

Vanishing in Space and Time –

Why science gets lesser representation in the media.

By

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ABSTRACT:

Mass media has been the most important way the general public learn about advances in science. Commercialization of the media has raised questions about how well the media is able to perform the function of not only being the watchdog of the society, but also about its function of informing and educating the society about societal as well as scientific issues. The amount of space given to societal issues keeps progressively reducing, at the same time, there also seems to be a paucity of space given to science. There also seems to be a disconnect between science communication and science journalism. Researches suggest that this could be because of lack of training to those who report science, lack of understanding of scientific information due to non-science background of the reporters, inability of scientists to communicate with the public in a language it understands, news gathering methods, editorial pressures or less importance given to science communication simply because that information lacks 'breaking news' quality. This paper hopes to explore this gap between science communication and science reporting through interviews and content analysis.

Introduction

Media acts as the conduit of information between the government, scientists and the public. The duties and the responsibilities of the media are well established. However with liberalization and globalization well entrenched in the Indian economy, and with the media becoming increasingly commercial in nature, the functioning of media seems to have changed drastically over a period, especially since the 1990's. With shrinking editorial spaces, the importance given to socially relevant news has been steadily decreasing. People get to know the reality of science from what they read in the press or watch on the television. It is only the media which is their source of

contact with the scientific community and the rapidly changing scientific scenario. It is the only source through which the public can understand how science could, in the future affect their lives and help them form an opinion about a particular development and help them participate in the policy decision process. This is important in a democratic setup where the public elects a government because the law and policy makers are directly answerable to the public who has elected them.

A Review of Literature

What makes news?

Ranade has succinctly stated the theories of 'What Makes News' as follows (Ranade, 2007): Walter Lippman suggested five factors that could make an event newsworthy: *sensationalism, proximity, relevance, unambiguity and facticity* (Lippmann, 1922). Einar Ostgaard of the Peace Research Institute, found three factors determining selection: *simplification, identification and sensationalism* (Ostgaard, 1965). Galtung and Ruge differentiated this concept into twelve factors: *frequency, threshold, unambiguity, meaningfulness, consonance, unexpectedness, continuity, composition, reference to elite nations and elite people, personification, and reference to something negative*. (Galtung & Ruge, 1965). Schultz conducted an extensive analysis and classification of media news content with an assessment of news awareness and stated that the characteristics that make news have "ethnocentrism", "personalization", "degree of conflict", "surprise", "complexity of portrayal", "proximity", "pre-eminence", and "centrality" (Schulz, 1982). Gatekeeping is another function which is performed by news organizations while deciding, usually by a combination of the above factors as to which event makes news. Moreover it also depends on the agenda set by the organization which matters while making news. Thus, several factors go into 'making of news'. Usually, it is a combination of several of these factors that make an event newsworthy and it is left to the reporters, the editors and the media organization itself, based on their values and agenda to decide whether a particular event is newsworthy. It also depends on what other event a particular event is competing with to make it through the gate.

Is science newsworthy?

Weigold has, in the journal *Science Communication*, presented an excellent discourse on the literature on science communication and most of the topics presented in the following paragraphs are to be credited to him. In media, there is a tough competition for space and time between editorial content and advertising and business content and the latter consistently keeps gaining. Amongst the editorial content which seems to increasingly get commercial and celebrity centric, science has to compete with other societal issues for time and space. During the Second World War, the importance given to science seems to have reached its zenith, when science and technology were seen as integral to victory. The launching of Sputnik led to re-evaluation of science education.

Though science has not been given much importance by the media compared to politics and business, there has been surprisingly large amount of curiosity and study on the representation of science in the media (Weigold, 2001). The importance of science in media has been well documented by several researchers. People learn about science from the media as it is their primary source to get information about the advances in science. Research shows that there is substantial recall and information retention, especially in television viewers. (Jon D. Miller, 2006). After schooling, most people are not usually in contact with what goes on in the rapidly changing scientific and technical fields. They are mere users of the applied science, and understand science less through direct experience. Media remains their only source to stay in contact and get information about the advances in scientific field and understand the implications of these advances in their lives (Weigold, 2002). In a democratic setup, it becomes all the more important that the public be informed about these advances as they are the ones who ultimately elect their representatives to make policy decisions on the scientific advances. Zimmerman et al argue that a carefully designed presentation can enhance public understanding of complex information and mathematical models and science management practices (Donald E. Zimmerman, 2006). In their study, using purposive samples, they explored the effects of visualizing and animating predictions from mathematical models in computerized presentations explaining forest succession (forest growth and change through time), fire behavior, and management options and found that rural population understood concepts better when explained

using visualized and animated presentations. This clearly implies that presented properly, the audiences do understand and would be able to participate in the scientific process.

