspapers generally plan their Sunday editions beforehand.

Table 3. Weekday wise distribution

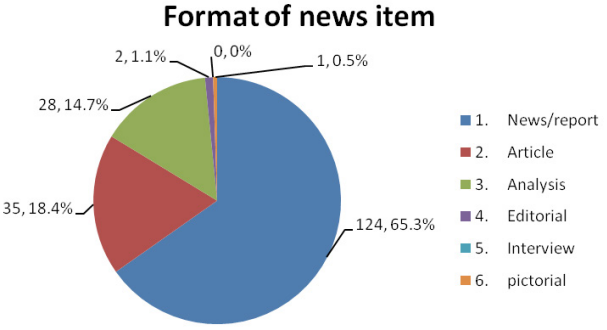
	Frequency	Percent	Cumulative Percent
Monday	26	13.7	13.7
Tuesday	51	26.8	40.5
Wednesday	33	17.4	57.9
Thursday	28	14.7	72.6
Friday	23	12.1	84.7
Saturday	16	8.4	93.2
Sunday	13	6.8	100.0
Total	190	100.0	



iv) **Format of the news item:**This is important to study in which format the defence science news were covered. Most of the coverage was in the form of news reports (65.3 %), followed by articles (18.4%), and analyses (14.7%). In analysis mostly strategic equations are analysed, defence preparedness of India is compared with other countries (mostly China and Pakistan). Only two editorials were found, indicating that editors of all newspapers found less merit in writing editorials on these subjects. Surprisingly, no interview appeared in any newspaper, which points towards the fact that defence scientists are least media savvy as well as journalists too do not care much. Only one news item is published in pictorial format, which shows that defence journalists are still preoccupied with traditional form of reporting.

Table 4. Format of the news item

	Frequency	Percent	Cumulative Percent
News/report	124	65.3	65.3
Article	35	18.4	83.7
Analysis	28	14.7	98.4
Editorial	2	1.1	99.5
Interview	0	0	99.5
Pictorial	1	.5	100.0
Total	190	100.0	



(V) **Approach towards news item:** The news items can be covered in two ways - scientific and general. In scientific form the technical aspects of the weapon can be talked about in some detail. In general form only news related to weapon is given such as the weapon is tested.The defence science news were covered only in general form, perhaps due to the fact that journalists might have thought general public not interested in details.

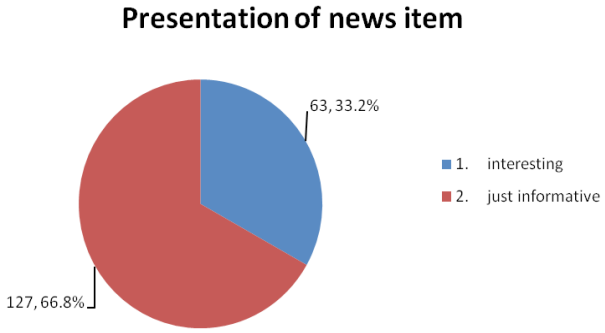
Table 5. Approach towards news item

	Frequency	Percent
Scientific	0	0
General	190	100.0

(vi) **Way of presentation of news item:** The defence science news were reported in informative form, i.e. the news is given as it happened without any additional information. Alternatively, the news could be given in interesting formwith adequate explanation of the weapon developed including possible benefits over theexisting technology.

Table 6. Way of presenting the news item

	Frequency	Percent
Interesting	63	33.2
Just Informative	127	66.8
Total	190	100.0

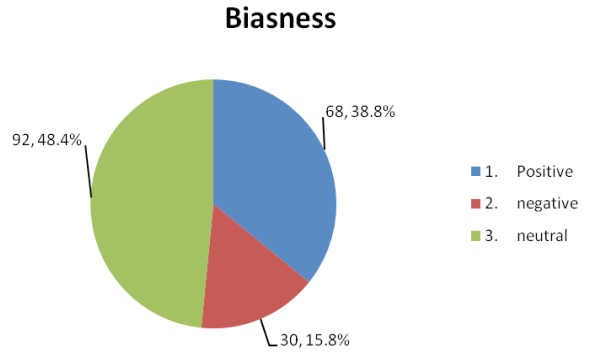


(vii) **Bias**: While studying the defence science news items, the bias towards defence science was also

looked into. Each news item was studied thoroughly to find whether the news item supports the new weapon developed or promotes defence related acquisition, praises the defence establishments in any manner, tries to make favorable opinion towards defence industry or persons involved. The news items which do so are termed as positive and the news items which are opposite to it are termed as negative. The news items which don't seem inclined to either side were termed neutral. It was found that neutral news items are 48.4%, which are almost half. It shows that press largely reported the news as it happened and did not take side. The positive news were found to be 35.8%, it shows that when it comes to defence related news and views, majority of journalists are in favor of promotion of defence. The negative news were found to be 15.8%, although it is relatively small but such news items were published with more prominence such as on front page with bigger font size of headings, etc.

Table 7. Overall bias towards defence science & technology

	Frequency	Percent	Cumulative Percent
Positive	68	35.8	35.8
Negative	30	15.8	51.6
Neutral	92	48.4	100.0
Total	190	100.0	



(viii) **Source of the news item**: All the news reports sources were also identified. It was found that a majority of the news were given without naming the source (43.7%). This was followed by name 41.1%, which shows the availability of expert writers in this field. This was followed by agency news (12.6%) and by staff reporter (5%). An interesting data with authors' names and respective number of news items published is given in Table 9. Rajat Pandit,for instance, was found most prolific author with 7 news items, followed by Ajai Shukla and Ajay Banerjee with 4 news items each. A total of 51 defence correspondents were found to have published news, of which 14 have published more than one news item over the period.

Table 8. Source of the news item

	Frequency	Percent	Cumulative Percent
By name	78	41.1	41.1
Staff Reporter	5	2.6	43.7
Agency	24	12.6	56.3
Not mentioned	83	43.7	100.0
Total	190	100.0	

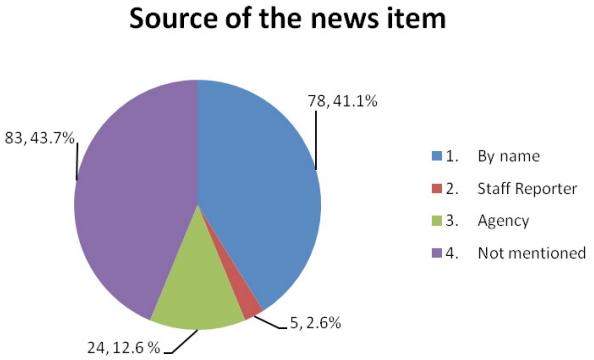


Table 9. Author-wise distribution

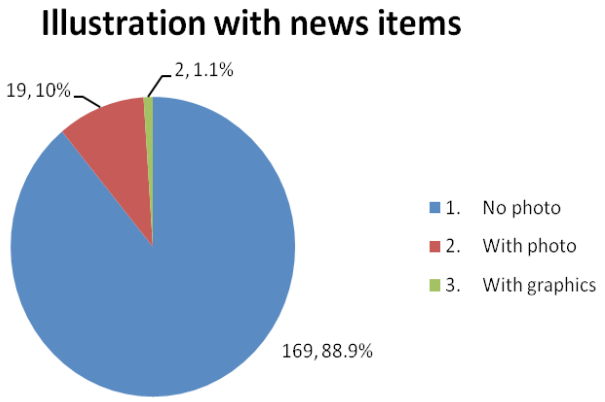
Name of the author	Frequency	Percent	Cumulative Percent
Without person name	112	58.9	58.9
Abhijit Iyer Mitra	2	1.1	60.0
Aditi Phadnis	1	.5	60.5
Ahmed Ali Fayyaz	1	.5	61.1
Ajai Shukla	4	2.1	63.2
Ajay Banerjee	4	2.1	65.3
Ananth Krishnan	1	.5	65.8
Ashok K Mehta	2	1.1	66.8
Ashok Tuteja	1	.5	67.4
Ashwini Kumar	1	.5	67.9
Atul Aneja	2	1.1	68.9

B R Srikanth	1	.5	69.5
Bharat Karnad	1	.5	70.0
Bharti Jain	1	.5	70.5
Gautam Datt	2	1.1	71.6
Gautam Dutt	1	.5	72.1
Hasan Suroor	1	.5	72.6
Indrani Bagchi	1	.5	73.2
K J M Varma	1	.5	73.7
K V Prasad	1	.5	74.2
Kalyan Ray	1	.5	74.7
Kartkeya Sharma	1	.5	75.3
Lt Gen Nirbhay Sharma	1	.5	75.8
Maj Gen J S Kataria	1	.5	76.3
Mannu Pubby	1	.5	76.8
Manu Pubby	3	1.6	78.4
Michael Krepon	2	1.1	79.5
Najeeb Jung	1	.5	80.0
Narayan Bareth	1	.5	80.5
Piyali Mandal	1	.5	81.1
Praveen Swami	2	1.1	82.1
Rajat Pandit	7	3.7	85.8
Rajshri Mehta	1	.5	86.3
Ranjit Kumar	3	1.6	87.9
Ravi Dhaliwal	1	.5	88.4
S Anandan	1	.5	88.9
Saibal Dasgupta	2	1.1	90.0
Sandeep Dikshit	1	.5	90.5
Shubhadeep Chaudhary	1	.5	91.1
Sri Krishna	1	.5	91.6
Steve Stecklow	1	.5	92.1
Surajeet Das Gupta, Sounak Mitra	1	.5	92.6
Sutirtho Patranobis	1	.5	93.2
Tanda (Akhnoor)	1	.5	93.7
V P Malik	1	.5	94.2
Vijay Mohan	3	1.6	95.8
Vinay Kumar	3	1.6	97.4
Vinay Kumar, Ahmed Ali Fayyaz	1	.5	97.9
Vladimir Radyuhin	1	.5	98.4
Vladimir Radyyuhin	1	.5	98.9
Y Mallikarjun, T S Subramanian	1	.5	99.5
Yusuf Jameel	1	.5	100.0
Total	190	100.0	

(ix) **Illustration with news item:** It was found that majority of defence science news items were published without photo of the product/event (88.9%), which might indicate that correspondents with camera are least welcome in defence installations worldwide. very less number of news items published with photographs of the products/events (10%).In most cases, photos were captioned as file photo. Only two news items were published with graphics, which portrays the highlights of the product in very catchy manner.

