Science and Science Communication

Communication is the process of sharing ideas, information, and messages with others in a particular time and place. Communication includes writing and talking, as well as nonverbal communication gestures, and visual communication. However, the communication has become an essential component of our lifestyle in the modern world. Apart from the face-to-face communication among us, we do communicate through various media of mass communication, and also through internet individually or as groups.

While the print medium which exists from olden days is developing and expanding rapidly with modern technology, electronic media affect mankind closely and strongly. Today, the communication has spread through various fields such as day-to-day events, social trends, political issues, international affairs, sports and culture. However, it is not a secret that Sri Lankan electronic media in general has devoted the major part of their air time for mere entertainment.

Meanwhile, the impact of rapidly growing modern science and technology has imposed strongly on human being of the entire globe. With the development of modern science, the man started trying to understand natural phenomena, he experienced in a different way. This understanding is used for the betterment of mankind and also to defend him from enmity.

However, the development of science and technology could be able to mitigate unfavourable situations like famines, epidemics and eradicate diseases like smallpox. Mainly due to these developments, life expectancy at birth of human being has been increased in almost all communities in the world. It leads to increase the human population to a higher level. Then their damaging actions to the nature resulted unfavourable natural conditions for them and other life forms.

Due to the enormous strength associated with the correct use of science and technology, the man gradually started to use science to find solutions for various problems that came across in day-to-day life leaving conventional practices aside. Now, it has come to a situation that having scientific knowledge and capabilities is essential for almost all human activities. These practices have become essential components of human life, so that modern society has developed a "Science Culture" together with its other cultural practices.

The knowledge of science has obtained through scientific methodology. Scientific method refers to a body of techniques for investigating phenomena and acquiring new knowledge, based on observable, empirical, measurable evidence and subject to laws of reasoning.

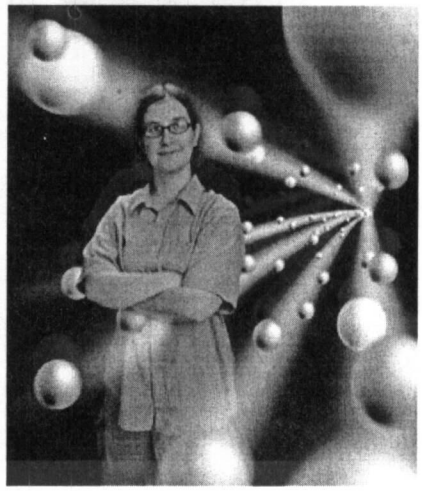
The type of science communication varies from situation to situation. Communication of science among scientists is very important for the advancement of science and technology. This usually happens in a very systematic and methodical manner through technical sessions, symposia, proceedings and peer reviewed articles in scientific journals of various national and international scientific organizations.

Science education can also be considered as another type of science communication. Science education is conducted mainly in secondary and tertiary levels of education using various techniques. Science education mainly gives knowledge and in-depth understanding of science to a particular fraction of the community.

The individuals of this community has already had interest and confidence on science and chosen their future professions in the field of science. Considering the importance of science education in general some universities have given opportunity to follow basic science courses for the students who have not registered for science based study programmes.

However, the view of the majority on science communication is quite different. They think that the science communication is taking science to the general public. Some instances, science communication is referred as science popularization. The science, which can be taken to the general public, is called as popular science by some people.

What is importance of taking the knowledge or information of science to the general public? Even if the science communication among scientists is done by themselves, carrying science to the general public is not happened in the same manner. Common belief is that communicators with the knowledge on modern science and scientists with communication skills are needed for taking science to the general public effectively. The people with such capabilities are known as science communicators.



According to the well known science communicator, Prof. Chris Bryant, the science communication is the processors by which the scientific culture and its knowledge become absorbed into the culture of the wider community. What is the wider community? One thing we should know about the wider community is, it is not homogeneous. It has individuals with different qualities and also from different backgrounds.

When we introduce a certain concept or information we should not expect to be transferred the same picture which is in our mind to everybody's mind. They will understand the concept in their own way according to their nature and the back ground. However, in many instances, we do not consider that fact and we communicate expecting to flow the knowledge from one brain to another as the way water flows through a conduit pipe.

Following results were obtained from a survey conducted by the National Science Foundation of USA to evaluate the efficiency of science communication for the general public of the United States. 15% of the participants were satisfied with existing science communication programmes and 35% of the participants have said that the awareness programmes are inadequate.

It was found that 50% of the participants did not know the following facts.

- the earliest humans lived long after dinosaurs
- the earth takes one year to go round the sun.
- electrons are smaller than atoms.
- Antibodies do not kill viruses.

But, some people question that does that not knowing any of these things matter for their day-to-day lives. Even the misinformation about antibiotics should not matter that as long as they get their prescription from a qualified medical practitioner. Does it really matter if some one thinks the sun goes round the earth? The earth will continue to go round the sun in spite of what people think. The result obtained from the similar survey conducted in the UK was not much different.