How does science make news?

There are several issues about science communication and journalism that have been researched. In a research conducted on the impact of headlines, it was found that sometimes, sensational headlines sometimes dilute the importance of the story itself. Many members of the public glance at the headlines, form an opinion and decide whether to read the full story. This holds true for science news too, which, many times appears in sensationalist headlines, thereby diluting the interest of the reader. Either the reader reads 'between the lines' and decides that the report is not newsworthy, or immediately forms an opinion about the news, based on its face value and skips reading the rest of the story (Celste M. Condit, 2001). In a study conducted by Hijmans *et al*, the content analysis of Dutch newspapers revealed that even quality newspapers and science sections did not supply more or better reporting of background and methodological aspects of research that they cover. In general, reporting of science news meant avoiding complex information even in the science sections. The reason could be that most of the science related content was covered in the news section which in general demanded content which can be easily understood by the public (Ellen Hijmans, 2003). There are several other reasons mentioned by the researchers. Results from scientific research are often contradictory, there is disagreement among the scientists about the results whereas the general public expects certainty from the scientific community. That scientists disagree on results is evident by the recent controversy on the results of the nuclear blast conducted by India and the contradictory claims by scientists regarding the same in the Indian newspapers and media. These contradictions increase the delirium in the minds of common people, who depend solely on the media for information. In such cases the journalists are faced with the task of simplifying the scientific facts and presenting them before the public resulting in dilution of scientific data. There are several other problems faced by the journalists. Many editors look at scientific news as part of ordinary news that can be only occasionally reported. Such reports are judged on the basis of news value rather than on its merit of correctness or completeness. Science news is looked at as 'Supplement Material' rather than an important newsworthy item.

Modern news organizations tend to treat science as a niche area. From specialized science beats to science being treated as a general story, the news organizations differ according to their size and resources. Magazines tend to provide more in-depth reporting on science than the newspapers.

Another important aspect in news media is the gatekeeping function. These too depend on the agenda set by the news organizations. Some are solely worried about the TRPs, while some look out for sensationalism. Most of them, however, tend to look for the 'human interest' angle before the story passes the gate. There is always the issue of deadlines and news organizations tend to either over-simplify the scientific fact or not try and simplify the complex nature of scientific data so that their audiences understand the issue. Television news, though running 24 hours a day, manages to squeeze in just a bare minimum of science news. Further, the coverage of science happens only when there is a 'newsworthy' event than the scientific idea itself. For example, it was found that the coverage of evolution was less a function than Darwin's anniversary. Another example is the manner in which news appeared in the Indian media when the Nobel Prize was awarded to Venkataraman Ramakrishnan. The media covered the news completely episodically. Most of the reports were on personal details and even went on the report that he has kept the money he won for buying a Cello for his son. Very few reported on his research, giving details or trying to explain what exactly he was awarded the Nobel prize in a way common people would understand. The commerce of science is also evident by the fact that more coverage is given to commercial scientific news promoted by business organizations rather than that given out by a purely academic science organization (Weigold, 2001).

Framing of the scientific data is important. Perhaps along with the presentation of data using animation techniques, it is also important that the data being presented is framed in the right manner. Shanto Iyengar emphasized on the concept of framing in the television media. He argues that people think about an issue depending on how the issue is framed in the media. "*When news media presentations frame poverty as a general outcome, responsibility for poverty is assigned to society-at-large; when news presentations frame poverty as a particular instance of a poor person, responsibility is assigned to the individual.*" (Iyengar, 1990). Michael D. Cobb suggests that attempts to frame nanotechnology might have important consequences for public perceptions about it. His research explores potential framing effects and concludes that general framing with an overall attitude towards science produced little effect, at the same time, positive

and negative frames had an equal effect. He also found that negative framing increased the amount of distrust amongst the elitist over the subject. These findings could have implications on the public reaction to policy making. Today, there are several problems which could be solved by science communication. Global agriculture, for example faces several challenges and there are several novel techniques which could help in solving them; however, appropriate communication between researchers and producers is vital for the development, acceptance, and adoption of new innovations or techniques. The need for better communication between farmers and scientists has been widely documented; the failure of farmers in developing countries to adopt certain new technologies has been attributed, in part, to a lack of appreciation by researchers of farmers' needs (Clarke, 2003).