Table 10. illustration with news item

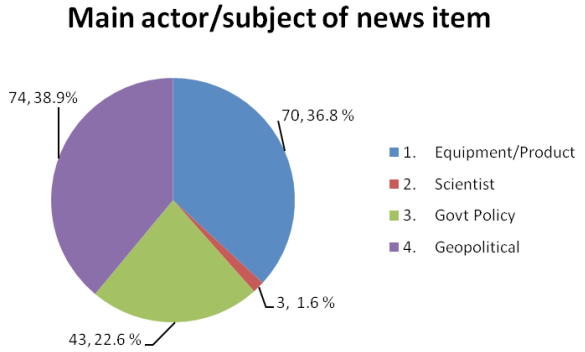
	Frequency	Percent	Cumulative Percent
No photo	169	88.9	88.9
With photo	19	10.0	98.9
With graphics	2	1.1	100.0
Total	190	100.0	



(x) **Main actor/subject of news item:** The news items were also studiedon the aspect of their main focus, whether it is product, scientist, government policy, or geopolitical (concerning defence relations among countries). It was found that majority of defence science news items were geopolitical in nature (38.9%), closely followed by equipment/product (36.8 %). Government policy was at centre of a sizable number of news items (22.6%). The scientists were least focused with only 1.6% coverage. This shows that press is more occupied with analysis of geopolitical situation, this is on expected lines.

Table 11. Main actor/ subject of news item

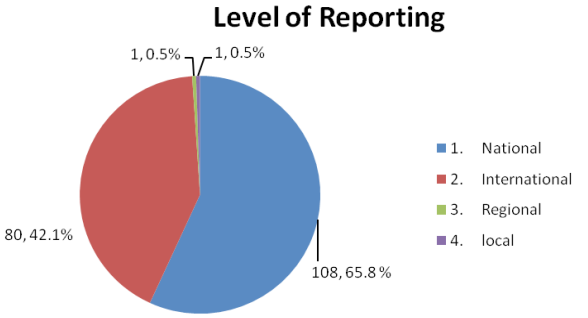
	Frequency	Percent	Cumulative Percent
Equipment/Product	70	36.8	36.8
Scientist	3	1.6	38.4
Govt Policy	43	22.6	61.1
Geopolitical	74	38.9	100.0
Total	190	100.0	



(xi) **Level of reporting:** The news items were alsodistributed according to the level of reporting whether it is local, regional, national or international. As per expectation defence being a subject of national importance the local and regional news were very few only one each infact. The national news were found to be most (56.8%) which is natural to a big country like India. The international news were 42.1%, which is considerable figure. This shows Indian media is very alert to follow defence science news from around the world.

Table 12. Level of reporting.

	Frequency	Percent	Cumulative Percent
National	108	56.8	56.8
International	80	42.1	98.9
Regional	1	.5	99.5
local	1	.5	100.0
Total	190	100.0	



Conclusion

1. The maximum coverage is found in The Tribune (17.9%), followed by Times of India (12.6%), The Hindu (11.6%), Asian Age (8.4%), Pioneer (8.4%), Statesman (6.8%), Deccan Herald (6.3%), Indian Express (5.8%), Mail Today (5.8%).
2. The least coverage is found in Economic Times (0.5%), DNA (0.5%), followed by Hindustan Times (1.6 %), Punjab Kesri(1.6%), Navbharat Times (3.7%), Jansatta (4.2%), Business Standard (4.2%).
3. The preferred format was news/report (65.3%), followed by article (18.4%), analysis (14.7%). Only two editorials were found.
4. All the items were written in general genre, most of them were just informative (66.8%) and some were interesting (32.6%).
5. The overall bias of news items were neutral (48.4%), positive (65.8%), and negative (15.8%).
6. Predominantly source of news were not mentioned (43.7%), by name (41.1%), agency news (12.6%).
7. Level of reporting: national (56.8%), international (42.1%).
8. The main subject of the news were geopolitical (38.9%), equipment/product (36.8%), government policies (22.6%), and scientist (1.6%).

References

1. Retzbach, Andrea and Maier, Michaela (2015) Communicating scientific uncertainty: media effects on public engagement with science. *Communication Research,* Vol 42(3), 429-456.
2. Zhao, X (2009) media use & global warming perceptions: a snapshot of the reinforcing spirals. *Commu-*

nication Research, Vol 36, 698-723.
3. M. Bucchi and R. G. Mazzolini (2007), "Big science, little news: science coverage in the Italian daily press, 1946-1997". In Journalism, Science, and Society. Edited by Martin W Bauer and Massimiano Bucchi. Routledge. ISBN 978-0-415-37528-3.
4. May O. Lwin & Charles T. Salmon(2015) A retrospective overview of health communication studies in Asia from 2000 to 2013**.** *Asian Journal of Communication*. Volume 25(1), 1-13.
5. Susan Grantham , Edward T. Vieira (2014) Risk Dimensions and Political Decisions Frame Environmental Communication: A Content Analysis of Seven U.S. Newspapers From 1970–2010. *Applied Environmental Education & Communication*. Vol. 13(2).
6. Arulchelvan, S. (2010) Science and technology dissemination through Tamil newspapers: A study. *Indian Journal of Science Communication*. VOL 9(2), 3-9.
7. Survey of science coverage in media of Hindi and English newspapers by TALEEM Research Foundation, Ahmedabad, June 2000.
8. Meenu Kumar(2013) Comparison of Science Coverage In Hindi And English Newspapers Of India: A Content Analysis Approach. *Global Media Journal*, Indian Edition, Vol 4(1), University of Calcutta, Calcutta.
9. Anuradha Mishra Gaur, 2015. Disseminating science news(with reference to outlook of scientists and journalists). *Communication Today*. Jan-Jun 2015, pp. 87-100.
10. Meenu Kumar (2005) Coverage of science and technology in national and regional newspapers: a comparative study. *Indian Journal of Science Communication*, Vol 4(2), pp. 07-12.
11. Manoj Dayal and Prem Monga (2015) Science communication in leading English dailies. *Communication Today*, Jan-June 2015.
12. B. Dutt and KC Garg (2012). S&T Coverage in Englishlanguage Indian dailies. *Indian Journal of Science Communication*, 11(03).
13. Manoj K. Patairiya (2009). Science and technology studies in India: Policies and experiences, *Science Communicator*, Vol 01(01).

■

Mathematics popularisation through radio: A global assessment of applications and outcomes

Ujjwala Tripti Tirkey
Scientist 'F',
Department of Science & Technology, New Delhi, India

Dr. R Sreedher
Emiritus Professor and Media Expert,
Apeejay Stya University, Sohna, India

Far back in space and time and in the Indian context, two ancient legendary mathematicians – Bhaskara-II and Mahaviracharya, the renowned Jain monk, and the author of famous mathematical work, Ganita Sara Sangraha – were the forerunners in popularising mathematics (Raj, 2004). Both with a mathematician's sharpness, a poet's imagination and an artist's creativity enriched their mathematics with a romantic and pleasant flavor of vivid poetry; and curiously presented to their disciples and lay people the mathematical concepts in the form of beautiful poems. Bhaskara taught mathematics to her widowed daughter Leelavati, through poetry and soon she became perhaps the first Indian woman mathematician.

Introduction

Mathematics has been acclaimed as man's most noble endeavours to understand the laws of nature and the universe. Today, it has become the language of technology, particularly computers, so much so that learning mathematics is considered as a prerequisite of understanding these applications. Mathematics is also a truly international language as it spans through borders and allows a great amount of collaboration – and maybe also cultural understanding and peace (Legner, 2004).In the past, the mathematical community has maintained itself as a 'scared exclusive', forming a kind of priesthood in which there was no dialogue whatsoever with laypeople. Even the new aspirants to join the field had to face difficult series of trials before their admission. However, soon the local and regional socio-economic realities started generating in increasinglycomplex demands for mathematical solutions of the issues. It was now realized that a society comfortable with mathematics is more likely to tolerate and support especially those who want to work with mathematics (Schneider, 1994). This is how mathematics was liberated from high priests and temples of so called scholarships. Subsequently, mathematician-public dialogue began in all its earnest leading to growth and socialization of the subject.Over the years, popularizing mathematics has become one of the most curious areas in science popularization as well as public understanding of science. Although mathematics is viewed as the most difficult subject by layman including science lovers. A sustainable 'mathematicalisation of society' through building public awareness helps us equip and carve a productive and joyful place in an increasingly changing

technological world. There have been some exemplary initiatives taken by science communicators to showcase the efficacy of teaching mathematics to general public including illiterates, non-school going children, farmers, and industrial workers, among others. The paper presents a scientific studyof the initiatives taken by different countries in the area of mathematics through radio vis-a-vis in India.

