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IMPACT OF SCIENCE COMMUNICATION: DOES PRESENTATION FORMAT MAKE ANY DIFFERENCE?

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Abstract

This essay discusses the impact of Science communication on common people. It elaborates three hypotheses.

- Science Communication has little impact on the belief system and/or superstitions. It, however, makes people take to new technology and gadgets. There is, thus, a difference in the impact of *science* communication and *technology* communication; so far the recipient of communication is concerned. This validates the communication theory of selective perception and acceptance.
- People will take to the devices or behavioral practices which, *they* think will 'benefit' them.
- Lack of formal education is not a big deterrent to people using technology or devices.

This essay attempts to validate the hypotheses through the analysis of recent and distant events and people's reaction to those events. It ends stressing the need to find new and innovative ways of more effective mass communication about the benefits of science, and also about areas of concern to the general public; and highlighting the need for constant engagement with issues of concern.

Science is the organised study of mankind and the universe by means of observation, measurement and experiments. Scientists try to find the rules which govern the universe. Technology is the practical application of science. However, here, when I am discussing about Science Communication or Science Writing, I am talking about *both*.

There could be four types of Science Writing, from the point of the writer.

- Scientist to Scientist: as in Text Books, Niche Publication, papers/articles in research journals.

- Scientist to General Population:
- Science Communicator (Science Journalists included) to People interested in Science: as in Science and Technology publications
- Science Communicator (Science Journalists included) to General People: as in mainstream newspapers and periodicals, popular television programmes

There could be several purposes of science communication, often with considerable over lap; for example:

- Information about new invention/discovery/concept
- Looking at a phenomena with new light
- Trying to change behaviour
- Trying to influence people to take to new technology/process/device, etc.

In this paper, I shall discuss about the impact of Science communication on common people. I have three hypotheses.

- Science Communication has little impact on our belief system, our superstitions. However, it makes people take to new technology and gadgets. There is, thus, a difference in the impact of science communication and technology communication; so far the recipient of communication is concerned. This validates the theory of selective perception and acceptance.
- People will take to the devices or behavioral practices which, they think will 'benefit' them.
- Lack of formal education is not a big deterrent to people using technology or devices.

Let me elaborate on my hypotheses.

I entirely agree with what Donald P. Hearth, Former Director, NASA Langley Research Center wrote "Beginning with the plow, science has changed how we live and what we believe. By making life easier, science has given man the chance to pursue societal concerns such as ethics, aesthetics, education, and justice; to create cultures; and to improve human conditions. But it has also placed us in the unique position of being able to destroy ourselves."
However, changes in human belief system have been woefully slow. The changes again have not been permanent. Circumstances often trigger reverse-change.

Let me give you some examples. In August 21, 1995 suddenly news of Lord Ganesh drinking milk across the country started circulating. Hundreds of gallons of milk were fed to Lord Ganesh, and then to other deities. Seeking to explain the phenomenon, scientists from India's Ministry of Science and Technology travelled to a temple in New Delhi and made an offering of milk containing a food colouring. As the level of liquid in the spoon dropped, the scientists explained that after the milk disappeared from the spoon, it coated the statue beneath where the spoon was placed. With this result, the scientists offered capillary action as an explanation; the surface tension of the milk was pulling the liquid up and out of the spoon,

before gravity caused it to run down the front of the statue. People stopped feeding milk the next day. However, the phenomenon occurred again on 20-21 August 2006 and in 2010. Some people still believe it was a miracle.

Similarly on 2006, some people claimed that the water at Mahim Creek in Mumbai had suddenly turned sweet. Hundreds flocked to that area, some drank the water, some took it in bottles, thinking it to be 'miracle cure for diseases'. Television reports showed people drinking water on the spot with their hands, and others bathing, apparently to wash away their sins with the "holy" water. News reports of the Mahim Creek incident sparked further mass hysteria at Gujarat within hours, with residents there claiming that seawater at Teethal beach in Valsad had also turned sweet. Geologists at the Indian Institute of Technology (IIT) in Bombay and M.D. Zingde, the head of the Mumbai office of the National Institute of Oceanography explained that the water turning sweet in Mahim Creek was a natural phenomenon. Continuous rainfall over the preceding few days had caused a large pool of fresh water to accrue in an underground rock formation near to the coast, which then discharged into the sea as a large "plume" as fractures in the rocks widened. Because of the differences in density, the discharged fresh water floated on top of the salt water of the sea and spread along the coast. Over time, the two mixed to become normal sea water once more. Same thing happened in Gujarat. The reason for the water tasting less salty than usual was that because of the monsoon, two rivers Auranga and Banki were in spate and had been flowing into the sea in the region.