Susan D. Moeller has identified a four stage news cycle especially when reporting disease and famine. The *first stage* focuses on the initial event, constantly replaying key imagery and sound bites. This stage captures the audience's attention and holds their gaze. In the *second stage* of the news cycle, the dominant story becomes disclosing the perpetrator's identity and seeking justice: "who is he (or who are they), what was his motive, what threat remains and what is the response of the authorities." The *third stage* involves funerals and public mourning. Media coverage shifts back to the audience, creating a psychological space to express grief and purge negative emotions. The *fourth stage* creates a sense of closure, Moeller claims "when the media reassert the supremacy of the established political and social order." (Moeller, 1999)

In another study, newspaper coverage of the "bird flu," examined global discourses in terms of alarming and reassuring coverage. Three stages of discourse were identified. The first is termed *sounding the alarm*, where fearful claims making predominates. The second is *mixed messages*, and involves a continuation of the threat with efforts to moderate it with elements of reassurance, including scientific promises and national plans to combat bird flu. The third stage is *hot crisis and containment*, and involves efforts to undo the most frightful elements of the *avian mutation* interpretative package as the H5N1 virus spreads into Europe (Ungar, 2008).

Science and the Internet

Many researchers have explored the impact of the Internet on science communication, which seems to have the potential to dramatically change the relationships of the players in science communication. The internet allows the scientists to communicate directly with the people

without the mediation of the news organizations. Secondly, the severe limitations of time and space in the print and the television media are eliminated. The advances in the web technology further enhances the delivery of scientific information in a visual format of graphics, sound and films. There are several parameters under which websites can be evaluated ranging from informative, participatory, networking, formal and design features. For a country like India, the presence or absence of the website in Indian language is also of utmost importance. Design is also a major factor by which websites are perceived by the users. In two recent studies done by this author, it was found that most of the political and government websites lack in participatory features and most do not have their content in an Indian language. Also, most of these websites do not follow the F-Pattern of website design. Interestingly, this author found that the government websites in India follow a typical U pattern of design. By design, this author does not mean the aesthetics, but the layout and the manner in which content is presented to the audience to facilitate easy navigation. In an interesting study, it was found that visitors of scientific websites tended to feel disoriented because they had trouble estimating the size of the documents. The researchers also found that the viewers found it more difficult to read graphics and tables, which are essential parts of scientific research reports (Mônica Macedo-Rouet, 2003).

How well do scientists communicate to the media?

A study found that there are significant differences among scientists, grouped as media generally see science sources: government scientists, university scientists, or industry scientists. As most journalists presume, scientists on university faculties are most willing to meet with reporters and are less concerned about the prospects of a negative outcome. Government scientists, on the other hand, felt more constrained and less comfortable talking with journalists. And those employed by industry were restricted by policies limiting what they could discuss and with whom. Their attitudes toward journalists, perhaps understandably, were the least informed or user-friendly (VALENTI, 1999). Usually, scientists use the “deficit model” of communication which assumes “public deficiency, but scientific sufficiency.” This model adopts a one-way, top-down communication approach, in which scientists, who have all the required information fill the knowledge vacuum in the scientifically illiterate public, as they saw fit. This hampers two-way communication where the public is left to form its own opinion without actively interacting with the scientists. The general feeling the public gets is that of being dominated. Moreover,

science communication is framed in a negative way; it is seen as a difficult, perhaps impossible, task.

Hak Soo-Kim states that the danger of the cultural divide between the public and scientists seems to exist in their not having a “joint” problem-solving and issue-resolving capability, not in the wide, but artifactual, gap of scientific literacy between them (Kim, 2007). Raza, Singh and Dutt argue that the cultural divide between the scientific community and the public could be a reason for ineffective communication. (Raza, Singh, & Dutt, 2002).

Scientists are frequently disappointed or angry about media coverage of their research, their fields, or science generally, journalists report frustration with the difficulties of describing and understanding important scientific findings (Hartz and Chappell 1997) and with the low levels of support provided by their news organizations for reporting on science news. Research suggests that those who cover science frequently lack any but the most cursory backgrounds in the sciences and mathematics. “Most journalism graduates will be exposed to science journalism issues, if at all, in passing during basic and advanced reporting courses” (Palen 1994, 607). News-gathering norms also may hinder effective science communication.

There are thus, diverse views on science communication and science journalism. In this whole game between the scientists and the media, the ones who ultimately remain devoid of information and knowledge are the publics for whom both these players work ultimately.