The joy, beauty and fear of mathematics

For mathematicians, the driving motivation to do mathematics is the joy and excitement of solving problems and pleasure of discovering new things, like music or art. Conversely, music can be analyzed using mathematical concepts like symmetry and group theory, but at a much deeper level than the mathematical equations for sound waves, and similar ideas apply to art. Mathematics is also linked to philosophy and fundamental questions about truth, knowledge and logic (Legner, 2004).

At popular level, mathematics provides a "mathematical perspective" in everyday life to look into and understand the things around. For example, perceiving one hectare of land is more logical and specific rather than merely saying a piece of land! Realizing the value of money in terms of interest earned, the actual income and expenditure incurred of a household instead of just living in a qualitative sense only! Thus, "mathematical thinking" as an intrinsic skill is just as important as any content or theory while studying mathematics. However, since mathematics is both difficult and abstract, it much less accessible to the general public. We all know that school mathematics is one of the most unpopular subjects, perceived as difficult, boring and irrelevant, while it attracts deep hostility and hatred from others. More importantly, "the popularity of mathematics diminishes at the time when students are exposed to mathematics at school" (Study Overview; Howson and Kahane) and mathematicians are perceived as "arrogant, elitist and eccentric people socially misfit". Even adults are often proud to have been 'bad at maths' (Charpin, 2006).The reasons for the negative image of mathematics could be:

i. In mathematics, since everything new builds upon things learned previously, not understanding one topic may make it very hard to keep up in the future.
ii. Lack of public recognition of mathematical success in the form of wealth, acclaim or medals.
iii. The aim of school mathematics is for students to solve examination questions most efficiently, rather than gaining a deep understanding of mathematics.
iv. The kind of mathematicstaught in schools focuses on memorizing procedures rather than exploring and discovering exciting real-life applications.

The need for popularization

Popularization can help change the above misconceptions by making the subject more exciting, creativeand interesting by connecting students to countless applications of mathematics in day-to-day life. It offers everyone the opportunity to understand and appreciate this universal language. Making people aware of the new mathematics invented constantly with emerging applications in a technologically advanced world acquires much more significance. The mass media can play a significant role in encouraging such understanding that depends on building creative linkages between academics and media (Stewart, 2006).

Science popularisation has been interpreted differently in its scope and context. Howson and Kahane describe popularisation as "any effort to bridge the gap between science and public understanding of science", which consists of "sharing mathematics with a wider public" as well as "encouraging people to be more active mathematically" (Howson, Kahane).According to Schneider (Schneider 1994) "the primary attraction (of popularisation) may not be mathematics but something else, such as music, humour or a physical activity. Without willing participants, without an audience, there is no possibility of success, no matter how worthwhile the mathematics is".Wai Yi Feng creates a framework for classifying mathematics enrichment (Feng 2006), and distinguishes it in four different categories:

i. Development of exceptional mathematical talent,
ii. Popular contextualization of mathematics,
iii. Enhancement of mathematics learning process,
iv. Outreach to the mathematically underprivileged.

The maths popularisation projects can help trigger the excitement of mathematics, understand applica-

bility and realize the inherent beauty of mathematics. It could include history and philosophy of mathematics, mathematical thinking and reasoning, applying and relating mathematics to real life situations, and drawing results and solutions.While 'popular mathematics' is often associated with *recreational mathematics*, rather than more serious mathematics such as mathematical modeling, Olympiad, etc. 'Outreach' is also primarily used for the work done by universities and museums, whereas 'enrichment' usually refers to activities extending or enhancing classroom teaching (Legner, 2004).

History of mathematics popularisation

The popularisation of mathematics has a long tradition, though it has been formalizedrecently as a discipline. The first major initiative dates back to *The Ladies' Diary* published between 1704 to 1841 by the Company of Stationers (London). It advertised itself as containing new improvements in arts and sciences and many entertaining particulars including mathematics' problems and letters about them. Lewis Carroll (alias Charles Dodgson 1832-1898) studied mathematics and wrote several recreational mathematics books including the famous *Pillow Problems*, which he said to be *"*worked out in bed at night without pencil or paper*"*. Mathematician David Hilbert gave popular lectures in 1920s for students returning to the university after the war. Lucas' *Towers of Hanoi* game is an example with a much broader impact. Martin Gardner (1914-2010) wrote a recreational mathematics column for the magazine *Scientific American*ad developed countless mathematical games, ideas, puzzles and stories. He was succeeded by Douglas Hofstadter, Ian Stewart and, most recently, Dennis Shasha (ibid, Legner, 2004).

Far back in space and time and in the Indian context, two ancient legendary mathematicians – Bhaskara-II and Mahaviracharya, the renowned Jain monk, and the author of famous mathematical work, *Ganita Sara Sangraha* – were the forerunners in popularising mathematics (Raj, 2004). Both with a mathematician's sharpness, a poet's imagination and an artist's creativity enriched their mathematics with a romantic and pleasant flavor of vivid poetry; and curiously presented to their disciples and lay people the mathematical concepts in the form of beautiful poems. Bhaskara taught mathematics to her widowed daughter Leelavati, through poetry and soon she became perhaps the first Indian woman mathematician.

Bhaskara also composed a popular volume in the name of his daughter under the title "Leelavati" which is considered to be a major milestone of the Indian mathematics. A number of commentators have subsequently written commentaries on "Leelavati" to further explain the complex concepts of mathematics to common man and interested people at large. They used to organize seminars based on Leelavati to popularize mathematics.

Though, the mathematics popularization had a long tradition, it became a systematic practice in late 80s. The stimulus for this was a study seminar organized by the International Commission on Mathematics Instruction (ICMI) at the University of Leeds (UK) in 1989 (Howson et al, 1990). The conference elaborated on the need of a framework, some principles and methods of popularization.

Studying impact

The 70shadalready witnessed an explosion of various mathematics education projects, be it 'popularisation', 'outreach' or 'enrichment' for obvious reason. The students, teachers and mathematicians started becoming increasingly unhappy with the way mathematics was being taught in the schools as well as compulsion of the growing importance of technical jobs for the developing economy. During this period, the Interactive Radio Instruction (IRI) was developed as the methodology to turn a typically one way communication into a tool for active learning inside and outside of the classroom with two way communication. As a result, fourteen applications of IRI mathematics were developed in twelve countries worldwide (Bosch, 2001).

Radio Schools of Tarahumara Project, Mexico (*ibid*) is hailed as the first significant IRI initiative. It began in 1955 with the aim of spreading the educational work of the Jesuits. Initially, education was related to religious beliefs. However, by 1960, secular education was provided with the aid of radio schools to provide high quality education to the students through the radio so that they could use it for further development if they went to public schools. By 1971, there were 46 radio schools that catered to more than 1000 students of the region. The 15minute radio lessons were grade specific broadcast continuously through the school timing. An evaluation done by the Centre for Educational Studies in Mexico City showed that when it comes to im-

parting cognitive knowledge, radio school students had a slight upper edge over the traditional students. The contributing factor was other than radio lessons - high dropout rates and significantly high rate of non-attendance. This evaluation compelled the radio schools to reevaluate their efforts.

Mexico's Radio primaria (*ibid*) was started in 1969 with the intent of providing higher levels of elementary education to the inaccessible rural areas of Mexico. Twentynine schools were setup but they were discontinued after one year. Radio primaria was started to allow a school with four teachers. Three teachers handled the three grades as per the traditional method of schooling while the fourth teacher instructed the fourth, fifth and the sixth graders with the help of radio lessons.

The Nicaragua Radio Mathematics Project was created by a team from Stanford University in the early 1970s, who were able to combine the low cost and high reach of the radio medium with a clear understanding of how people learn. The project began in Masaya state to teach elementary school mathematics. It reached to thousands of first and second grade students in three years. During 1975, the project produced 150 first-grade mathematics lessons that were presented daily in the classrooms. Experiment was done through oral teaching, worksheet exercise, songs, physical games, storytelling, and pen - paper test. Their performance was tested (pre & post). The result showed that the experimental groups performed better than the control groups (Jamison, 1980).

The performance of the first-graders was evaluated in 1975, 1976 and 1978 and the high magnitude of the achievement of the radio was well established. It was observed that radio, have the capacity to eliminate much of the gap in achievement across classrooms and a noticeable amount of the more substantial gaps among individuals. Moreover, it was seen that both radio and text books to be relatively more effective in rural schools.