However, the above mentioned type surveys are meant to directly measure the level of the knowledge on science of the people. Through science communication, it is possible to transfer science knowledge to the public to be used for their economical development, day-to-day life, cultural aspects and social activities. In some instances, science exists in the people's mind invisibly till they get an opportunity to apply.

However, widely accepted view is that the public understanding of science and public awareness of science are not similar. Science education always leads to understanding of science and it is normally conducted in a formal manner. The other fact related to science education is that the people engage in that already have an interest and faith on science. But, the important task here is to aware the people who do not study science and that makes the majority of the community.

Increasing public awareness of science is a more difficult concept. Two well-known science communicators, Stockl Mayer and Gilbert have described the public awareness as a set of attitudes based on beliefs and feelings, accessing scientific and technological knowledge and a sense of ownership for science. Through this, a confidence is built up to investigate science and technology and their applications. This confidence will lead them to evaluate the nature of their knowledge and its importance on their personal, social and economical aspects of life.

Awareness goes further than a mere knowledge that the science exists. It implies that an affective change has taken

place in the observer that he or she feels comfortable with science, may even have a sense of ownership and pride in it. It emphasize the importance of participation. Even to understand and enjoy a science fiction, one needs to have a sufficient science knowledge.

To increase the awareness of science in the general public many techniques can be used. Print and electronic mass media can play a major role in this regard. In addition to this, lectures, discussions, workshops and even drama are broadly used for science communication globally. Science museums, zoological parks, botanical gardens and science exhibitions have strong potential of uplifting the level of awareness of science in the general public.

However, whatever the technique we use for this purpose should be very attractive and appealing to the participant without disturbing it's objectives.

Broadly speaking, the science communicators bridge science and it's stakeholders. Specially, science communicators' more important role is to develop public confidence on Science related matters while improving critical thinking capabilities of the public, rather than building an image on a particular scientist or group.

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http://www.listen.org/Templates/fact_conpetence.htm
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LISTENING COMPETENCE AND OMMUNICATIVE COMPETENCE

Confident individuals listen to message content better than individuals who lack confidence (Clark, 1989).People with less confidence in themselves tend to be better listeners for the emotional meaning of the spoken message (Clark, 1989). Being more willing to communicate and less apprehensive about listening and speaking is an indicator of better listening comprehension (Clark, 1989).

When learning a foreign language, one's grammar improves if one learns to listen to the language prior to speaking it (Benson, & Heilt, 1978).

Both business practitioners and academics listed listening as one of the most important skills for an effective professional, yet only 1.5% of articles in business journals dealt with listening effectiveness (Smeltzer, 1993). Individuals agree less on the ratings of good listeners, but agree more on the ratings of poor listeners (Cooper & Buchanan, 2003). Listening accounts for approximately 1/3 of the characteristics perceivers use to evaluate communication competence in co-workers (Arnold, 1995).

Listening and listening-related abilities such as understanding, open-mindedness, and supportiveness constitute the single dimension upon which people make judgments about communication competence (Wienmann, 1977). An individual's willingness to listen is positively correlated with communication skills and negatively related to receiver apprehension and sender based communication apprehension (Roberts & Vinson, 1998).

Listening is an important component in how people judge communicative competence in the workplace (Haas & Arnold, 1995). Further, individual performance in an organization is found to be directly related to listening ability or perceived listening effectiveness (Haas & Arnold, 1995).

LISTENING AND MEANING

In a spoken message, 55% of the meaning is translated non-verbally, 38% is indicated by the tone of voice, while only 7% is conveyed by the words used (Mehrabian, 1981).Spoken words only account for 30 -35% of the meaning. The rest is transmitted through nonverbal communication that only can be detected through visual and auditory listening (Birdwhistell, 1970).

LISTENING AND MEMORY

On average, viewers who just watched and listened to the evening news could only recall 17.2% of the content when not cued, and the cued group never exceeded 25% (Stauffer, Frost, & Rybolt, 1983).
In a linear one-way listening task, when presented with a list of words, people can remember, on average, 7 items (Miller, 1956).
When presented with a series of unrelated sentences and asked to remember the last word of each sentence, people can remember, on average, 2.805 items (Janusik, 2004).
In a dynamic, conversational listening task, where people must remember a series of related questions and respond to them, people can remember and respond to 2.946 items (Janusik, 2004).

LISTENING AND SPEECH RATES

The average person talks at a rate of about 125 – 175 words per minute, while we can listen at a rate of up to 450 words per minute (Carver, Johnson, & Friedman, 1970).

LISTENING AND LEADERS

Listening is tied to effective leadership (Bechler & Johnson, 1995; Johnson & Bechler, 1998).
Leaders give good attention to the speaker by looking the speaker in the eye (Orick, 2002).
Leaders listen with an open mind by not becoming emotional or defensive (Orick, 2002).
Leaders can listen to a speaker and be respectful by not betraying the confidence of the speaker when asked to do so (Orick, 2002).