Method of study

This research can at best be termed as a study to find out in a limited amount of time available, the reasons for the gap in communication between the scientists and the journalists. This was an exploratory study done by conducting interviews with reporters from various television channels and a few scientists. A very simplistic questionnaire was e-mailed from which till the time of writing this paper, this researcher was able to get thirteen coherent responses (Please see Appendix 1). Open ended interviews were conducted with scientists from well known scientific organisations.

Observations

From the data gathered from reporters, editors and producers from television channels, and also from the open ended interviews, some observations stand out. The results of the study match many of the observations in the literature above. For example, media professionals have stated that scientists tend to shy away from the camera which make their job tougher as television is a visual medium. They also tend not to explain the scientific data in a way that the reporters understand the research. This in turn puts the onus on the reporters to explain and try to convince their editors that the research is newsworthy. At the same time, many of the reporters agree that they lack the scientific background necessary to get the facts right, enabling them to further explain them to their audiences in a way they understand, while keeping the facts intact. Secrecy and the lack of access to scientific institutions and organisations is also a reason for science stories not finding space and time.

Another observation was that most editors and producers tend to overlook a scientific story mainly for two reasons. One, they feel that the story is not newsworthy, second, the scientific story is sidelined when there are several other ‘human interest’ stories coming in. One reporter has stated that the science stories are not picked up because they do not affect the day-to-day lives of the public. Interestingly, several reporters have stated that the public does not like to watch science stories unless they are dramatized or sensationalized. Many have stated that lack of a dedicated science beat or a science reporter also affects the science story. There is also the question of lack of technical aptitude in the channels to produce a good, interesting science story. Most of the reporters and editors interviewed stated and an important reason why a science stories do not get picked up was the lack of visuals.

In the open ended interviews, this researcher was amazed by the lack of communicating ability of one scientist in an eminent position. Firstly, this scientist was a bad listener, not taking time to understand the questions posed, at the same time talking so much jargon that even though this researcher is a science post-graduate, it was difficult to follow and comprehend. However in another interview, this researcher was pleasantly surprised by the superb communicating abilities of the scientist interviewed. In another interview, the scientist categorically stated that the reporters lack scientific background and are hence not able to comprehend even basic scientific terms. He stated categorically that many times the questions posed by the reporters were

laughable. The way in which media covers science stories was frustrating to all the scientists interviewed, be it the Large Hadron Collider or Swine Flu.

The scientists as well as the reporters also put onus on the viewers' choice of news stories, stating that even the public is partly to blame for this scenario, for the lack of scientific aptitude.

Discussion

From the observations, it is evident that the problems of science communication as well as science reporting were in line with the problems around the world. The gap is not just between the scientific communication and science reporting, but the gap also exists between the public and the scientists on one hand and the public and the media on the other. True, the public depends solely on the media for scientific knowledge and information, but they are not prevented from finding out scientific facts on their own. The question is of scientific attitude. Reporters and scientists too need to be on the same platform as that of the public to be able to communicate better with each other.

Proximity, sensationalism, meaningfulness, simplification, identification and sensationalism frequency, ambiguity and meaningfulness seem to be the factors that are lacking in scientific communication, thus hampering scientific events from becoming newsworthy.

Perhaps the solution could be in training the scientists and the reporters alike in communicating with the public. The scientists too have to understand that in this era of 'breaking news', they need to probably communicate with more visual aids and also be camera savvy, enabling the media to make the story interesting to the public.

Scope for further research

As stated earlier, this research can be at best termed as a study. There is immense scope for further research. A more detailed form of interview with a large number of media professionals could reveal much more interesting information. There is a need for content analysis of the media to find the evolution of scientific news.

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Appendix I

Organi zation	Why science is absent 1	Why science is absent 2	Why science is absent 3	Why science is absent 4	Why science is absent 5	Stories in past month	Stories in past year	Stories in last 5 years	Three difficulties in getting story 1	Three difficulties in getting story 2	Three difficulties in getting story 3	Three difficulties in publishing the stories 1	Three difficulties in publishing the stories 2	Three difficulties in publishing the stories 3
IBN7	Less TRP rating	No special beat for Science subject	Does not occur regularly	Lack of attention and knowledge	India news electronic media is just ten years old	No ne	2	2	No TRP	Lack of PUBLIC INTEREST	LACK OF KNOWLEDGE	TRP	NO SPECIAL BEAT	NO DAY TO DAY UPDATING
News X	Fast paced nature of the businesses	Concept of breaking news discourages science reporting	No incentive for those reporting science	TV being a medium of the masses , pure sciences have limited appeal	-	No ne	0	0						
Star Majha	Lack of knowledge about scientific developments in the people who run the businesses of news	Lack of Scientist to come ahead and talk about their innovations	No dedicated reporters, hence no one to explain to the desk the importance of science news.	Timing of the scientific development matters a lot. Amount of people who will be affected by it is also considered while putting the news on air	Missing visuals	1	4	8	The relevance of the development to the target audience	The place where the innovation has been done	-	Getting the news in the first place	Difficult to convey what exactly has happened in common man's language	Science news does not get preference over other news.
Zee News, Mumbai	No advertiser puts their money on Science bulletins	Lack of Science subject knowledge in reporters	No audience response in Science stories.	They are more episodic and very less thematic, therefore loses importance in a short period of time	Science stories are easily available	1	1	1	Hardly any press release or invitation available for science stories	Other beats are given much more importance than science & technology	No easy access to Science institutions, which makes national news stories	Channel doesn't want such stories , unless something very big	Availability of visuals	Gatekeepers (editors , producers) not interested in stories