Why did the radio group improve at a rate significantly greater than that of the textbook group? It seems likely that at least part of the difference can be attributed to (i) the more inconsistent application of the textbook treatment in the hands of teachers with relatively low levels of education; (ii) the uniformly administered, high-quality radio lessons that embodied learning principles such as active responding, immediate feedback about answers, and careful timing and systematic review of past lessons; and the use of radio as a delivery medium for standardized delivery of lessons (Jamison, 1980)

The most significant outcome of these original initiatives was that their project design and radio scripts served as the basis for IRI adaptations in the countries like Bolivia, Thailand, Cape Verde, Haiti, Kenya, Dominican Republic, Thailand, Ecuador and Guinea. Many of them have not gone to scale, yet after twentysix years and repeated studies on pedagogy, cost and sustainability, the interest in IRI does not seem to be waning (Bosch, 1997)

In the Dominican Republic, an IRI project called RADECO was created for children who had no schools and has been broadcasting for twelve years. In early evaluations, the children who had just five hours of integrated instruction a week using IRI and thirty minutes of follow-up activities were compared to students who were in regular formal schools for more than twice the amount of time. It was found that the children significantly performed better in Maths using the RADECO programmes than those in the control groups.

The IRI Math in Bolivia helped teach maths to over a million students from 1987 to 1998 before it was discontinued due to political changes. IRI Math in Guinea promises to reach out and transform a struggling African education system in West Africa. In Haiti, the IRI programme focuses on its failing schools. In Zambia, mathematical skills are integrated with language lessons and other subject matter to make education accessible to populations that otherwise might be bypassed – children of agricultural workers and children left orphaned by the devastating effects of HIV/AIDS. IRI mathematics in Venezuela, the largest of the IRI programmes, has reached over 3 million students in first to third grades since 1995 (TechKnowLogia, 2000). The IRI teams in Honduras developed another series of primary school maths called mental maths that attempted to introduce setting recognizable story-lines into the conceptualization of maths skills. Other integrated IRI programmes have also emerged that are heavily tied to the communities they serve. Both versions of IRI maths and the integrated series that have been evaluated thus far have proved to be highly effective in improving educational outcomes (Bosch, 2001).

Interactive Radio Instruction Project, Nigeria (Solomon & Swadchet, 2010)was started in Nigeria in 2004 and continued till 2009. It was funded by USAID and was implemented by Creative Associate International. This Interactive Radio Instruction

project was carried out under the name of COMPASS, i.e. Community participation for Action in the Social Sector. With an aim to improve the teaching of literacy and Mathematics, it was carried out in three states namely Lagos, Kano and Nasarawa of Nigeria. IRI also reached out-of-school and hard to reach populations thus inspiring National Commission for Nomadic Education in Nigeria to give life skills to migrant pastoralist and fishing folk.

The IRI proved to be a highly viable tool for the literacy and mathematics skills improvement in Nigeria that can be testified through this COMPASS project. Local capacity was improved through workshops and training was given to various experts like language experts, musicians, actors etc. on developing an effective IRI programme.

In Nepal, an interactive radio model was developed in 70s under the Radio Mathematics Project (Homes, Himalayan Research Bulletin, No. 2&3).Its purpose was to give high quality Maths instruction at the primary level schools. As Nepal has a hilly terrain with lack of proper transportation and communication facilities, the usage of radio as a tool for education was explored. It started with the in-classroom broadcasting with the help of UNICEF. This was not that effective as it was more of a lecture for a fixed duration. However, with the introduction of USAIDassisted Radio Education Teacher Training Project in 1978, it resulted in good quality, the pace of the instructions given was good and hence the students could comprehend easily and could relate to the radio as their teacher. This success encouraged the Government of Nepal to implement the project for three years on a large scale.

Southern Sudan Interactive Radio Instruction (SSIRI) (Education Development Center, 2008) project anticipates reaching over 1,00,000 children in grades 1 to 4 through daily half-hour radio programmes per grade. The lessons included: math, local language literacy, English, peace building, and life skills. The broadcasts were in English, with instructions for the local instructor to translate directions into the local language. The initiative has also developed the first of several planned modules of radio programmes to support teachers' training.

The Indian perspective

When Government of India, with a view to observe the birth centenary of the mathematical genius Srinivasa Ramanujan declared 2012 as the year of Mathematics, (DST, 2012), the National Council for Science & Technology Communication (NCSTC), DST launched a nation-wide programme for exploiting the potential of community radio in popularising mathematics among lay persons. Ten radio stations selected from different parts of the country came forward to produce the programme with community participation and broadcast for one year. The various applications of mathematics in everyday life were explained with real life examples. All these examples were designed with a range of lessons covering addition, subtraction, multiplication, division, fractions, algebra, trigonometry, geometry; the same were broadcast on radio. Mathematical ideas and skills were disseminated using fun games, music and songs, folk arts, drama, puzzles, riddles, and through events such as competitions, quiz, case studies and stories. The audience included students from pre-primary to college, people in the non-formal sector and neo-literates to women. They also participated in the making of the programme. Targeting 182 episodes in a year with every alternate day broadcast and its repeat for three times was a big challenge for the Community Radio Stations. Each of them worked with a specific group living nearby the station (Table-1).

Table 1: Spread of NCSTC's Radio Mathematics Programme

No.	Name of Radio Station	Target audiences
1	*KumaonVani*, Mukteshwar	Primary school students from rural area
2	Radio Mewaat, Mewaat	School students of a minority community
3	*Alwar ki Awaz*, Alwar	School students of upper primary
4	Radio MUST, Mumbai	School and college students and general community of urban slum
5	*VasundharaVahini*, Baramati	Textile women workers
6	Radio Active, Bangalore	House maids
7	SVYM, Mysore	Tribal children
8	Periyar CR, Thanzavur	Women farmers
9	*Rathinavani*, Coimbatore	Industrial workers
10	*Shyamalavani*, Madurai	MGNREGA workers and small business entrepreneurs

Meta-University Popularizing Mathematics through Community Radio project (Sharma et al 2014) was designed jointly by University of Delhi and Jamia Millia Islamia wherein they introduced the founder course in mathematics education called the Master of Mathematics Education (MME). The idea propagated by National Knowledge Commission. The aim of the course is to prepare professionally inclined teachers who have sound knowledge of the subject and can use modern technology to teach mathematics. The broader aspect of the course is to develop mathematics as a discipline to foster research and innovation in it. The principles underlying the framework of the course are as follows:

- The subject should be taught to students as an interactive-experiential activity
- Students should be given opportunity to explore, investigate, analyze and rationalize
- Mathematics should be presented to students as a coherent and unified discipline of inter-related concepts
- The subject can be understood in real-life using the power of intuition and discovery
- Teachers should be unbiased to the subject so that the students can understand and relate to the subject
- Use of multimedia can be an added benefit in making learning joyful

Under this programme, the students were supposed to promote maths literacy through online radio series on community radio station. The topics were chosen that could generate interest like, mathematics and nature, mathematics and everyday life, how to overcome the subject phobia, Indian women mathematicians; mathematics and hands-on activities, etc. The students worked in group of two-three, rehearsed the topics and with the guidance from faculty, they were able to connect to the larger population. It encouraged the students to launch a mathematics helpline for school students, teachers, parents and adult learners.

A similar initiative *'Ankon ke Khiladi'* or 'Magic of Numbers' was launched by NCSTC-DST to promote mathematics through All India Radio in October 2013. It had 26 episodes focusing on the life of mathematicians and their contribution to the society.

The Karnataka Interactive Radio Project was launched in the elementary schools of the state to promote learning mathematics and environmental science (Shubhashansha et al 2013). An assessment of the students' learning outcomes showed that while the mean scores of those in the implementation group for IRI were higher than the control group, the differences were not statistically significant. Interactive radio was also interactive to an extent because of the design. Schools where teachers were motivated to utilize IRI, though small in number, exhibited a positive energy in the classrooms. Students were seen to be actively participating in classroom activities. The teachers in these classrooms found the intervention useful in explaining difficult concepts.

Potential for strengthening science communication agenda

Despite the arrival of high media technologies like television and digital, radio continues to be a highly viable and cost-effective vehicle for popularisation of science, particularly mathematics. As we have seen, in the past five decades, radio maths has consolidated itself as a powerful field the world over. A large number of impact studies also have consistently demonstrated high learning gains, decreased equity gaps (both urban/rural and gender) across projects. The range of programme content and audience interactions during learning is highly impressive. While some popularisation projects only *teach about mathematics*, including its applications, history and philosophy, other projects actively engage their audience in problem solving and mathematical thinking. And above all, there have been a whole host of innovations to capture the audiences' attention and imagination, which include cryptography, games and activities, music, art or stories. Such innovations make the jarring mathematics beautiful, insightful, enlightening and simply attracts unexpectedly in may ways.

It is not easy to pinpoint the enabling factors that lead to relative success of the IRI methodology. It looks like a combination of the key factors converges to provide the needed conditions for long-term viability and sustainability that provide an impartial learning impetus to audiences across traditional boundaries to wander into the fascinating world of mathematics. Further studies in the field of radio maths may focus on the following issues (Schneider et al, 1995):

1. What is the relation of radio maths with school

mathematics?
2. What is the relationship with popularization of science?
3. What is its interplay with the wider culture?
4. What is the relation to the problem of woman's participation in mathematics at all levels?
5. What is its relation to the problem of cultural minorities' participation in mathematics at all levels?
6. How do we promote a healthy flow of information and encourage collaboration among practitioners?

