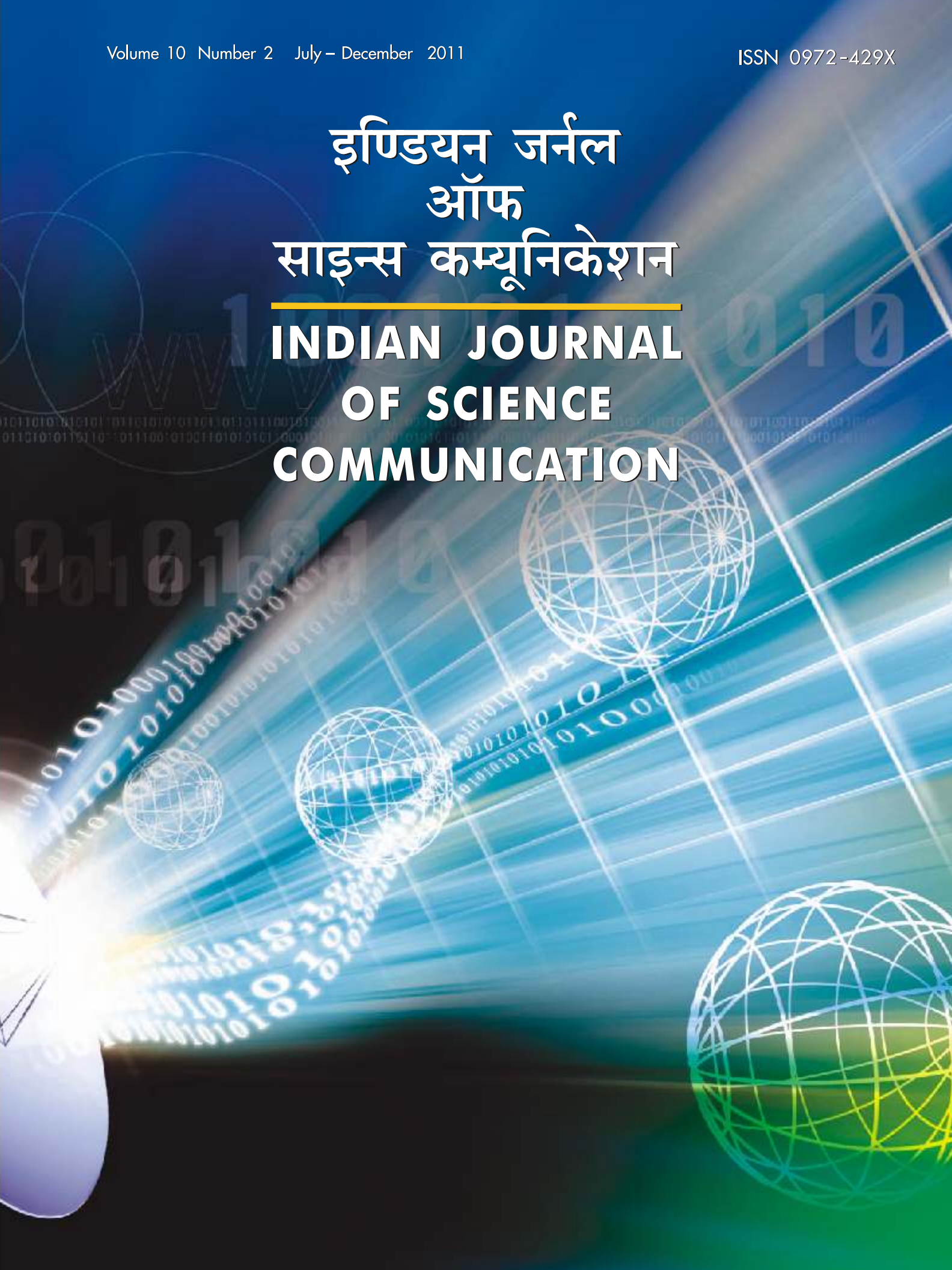इण्डियन जर्नल
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साइन्स कम्यूनिकेशन