tv9	Audiences don't like such stories	Reporters not interested in such stories	No audience response to Science stories	Not good stories	Science stories don't make sellable stories and are not necessarily viewer friendly	0	0	0	Hardly any press release or invitation available for science stories	Science & technology beat is not given enough importance	No easy access to Science institutions, which makes national news stories	Channel policy	Availability of facts and visuals and bytes	Editors not interested in stories
Zee News Mumbai	Viewers don't want to watch	Lack of scientific temperament	Doesn't give TRP	Incapability to produce good science programme	Lack of knowledge	0	few	24	Difficult to extract these stories	People in this field rarely cooperate	Lack of communication between scientific community and journalists	Its assumed that viewers don't like these stories	Editorially no encouragement unless it creates horror film effect	Problem in translating such stuff in popular format because its too academic
tv9 Mumbai (as Sr. Producer OutPut)	No relevant visuals available	News too academic	Scientists remain away from the media or avoid media	Science news not available in Hindi	Lack of public interest	0	0	0	No time to understand the concept behind a science story	Scientists do not generate interesting subjects that can make a news story in electronic media	The official secrets act	Not visually exciting for the television	Science community has failed to address the large hindi speaking population	Lack scientific news and making it interesting to the viewer.
TV9	is too academic	It doesn't get TRP	Common man is not bothered about science	Science many times appears in contrast with popular perception	Its demystifying effect doesn't get eyeballs	2	2	-	Themes are difficult to understand	Difficult to explain	Science stories doesn't give good visual opportunity.	How to put it in a package	How to explain audience about use of story	Does not address the needs of common public
tv9 mumbai (Managing Editor)	masses do not watch them	Difficult to depict visually	No amusement factor	Science news not available in Indian Language	No entertainment value	15	10	40	Scientists not interested in talking on camera	Difficult to make it visually interesting	Too technical	Not seen as headline	-	Represented in an amusing manner leaving out the scientific facts.
tv9 News Mumbai, Editor	Lack of viewership for science reportage	Ill-equipped channels	Science reporting skills do not promise jobs in media	Too technical a beat to report		-	4	20	High Level of secrecy maintained by people concerned	Authentic source of information	-			

			house											
CNN-IBN, Mumbai	No audience response in Science stories	No advertiser puts their money on Science bulletins	Lack of Science subject knowledge in reporters	They are more episodic and very less thematic, therefore loses importance in a short period of time	Science stories are easily available	0	3	20	Hardly any press release or invitation available for science stories	Other beats are given much more importance than science & technology	No easy access to Science institutions	Channel doesn't want such stories, unless something very big	Availability of visuals	Gatekeepers (editors, producers) not interested in stories
TV9	People and Press both lack science awareness	Apparently science measures poorly on the TRP scale	Too technical and specialized for general mass consumption	Lack proper professionals who can cover science as a beat in a simple assimilable way	Unlike foreign channels, Indian channels not professional enough to appreciate its efficacy				Articulate spokespersons	Absence of quality research barring public materials on net	Tough to convince channel that people would be interested in watching this story, worse still the subjects.	Timing or slot given	Unenthusiastic output people	Too many raised eyebrows... who will watch it pal
zee 24 taas	It may not have good trp	Less access to the field	We are yet to understand and how to represent scientific stories in visual media	People not related to the stories	We journalists are not mature enough to understand the stories and convert it in news	2	12	-	visuals	scientists, experts are not accessible	Convincing boss for the story [all bosses want high trp breaking news]	Convincing boss for the story [all bosses want high trp breaking news]	scientists, experts are not accessible	visuals