References:

1. Bosch, Andrea (1997), Interactive Radio Instruction: Twenty-ThreeYears of Improving Educational Quality, Education and Technology, Notes, vol. 1, No. 1, World Bank Human Development Department, The World Bank.
2. ibid (2001), Interactive Radio Instruction for Mathematics: Applications and Adaptations from Around the World, *TechKnowLogia*, March/April - www.TechKnowLogia.org
3. Charpin, J., P. Hanrahan, J. Mason, S. O'Brien, M. O'Sullivan (2012), *MACSI* summer school: a case study in outreach in mathematics, *International Journal of Mathematical Education in Science and Technology*, 43:7, pp863-880, cited by Legner, Philipp (2004), *op.cit*.
4. Annual Report, DST (Department of Science & Technology), (2012) and http://edaa.in/column/community-radios-to-promote-mathematics-and-science
5. Education Development Center (2008), Southern Sudan Interactive Radio Instruction (SSIRI): Grade 1 Evaluation.
6. Feng,Wai Yi (2006), Conceptions of Mathematics Enrichment, paper presented at the British Educational Research Association Annual Conference, Warwick (2006), cited by Legner, Philipp (2004), *op.cit*.
7. Geoffrey Howson, Jean-Pierre Kahane (ed), A Study Overview
8. Geoffrey Howson, Jean-Pierre Kahane (ed), Study Overview
9. Holmes, Dwight R. (), Education through Radio in Nepal: Changes Within and Beyond the Classroom, Himalaya, the *Journal of the Association for Nepal and Himalayan Studies*, Volume 10, Number 2, *Himalayan Research Bulletin,* No. 2 & 3, pp 24-29.
10. Howson, A. G. and J.-P. Kahane (eds.) (1990), *The Popularization of Mathematics*, ICMI Study Series, Cambridge University Press, Cambridge (UK); and *The Popularization of Mathematics*, ICMI Secretariat, Southampton, 1989. (The working papers for the Leeds Conference).
11. Jamison, Dean T. (1980), *Radio for Education and Development*, Sage.
12. Legner, Philipp (2004), *Popularising Mathematics*, August.
13. Raj, Ashok (2004), Ancient Jain Science: A Way to Enlightenment, Speaking Tree, *The Times of India,* July 29.
14. Schneider, Joel (1994), Issues *f*or the Popularization of Mathematics, Proceedings of the International Congress of Mathematicians, Zürich, Switzerland.
15. Sharma, Jyoti and Shobha Bagai (2014), Reaching To the Unreached: Popularizing Mathematics through Community Radio Series, *International Journal of Advances in Science Engineering and Technology*, Volume- 1, Issue-3, January.
16. Shubhashansha, Bakshi and JyotsnaJha (2013), Interactive Radio/Audio Interventions in Elementary Schools in Karnataka, India: A Policy Simulation Exercise, Centre for Budget and Policy Studies. +
17. Solomon, Semere and Swadchet Sankey (2010), Interactive Radio Instruction: A Case Study, Education for Development Division, Creative Associates International, July. More than 20,000 teachers and 7 lakh pupils in about 1,400 schools benefitted through this project.
18. Stewart, Ivan (2006), Mathematics, the media, and the public, Proceedings of the International Congress of Mathematicians, Madrid, Spain.
19. TechKnowLogia (2000), *I*nteractive Mathematics for Basic Education: The Venezuelan Experience with *IRI,* May/June.

■

Understanding scientific wisdom and culture

Dr. Alka Muddgal
Amity Institute of Education,
Amity University, Noida, U.P. India

Kalpana Sangwan
Amity Institute of Education,
Amity University, Noida, U.P. India

Introduction

Every Institution or society has its own culture. Culture is complex and includes knowledge, belief system, art, moral, law, custom and other attributes, capabilities and habits which are acquired by man as a member ofsociety (E.B. Taylor). It is defined by its geography or ethnicity (for example American culture, Chinese culture, Indian culture).This term is also applied to the practices, behaviours, and expectations of smaller groups of people. Few attributes of culture are as follows:

- Communication
- Social structures
- Skills (psycho-motor and cognitive)
- Customs and norms
- Attitudes, values, beliefs, expectations.

Within every culture always exists a certain subgroup which is commonly identified by indigenous language, ethnicity, race, social class, beliefs, occupation, gender, religion, values, etc. An individual can belong to several subgroups at the same time. Each subgroup belongs to a particular culture. For example, subculture of any school, subculture of our peers and of a particular science classroom, etc. Culture is the system of knowledge shared by a relatively large group of people. It is the sum total of the learned behavior of a group of people that are commonly considered to be the tradition of that group of people and these are transmitted from one generation to other.Science is a part of culture and how science is done largely depends on the culture in which it is practiced.

In this new pedagogy is critically analyzed how learning science within a multicultural environment makes children move easily between their everyday life-world and the school science-world. When children cross these cultural borders, a few of them do not face serious problems which affect their learning of science. However, many do experience serious problems and deal with cognitive conflicts between these two worlds. Different cultural processes are involved in the acquisition of science culture when students accept that each student in the group has something valuable to contribute. It involves the acquisition of scientific culture by the students in the school with teacher support during teaching learning process and cultural clashes between individuals' life-worlds and the science-world.

Scientific culture

Scientific Culture refers to systems of shared ideas, the conceptual designs, and shared systems of the meaning. The set of factors, various events and actions of mankind during social interactions, dissemination, teaching and the implementation of scientific knowledge helps develop a particular type of culture and is known as scientific culture.

When we speak of "scientific culture"it is necessary to understand at least three possibilities of the meaning:

1. Culture of science

a) Culture generated by science
b) Culture appropriate to science.

2. Culture through science

a) Culture by means of science
b) Culture in favour of science.

3. Culture for science

a) Culture geared to the production of science
b) Culture geared to the socialization of science.

Role of schools in development of scientific culture

Science always plays an important and remarkable role in the development of an individual's critical thinking and every nation has included it in the school curriculum since long time. The values, different methods of inquiry, various innovative practices, broad perspective and the curiosity of asking questions are the essential part of science education. All these components of science education should be used effectively for meaningful learning and its development.

Transmission of culture takes place in science teaching and acquisition of culture takes place in science learning where culture means an orderly system of meaning and symbols in terms of which social interactions take place (Spindler 1987). For example, in case of western culture or Indian culture where members of these groups share a particular way of communication and similar symbols for the purpose of social interactions.

Transmission of a scientific culture among students can either be supportive or sometimes it can be troublesome as well. If the subculture of science harmonizes and supports students' everyday life and science instruction supports the students'view of the world, the result is enculturation (Hawkins 1987). When enculturation occurs critical thinking enhances an individual's everyday thinking. Whereas, if the subculture of science is not supportive for a student's daily life culture then science instruction will tend to create trouble for student's view of the world by trying to isolate it (assimilation). Enculturation attracts those students who are science enthusiasts while assimilation attempts to dominate the thinking of students. Both enculturation and assimilation require crossing cultural boundaries into the subculture of science. This also requires contextualization of science wherein the boundaries are dissolved and science becomes a way of life.

Science teaching can be:

- *Culture free*
- *Culture fair*

C*ulture free* teaching of science says that different cultures of students should not be introduced into the classroom. Many teachers feel that student's culture can become an obstacle while teaching science, so they prefer culture free teaching learning process in their classroom. These teachers do not accept diversity in the classroom easily as they are not culturally competent and are unable to cater to the need of diverse students.

C*ulture fair* teaching of science says that teaching learning process should not be separated from the culture of the students. "Learning science in the classroom involves children entering a new community of discourse, a new culture" as given by Mortimer and Scott, 1994. According toMaddock (1981) the view of learning science as culture acquisition, affords an intuitive, holistic, and rich appreciation of students' experiences in a science classroom.

For the teachers who feel that culture is never a barrier in science classroom rather it provides an alternative system of knowledge for better explanation opts for culture fair teaching in their classroom. These teachers always cater to the need of diverse students and are able to handle the diversity.

UNESCO (2005) emphasized the following aspects in teaching learning process to ensure culture fair practices:

- Recognizing diversity
- Respect and Accept the difference in culture
- Use of local indigenous knowledge
- Identifying and working with culture specific ideas of society and world instead of ignoring them.

According to many researches when students observe difference in culture of their daily life and classroom like how effectively students move between their daily life culture and the culture of science, then academic achievement of science is affected accordingly, and the help that students receive from their teachers in making these changes is much easier and are ready to adapt to the different environments too.

Role of teachers in acquisition of scientific culture by students

The role of the science teacher must be that of a catalyst for change. The changes required should be conceptual and cultural. The changes should be helpful to students in a way that they outshine the typically over-learned ways of thinking about the role of science education and to implement their knowledge into actual habits of practice.

According to National Curriculum Framework (2005), in science education, teacher should focus on inculcation of values of honesty, integrity and cooperation along with the development of scientific skills and critical thinking among students.

Teaching approach and culture

The teachers'choices of teaching approaches have been classified into four main categories:

- Approaches which ignore culture means culture free teaching: According to various researches, teachers who adopt this approach, feel science has nothing to do with culture or even if it does, then also, the classroom is not the place to establish a relation between culture and science.
- Approaches that utilize indigenous knowledge systems mean culture fair teaching: According to researches, the teachers who adopt for this approach, feel that culture plays a major and important role in science teaching in today's classroom.
- Approaches which recognize the contributions of various cultures to western science.
- Approaches which consider science itself as being a subculture among various cultures.