However, people still believe and will continue to believe in miracles. And it has hardly anything to do with formal education. People with formal education are as liable to believe in miracle, and act accordingly as people without formal education.

The first national survey of the causes of death (the Million Death Study, undertaken in 2001-03 by the Registrar General of India and the Centre for Global Health Research) gave an estimate of 46,000 annual deaths by snakebite in the country. Most of the people die because they are not taken to the hospital, but to the local *ojha* or sorcerer.

Every year In Odisha on an average 30 persons, mostly women are killed, many more maimed and tortured, suspecting them of practicing witchcraft.

To validate my second hypothesis (People will take to the devices or behavioral practices which, they think will 'benefit' them) allow me to present data regarding increase in teledensity in India, thanks to phenomenal rise of mobile telephony. India had approx. 82,000 telephone connections at the time of independence and by 1984 the number of connections had slowly risen to 3.05 million. Presently India has the third largest (based on the total number of fixed/mobile subscriber lines) telecom network in the world and the second largest mobile network with 934 million subscribers while the total number of telephone lines amounted to 938 million by mid Sept. 2012. It has grown across the country, in urban areas and rural (the teledensity in rural areas is expected to cross 60 per cent in another three years). It has become ubiquitous.
UN Secretary-General Ban Ki-moon's remarked at Akash Tablet Event on 29 Nov. 2012, "Information and communications technologies are engines of economic growth and development and can help transform people's lives. They are great enablers -- helping people communicate across distances,

facilitating trade and commerce and providing better access to health care and education."
But the important question is: will the people adopt the technology, use the devices? They will, if they feel it practically benefits them in actually earning more than they used to, actually helping them to access health services, education, trade. Mobile telephone has become ubiquitous, because people have actually benefitted from its use. That triggered the demand. Availability of low cost instrument and low tariff rate made it accessible even to poor people.
Now look at a different set of data- regarding toilets. As per the census 2011 data, only 46.9 per cent of the total 246.6 million households have toilet facilities. Of the rest, 3.2 per cent use public toilets. And 49.8 per cent ease themselves in the open. In stark contrast, 63.2 per cent of the households own a telephone connection — 53.2 per cent of mobile phones. This shows people will take to the devices or behavioral practices which, they think will 'benefit' them. There are different ways people determine the 'benefit'; and it is not always economic. There could be factors like social status, peer-pressure, user-interface, habit, etc. Using a toilet does not seem to 'benefit' as much as a mobile phone does. Science communication can actually help here to increase the 'benefit –quotient' of a desirable practice or device.

My third hypothesis is: Lack of formal education is not a big deterrent to people using technology or devices. Look at the way rural India is taking to mobile telephone. Television/Mobile/Computer repairing shops mushrooming in rural areas as well. Look at 'Jugaad', the multi-utility vehicle in North India or 'Hero Water Pumps' in rural Bengal or 'Solar Water Heaters' in Central Karnataka. India's rural innovators have proved that ordinary people are indeed capable of extraordinary inventions. Despite many constraints -- lack of education and severe cash crunch -- most of them have succeeded in using technology cost-effectively to build ingenious products. A washing-cum-exercise machine, hand operated water lifting device, portable smokeless stove, automatic food making machine, solar mosquito killer, shock proof converter, a floating toilet soap – are some of the innovations showcased by National Innovation Foundation (NIF), a grant-in-aid institute under the Department of Science and Technology (DST) set up in February 2000.

An important Question remains to be answered: Does presentation format make any difference in acceptance of the concepts or facts? Research done in this subject is inconclusive. Even if the source and/or delivery platform is credible, if the information is in conflict with people's belief system- often it is not accepted or acted upon. Formal education has little impact in this. Just because the content is packaged neatly or just because the information is disseminated via internet does not make it more acceptable. Acceptability depends on several other factors including personal experience and perceived reward/punishment matrix.

However, there is a real need to find new and innovative ways of more effective mass communication about the benefits of science, and also about areas of concern to the general public. The mass media undeniably is the major role player in stimulating public debate and shaping public opinion on scientific questions and issues. By constantly engaging with issues of concern, with verifiable facts science may impact the belief system, one day. One of the greatest irony of the human kind is we want change *and* we fight/resist change. Science brings changes. Hence there will always be resistance *with* the inner craving of change.

I can only hope, it brings about a positive change in our belief system, fast.

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