Conclusion

Teacher's classroom practices are highly influenced by their conception about scientific culture. For effective teaching learning process, teacher should collect complete and authentic information about students'everyday environment. As success in science teaching also depends on how effectively and easily individuals relate their life world culture and the culture of science taught in classroom. Schools need to realize the importance of student's daily life culture to enhance their scientific skills and to develop their critical thinking. Teachers should recognize cultural diversity in order to broaden the path of scientific development as students who study with a diverse population develop a better understanding of scientific concepts by interacting students in a multicultural environment. Hence, schools as well as teachers need to be proactive to create a positive and healthy environment where students from different cultures are respected and accepted equally.

References

1. Aikenhead, S. (1996), Science Education: Border Crossing into the Subculture of Science. Studies in Science Education (1996), vol. 27, pp. 1-52.
2. Benoit, G. & Gingras, Y. (2000), what is scientific and technological culture and how is it measured? A multidimensional model. Public Understand. Sci. 9 (2000) 43–58. Printed in the UK.
3. Culture definition. Retrieved from https://www.tamu.edu/faculty/choudhury/culture.html
4. Culture from Wikipedia, the free encyclopedia. Retrieved from https://en.wikipedia.org/wiki/Culture.
5. Germann, P. J. & Aram, R. J. (1996). Student performances on the science processes of recording data, analyzing data, drawing conclusions, and providing evidence. Journal of Research in Science Teaching, vol. 33, pp. 773-798.
6. Jegede, J. & Aikenhead, S. transcending cultural borders- implications of science teaching. Retrieved from http://www.ouhk.edu.hk/cridal/misc/jegede.htm
7. Magee, D. & Meier, A.J. (2011). Science Education and Culture: Inquiry-Based Learning. Journal of Intercultural Communication, November 2011 ISSN 1404-1634, issue 27. URL: http://www.immi.se/intercultural/.
8. Matter, A. (2015). 5 Thought-Provoking Articles on Cultural Diversity in Education; Teacher Effectiveness:Teacher Hiring. Teacher Match: Talent Talk.
9. Mythili, R. (2006), Science teachers'perception of the role of culture in science teaching. R.V. Educational Consortium, Bangalore, India.
10. National Curriculum Framework (NCF 2005).
11. Ogawa, M. Science as the Culture of Scientists: How to Cope with Scientism? Retrieved from http://www.ouhk.edu.hk/~rcwww/misc/ogawa.htm.
12. Scientific culture: Great expectations. Understanding Science, How science really works retrieved from http://undsci.berkeley.edu/article/socialsideofscience_05.
13. Xenia, M. & Barbara, A. (2011). Teaching science as a cultural way of knowing: merging authentic inquiry, nature of science, and multicultural strategies, Cultural Studies of Science Education. DOI 10.1007/s11422-011-9318-6.

■

HIV-AIDS awareness through Doordarshan programmes: An analysis

Dr. Rachita Srivastava Roy
Asst. Professor,
Govt. Science College, Durg, Chhattisgarh, India

The attitude of a person is a reflection of hissocial and psychological behaviour. To study human behaviour it is essential to find out the attitude of a person. According to Margon (1971) attitude is a tendency of positive or negative response towards special things, persons or situations. We can see various kinds of attitudes of a person in every sector of life.Under the Farm & Home programmes, Akashvani and Doordarshan broadcast various health related and other information. HIV-AIDS is one of such issues. According to a study (2011), a substantial reduction in these cases is seen. Programmes related to HIV-AIDS are being telecast from time to time on Doordarshan which are watched by people with an understandable manner impacting on their attitudes and behaviours. To understand and change the behaviour of a person it is essential to know the attitude of the person and the success or failure of a programme or policy depends on the attitude of the receivers. The present study attempts at knowing the attitude of people towards HIV-AIDS programmes and their awareness level on the subject.

Objectives & Methodology

1. To study the attitude of viewers towards HIV-AIDS programmes
2. To compare attitudes of viewers towards HIV-AIDS programmes on the basis of gender and education.
3. To study HIV-AIDS awareness among viewers
4. To compare HIV-AIDS awareness among viewers on the basis of gender and education
5. To study correlation between attitude towards AIDS programmes and AIDS awareness.

The study comprises the following hypotheses:

1. Satisfactory positive attitudes found among viewers towards HIV-AIDS programmes.
2. Male viewers show more positive attitude in comparison to women viewers.
3. The higher education promotes more positive attitude towards these programmes.
4. The viewers show a satisfactory level of awareness on these programmes.
5. Male viewers show better awareness than their female counterparts.
6. Higher educated class possesses more HIV-AIDS awareness.
7. People's attitude towards these programmes and their awareness are proportionate
8. People with more positive attitude towards these programmes have higher awareness.

The study was limited to:

1. Raipur district of Chhattisgarh state,
2. People from the age of 15 to 50 years were included,
3. Only literate people were included.

For the study 120 persons in and around Raipur city of Chhattisgarh State were selected through random sampling including 60 male and 60 female. 40 persons having low education level, 40 medium and 40 high. According to National AIDS Control Organization (NACO), HIV-AIDS risk is a maximum between the age group of 15 to 49 years.

Data were collected through self-made schedules:

1. Attitude Scale (towards HIV-AIDS programmes)
2. HIV-AIDS Awareness Scale

Reliability of Attitude Scale has been obtained by

test-retest method. The value of reliability coefficient +0.902 was found with a high reliability. Statements in the Attitude Scale are +ve and –ve in nature. The reliability coefficient of HIV-AIDS awareness scale has been found +0.871 by test-retest method. The result shows a positive and high correlation between two scores.

Data analysis was done by Percentage, Chi-square, t-test and Co-efficient of correlation.

Hypothesis 1

Satisfactory positive attitudes found among viewers towards HIV-AIDS programmes.

To verify the Hypothesis Chi-square method was used

Table 1: Percentage of viewers having different attitudes

	Low	Below Average	Average	Above Average	High	Total	Chi-Square
Frequency	27	18	38	25	12	120	16.07 **
Percentage	22	15	31.5	20.5	10	100	

$P < 0.01$

It is clear from the Table -1 that chi-square value of the attitude distribution from the entire sample is 16.07 which is more than the required chi-squire value at 4 degree of freedom with 0.01 level of confidence. This shows significantly positive attitude of the viewers towards the programme and hence the Hypothesis 1 is accepted.

Hypothesis 2

Male viewers show a more positive attitude in comparison to women viewers.

Table 2: Mean, Standard Deviation and T-value of attitude scores of male and female viewers

Group	Mean	Standard Deviation	t-value
Male	16.70	9.91	0.259
Female	17.13	9.01	

Not Significant

In Table2 the mean value of attitude scores of male and female viewers are shown. To see the significance of difference of mean values, the t-value has been calculated which is 0.259 at 118 degree of freedom with 0.05 level of confidence. The standard t-value is 1.99 which is more than the obtained value. Therefore the hypothesis 2 is rejected.

Hypothesis 3

The higher education show more positive attitude towards these programmes.

Table 3: Mean, Standard Deviation and T-value of attitude scores based on education level

Statistics / Education Level	Mean	Standard Deviation	t-value
Low High	6.30 26.35	2.84 4.12	35.93 **
Low Average	6.30 18.10	2.84 4.19	20.88 **
Average High	18.10 26.35	4.19 4.12	12.73 **

** Signified at 0.01confedence level

Table3 shows that low education level viewers mean value 6.30 is much less than the high education level viewers (26.35). The validation of difference of mean is also seen in t-value (35.93) which is higher than the standard value. This is for 38 degree of freedom with 0.01 level of confidence.

Hypothesis 4

In general, the viewers show a satisfactory level of awareness of these programmes.

Table 4: Percentage of awareness in various education level viewers

Attitude	Low	Satisfactory	High	Total	Chi-square
Frequency	35	64	21	120	23.82 **
%	29	53	18	100	

** Significant at 0.01 level of confidence

From Table4 it is clear that 29% viewers have low awareness, whereas 18% viewers have high awareness. 53% viewers in-between have reasonably

good awareness. The chi-square value from the Table is 23.82 which does not follow the law of normal probability at 2 degree of freedom with 0.01 level of confidence. Therefore, the table clearly shows that the viewers have a satisfactory level of awareness which confirms the hypothesis4.

Hypothesis 5

Male viewers show better awareness than their female counterparts.

Table 5 : Mean, Standard Deviation and t-value of awareness scores of male and female viewers

Group	Mean	Standard Deviation	t-value
Male	20.03	10.68	0.343
Female	19.39	10.82	

Not Significant

Table5 shows the comparison of male and female viewers' awareness level on the basis of mean value. The mean of the male viewers are slightly higher but from t-test we can say that the difference is not significant. Therefore the hypothesis is rejected.

Hypothesis 6

Higher educated class possesses more HIV-AIDS awareness.

Table 6: Mean, Standard Deviation and T-value of attitude scores based on education level

Statistics / Education Level	Mean	Standard Deviation	t-value
Low High	7.30 30.90	3.69 4.77	24.76 **
Low Average	7.30 20.90	3.68 5.08	13.70 **
Average High	20.90 30.90	5.08 4.77	9.01 **

** Signified at 0.01confedence level

Table6 shows the effect of education level on AIDS awareness. It is clear from the table that the awareness in low education level viewers is much less than the high education level viewers. The result is also verified from t-value analysis. In all the three subgroups the obtained t-value is more than the standard value on 78 degree of freedom at 0.01 level of confidence. Therefore the Hypothesis6 is accepted.

Hypothesis 7

People's attitude towards these programmes and their awareness are proportionate

Table 7: Correlation between attitude towards programs and AIDS awareness

Group	Coefficient of correlation	Result
Overall	+0.928	Significant at 0.01 level of confidence
Female Male	+0.947 +0.909	Significant at 0.01 level of confidence Significant at 0.01 level of confidence
Low Education Average High	+0.770 +0.509 +0.583	Significant at 0.01 level of confidence Significant at 0.01 level of confidence Significant at 0.01 level of confidence

Table 7 gives information about relationship between attitude towards AIDS programme and AIDS awareness. In all the three subgroups of female and male the coefficient of correlation is significant.

Hypothesis 8

People with more positive attitude towards these programmes have more awareness.

Table 8: Mean, Standard Deviation and T-value of AIDS awareness of high and low attitude viewers of HIV-AIDS programmes

Group	Mean	Standard Deviation	t-value
N=33 Low attitude	6.42	3.34	25.40 **
N=32 High Attitude	31.62	4.55	

** Signified at 0.01 level of confidence

From Table8 it is clear that there is a significant difference between means of awareness scores of high and low attitudes viewers on the basis of whole data.

Results

Related to Attitudes:

1. There is a positive attitude of viewers towards AIDS programmes.
2. There is no significant difference between attitudes of male and female viewers towards AIDS programmes.
3. Higher education level viewers have more attitudes towards AIDS programmes than low education level viewers.

The results show that there are more or less the same attitudes between male and female viewers. In today's changing environment this is not a strange finding. The education level of viewers also affects the attitudes. Education brings in some change in thought. Perhaps this is the reason that more educated the viewers, a more positive attitude they have towards AIDS programmes because they understand the importance of such programmes.

Related AIDS awareness:

1. There is a satisfactory level of awareness among viewers.
2. No significant difference is found between male and female viewers.
3. High education level viewers are more aware than low education level viewer.

It is clear from the results that women have shown equal awareness with males on this issue.

Correlation between attitudes and AIDS programmes:

1. There is a high positive correlation between attitudes towards AIDS programmes and AIDS awareness.
2. The most important and interesting finding of the study is the U-shape, obtained from the correlation between education level and AIDS awareness.

The results show that if the low education level viewers increase their interest towards AIDS programmes, their awareness will increase.

References

1. Margon C. T. (1971), Monobigyan, translation.
2. NACO, India-2010, Publication division NACO, Govt of India.

■

Commissioned Studies/ Papers

Indian Journal of Science Communication encourages potential scholars to undertake short term studies/ research/ surveys on specific area/ topic/ sector concerning S&T communication. It is expected that such studies will also lead to writing of a paper/ article and can subsequently be published in IJSC, if found suitable. A committee of experts will evaluate and recommend carring out of such studies. A nominal amount towards honorarium may be granted for undertaking such studies. Proposals, including information pertaining to title of the study, scope and objectives, methodology, expected outcome, budget estimates and time schedule, etc., may be sent to the Editor, IJSC.

AASSA Special Committee on SHARE Communication: IJSC Editor as Vice Chair

Dr. Manoj Kumar Patairiya, Editor, IJSC elected as the Vice Chair of the AASSA Special Committee on Science, Health, Agriculture, Risk & Environment (SHARE) Communication

The 12th AASSA Regional Workshop on "SHER (Science, Health, Environment & Risk) Communication: Role of S&T Communication in Disaster Management & Community Preparedness" was jointly organized by the Association of Academies & Societies of Sciences in Asia (AASSA), the Indonesian Academy of Sciences (AIPI), and the Korean Academy of Science & Technology (KAST) during 8-9 December 2015 at Jakarta, Indonesia. The workshop was supported by the InterAcademy Partership (IAP), and the Agency for the Assessment and Application of Technology (BPPT). The 1st Special Committee on SHARE Communication was elected at the end of the workshop to promote science communication in member countries, where Agriculture (A) was also added in SHER to make it SHARE Communication.

AASSA Special Committee on SHARE Communication

Chair	*Prof. Hak-Soo KIM*, South Korea
Vice Chairs	*Dr. Finarya Legoh*, Indonesia
	Dr. Manoj Kumar Patairiya, India
	Dr. Aphiya Hathayatham, Thailand
Secretary	*Dr. Aristotle P. Carandang*, Philippines
Members	*Dr. Asilkan Dzhumanazarova*, Kyrgyzstan
	Dr. Ulduz Hashimova, Azerbaijan
	Prof. Avtandil Korakhashivili, Georgia
	Prof. Masataka Watanabe, Japan
	Prof. Xiaomin ZHU, China

Indian Journal of Science Communication

An International Half-yearly Research Journal in Science & Technology Communication

SUBSCRIPTION FORM

To
The Coordinator
Indian Journal of Science Communication (IJSC)
Indian Science Communication Society (ISCOS)
Chandrika Bhawan, 577-D, Near Dandahiya Masjid
Lucknow - 226 022, India
Email : info@iscos.org, mkp@nic.in

Please enroll me as a subscriber of Indian Journal of Science Communication. I am enclosing herewith a demand draft / cheque No. ..... dated ..... issued in favour of Indian Science Communication Society, payable at Lucknow, India, towards subscription fee as indicated below :

Name.....

Mailing Address .....

.....

.....

Date : ..... Signature : .....

SUBSCRIPTION FEE*

Period	Institutional Indian (₹)	Individual Indian (₹)	Institutional Overseas (US $)	Individual Overseas (US $)
One year	1000	500	50	25
Two years	1500	750	90	45
Three years	2500	1250	140	70
Five years	4000	2000	200	100

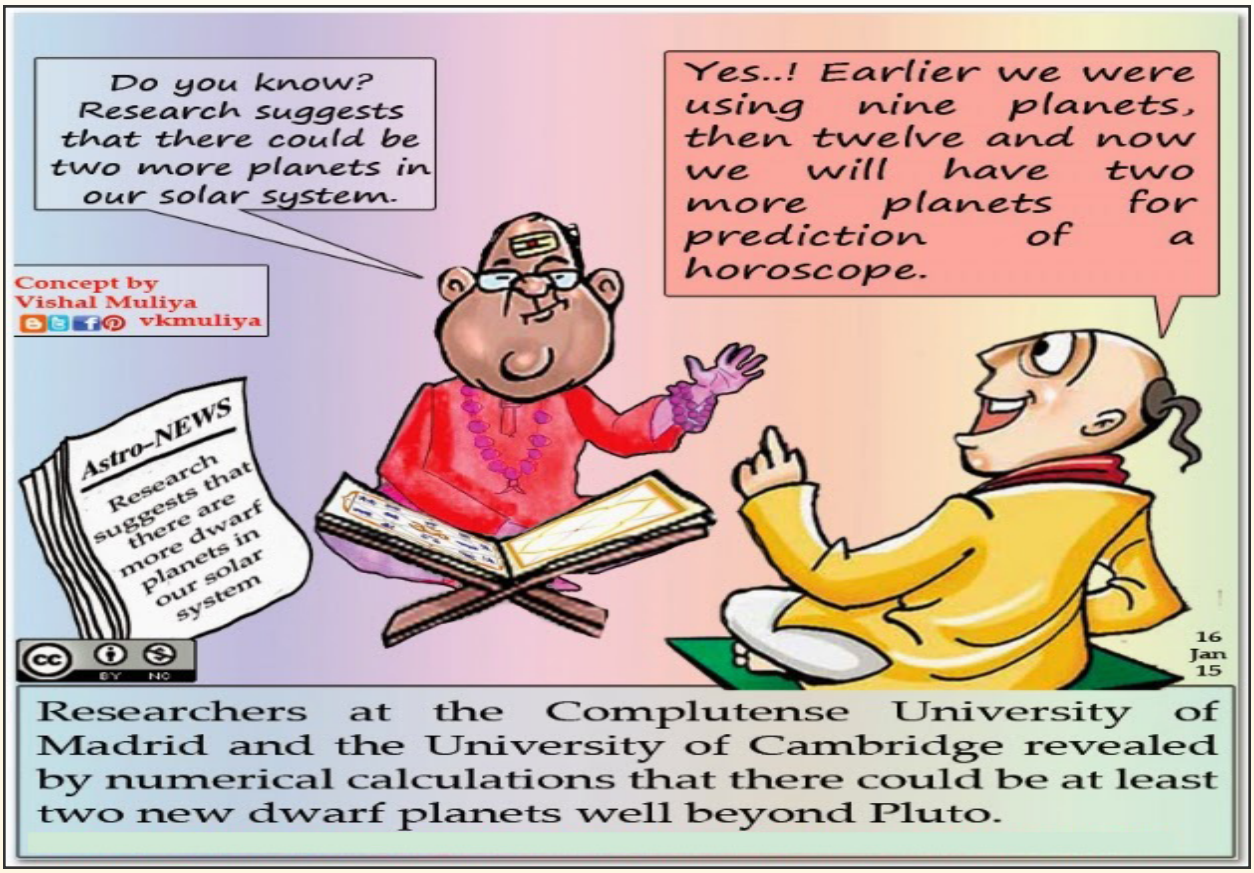
* Please indicate : Your category ..... Subscription period .....
* Overseas subscribers can send subscription through Bank Transfer (SWIFT Code SBTRINBBFED payable to "INDIAN SCIENCE COMMUNICATION SOCIETY, Account No. 57023117240" State Bank of Travancore, India) or through International Money Order to ISCOS at the address given above.

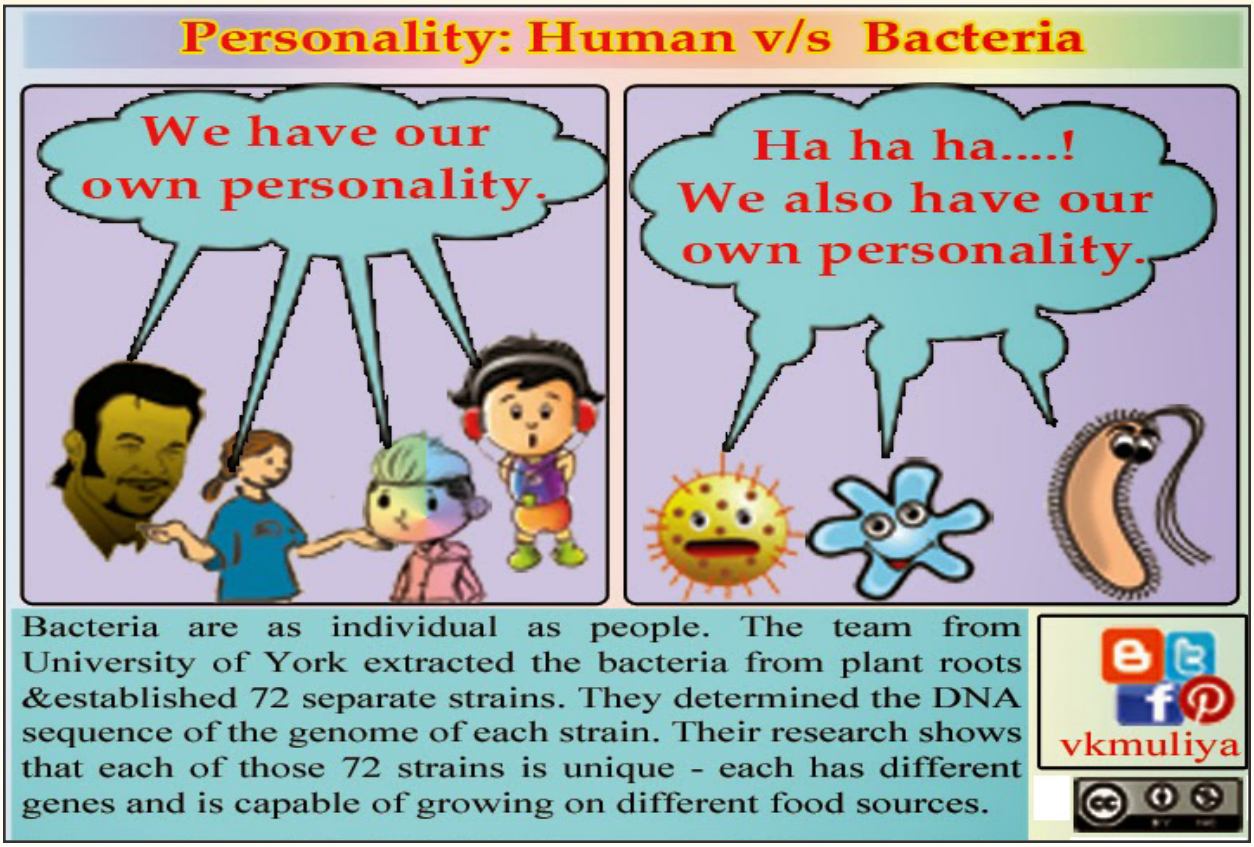
Indian Journal of Science Communication

Instructions to Contributors

- The scope of the IJSC encompasses all aspects of Science Communication and Popularisation (SCP); including Public Understanding and Engagement of Science (PUES); Public Communication of Science and Technology (PCST); and Science Technology and Society studies (STS). The communication of 'science' incorporates all its forms, i.e. Science, Technology, Research and Innovation (STRI), including Method of Science, Scientific Temper, and Scientific Culture. The communication of 'science' is inclusive of all basic, applied, and derivative sciences consisting of physical, chemical, biological, health and medical, animal husbandry and agricultural, environmental, space, nuclear, defence, and earth sciences, etc. It excludes contributions on basic and applied sciences and anything bracketed as popular science writing or science education. It also excludes technology development but includes its social and cultural implications and such studies.
- The IJSC invites original research papers, review papers, case studies and other contributions in any aspect of 'science communication' in the form of articles, assessment studies, book and programme reviews, survey reports, guidance and science dissemination project analyses from scientists, scholars, researchers, communicators and authors. Write-ups on science communication skills, innovative ideas to communicate science, cartoons (scientoons), etc., are also welcome. Science software materials, such as books, monographs, copies of TV and radio programmes, science kits and toys, etc., are considered for review, for which two copies may be submitted. News, views, opinions, debates, letters to the editor and suggestions are solicited for inclusion.
- Manuscripts should be submitted in hard copy and electronic form. Good quality printouts (two copies) in the Times New Roman font size 11 point are required. The pages should be numbered. The corresponding author should be identified by an asterix (include E-mail address). Electronic form of the manuscript should be submitted via E-mail and/ or in a CD/ DVD. Text should be entered using word processing software MS Word without any commands, formatting or designing.
- For illustrations, Corel Draw, Harward Graphics or any compatible format software (BMP, GIF, JPG, PCX, TIF) may be used. Label the CD/ DVD with the author(s) name(s), the word processing package used, software for illustrations and the type of computer. The illustrations should preferably be in camera ready form on white drawing paper suitable for reproduction without retouching and about twice the printable size to facilitate reduction. The photographs, charts, graphics and diagrams to be referred as figures(s), should be numbered and the captions be provided on a separate sheet. The figure numbers should be marked on the back of figure with the author's name. In case of photographs, only originals should be provided.
- The authors' photographs along with names and E-mail addresses may be provided for publication.
- The papers should be arranged in the order of - Title, Name(s) of author(s), Affiliation(s), Abstract, Keywords, Main text, Acknowledgements, Appendices, References, and then Footnotes/ Endnotes.
- Each table should be given on a separate sheet of paper and not to be adjusted into main text. Tables should be numbered consecutively and given suitable titles.
- Normally, the abstracts should not exceed 250 and the papers should not exceed 2500 words.
- The number of keywords should be around 5 and be placed in alphabetical order.
- The acknowledgements, if necessary, may include only special nature of assistance; no routine 'permissions' or 'thanks' to be mentioned.
- The references for sources cited in the text should be given at the end of text, numbered consecutively. In the text, the reference should be indicated by a number placed above the line (superscript). If done so, the reference should be listed in that order. If a reference contains more than one author, the names of all the authors should be given. References should be given in the following form:
    1. Patairiya M.K., Nogueira M.I. (ed.), Sharing Science, NCSTC, New Delhi and USP, Sao Paulo, 2011.
    2. Sharma R.D., Communication of science and technology in ancient India, *Indian Journal of Science Communication*, 1(1), pp 3-7, 2002. The sources such as unpublished papers and personal communications should also be included in the references in the following form:
    3. Menon P.K.B., Personal communication, 2000.
    4. Das Anamika, Unpublished work, 2002.
- The use of SI units in papers is mandatory. Commonly used units may also be given in parentheses following SI units.
- The national currencies may be converted into US $; the equivalent national currencies be given in parentheses following US $.
- No fee is charged from authors for their contributions for publication in the journal, similarly no remuneration is paid to them for their contributions.
- The IJSC follows zero tolerance policy for research misconduct or unethical practices. It is urged to refrain from plagiarism, copying, or using any material, information, text, visuals or data for your contributions for IJSC without proper permissions and citing references to avoid eventual consequences.
- The lead author or corresponding author is required to put his original signature on the manuscripts and give a certificate, along with the contribution, duly signed stating that: i) The contribution is the original work of the author(s), ii) The contribution has no infringement of the copyright and the necessary permission, if any, has been taken; and ii) The contribution is unpublished and is neither submitted earlier nor will be submitted later for publication elsewhere.
- Since the periodicity of the IJSC is 6 months and even if your contribution is scheduled for the next issue, it may take at least one year for publication!
- The contribution once submitted to IJSC normally cannot be withdrawn.
- Contributions submitted for publication should necessarily conform to these guidelines and while submitting manuscripts, the guidelines become acceptable to the authors.
- All contributions may be sent to:

The Editor
Indian Journal of Science Communication
Indian Science Communication Society
Chandrika Bhawan, 577-D, Near Dandahiya Masjid, Lucknow – 226022, India
Phone: +91-8090907153
E-mail: editorijsc@gmail.com; mkp@nic.in; Website: www.iscos.org





Published and printed by Dr. Manoj Kumar Patairiya for ISCOS, ISWA, New Delhi-110017, India
Printed at Smart Conference Pvt. Ltd., Lucknow-226001