INDIAN JOURNAL OF SCIENCE COMMUNICATION

Indian Journal of Science Communication

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CONTENTS

Hands-on Science: A Tool for Excellence

The 'Hands-on Science' being a sub-set of the broader set of 'Science Communication' carries the inherent concept of promoting creativity and innovation through learning by doing and putting things together with more accuracy and precision with better understanding. The activity and creativity oriented Hands-on Science experience can lead to synchronisation of head and hands together to achieve excellence in any walk of life. However, this practise did not gain much ground and has remained limited to those who are willing to put those extra efforts to the S&T advancement. This is where scientific and technological culture needs to be emphasized. 'Hands-on Science' could be an effort in this direction. India has a long tradition of such activities, be it tribal metallurgy, medieval craft, creative exhibits, demonstration of science experiments, or sophisticated innovations. The Scientific Society of Aligarh founded by Sir Sayed Ahmed in beginning of second half of nineteenth century had acquired a piece of land to experiment modern agricultural techniques and demonstrate agricultural practices to farmers. According to Habib (1985), one of the major activities of the Scientific Society, was organizing popular lectures-cum-demonstrations on topics of popular and academic interest which included history, philosophy, mathematics, mechanics, agriculture and natural sciences, etc. Father Lafont had organized a series of public exhibitions of science models, lectures and demonstrations on new scientific inventions, like telegraph and telephone, etc., at St. Xavier's College, Calcutta in 1886, which was a remarkable effort of 'Do-it Yourself' exhibits, recreated for the purpose.

An unsung hero and pioneer of science popularization Hargulal, a science teacher at Ambala, has contributed tremendously in science teaching-learning aids during mid 19th century (1857). He fabricated various scientific models, toys, designed posters and eventually started lecture-cum-demonstrations and exhibitions of his low-cost models among children and common audience for popularizing basic principles of science. As the demand of science models, posters and charts increased, he started mass production of different models and was able to export them. He also fought and won a court case against a Bombay based industrialist, who was trying to sell and export Lal's scientific instruments and models under his own name. Hargulal got compensation for the same (Patairiya 1997). According to Sehgal et al (1994), Ruchi Ram Sahni was a multi-faceted personality, a scientist, an innovator, an educationist, a patriot and a devoted social worker and science communicator. He started his career as Second Assistant Reporter to the Government of India in the Meteorological Department in 1885. One of his major achievements was the creation of scientific awareness amongst the common man of Punjab state. Those days, Punjab also consisted of the present day Punjab in Pakistan and some parts of Himachal Pradesh and Haryana. His efforts for science popularization are credited to be the first, besides some similar efforts in Bengal. He co-founded the Punjab Science Institute, with Professor J. Campbell Oman. Popular lectures on various aspects of science organized under the auspices of the Punjab Science Institute created lot of enthusiasm as people did not mind paying a small fee for science lecturers to Moffussil places. Probably this was the earliest instance in India of common people paying for popular science lectures and Hands-on Science demonstrations. On realizing the fact that no science teaching was possible without simple scientific instruments, he established a workshop as part of the Punjab Science Institute for repairing and manufacturing scientific apparatuses with his own resources. He also trained young people enabling them to follow the legacy of Hands-on Science experiments for science education.

Hands-on Science activities are aimed at furthering the culture of innovation and experimentation. It offers a tool for experts and practitioners to forge ahead achieving the goal of higher degree of innovativeness and skill appreciation in societies across the world. Hands-on Science has been emphasised by experts and proponents of popularisation of science skill culture. Several organisations, groups and experts have been working in their own knowledge spheres and achieving encouraging results. Hands-on science has been a movement in various parts of the world for making science communication and education more effective, besides enhancing skill and innovation level in the societies.

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The Effect of Online Communication
on Higher Education in India

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Abstract

Many areas of daily life have been influenced by technological and information revolution. Education is no exception. The aim of this study is to analyze the effect of online communication on higher education in India. A well structured questionnaire was distributed among 200 students pursuing their higher education in the metropolis of Chennai. The present study demonstrates and elaborates the various aspects of online media in enabling learning in higher education in India. It was found that the online communication had become a vital instrument for teaching, research and learning process of these respondents. Some suggestions have been set forth to make the service more beneficial for the academic community in higher education.

Keywords : Online communication, Online, Education, Higher education

Introduction

In the era of networked information, Internet, the largest worldwide network of networks, has emerged as the most powerful tool for an instant access to information at any time and at any place in the world. The Internet can provide access to essentially unlimited resources of information not conventionally obtainable through other means. The Internet has emerged as a powerful educational tool. With the increasing impact of information and communication technologies on higher education, all those concerned with higher education are attempting to grasp how online new media sources such as web logs or blogs, video web logs or vlogs, podcasts, wikis and many more could help in modernizing the process of teaching, learning and research. The increasing use of these online sources over Internet is making educators to rethink and readjust to the changing environment of teaching, learning and research.

The use of new media sources in higher education is increasing rapidly and has become an important topic as seen in a number of educational journals and research studies. But as with other new educational technologies, it is not so much the tool that improves teaching and learning but how the instructor and the learner integrate the tool into the curriculum and into the educational setting. An important step in integrating technology successfully is beginning with an explicit definition of the pedagogical role for that technology. Core to this task is trying to understand the types of roles asynchronous discussion tools can successfully play in higher education.

New media sources are much more than techniques and tools. They include new ways of co-operating with others for accessing and acquiring knowledge. In the context of "knowledge society", a society in which knowledge has become a valuable good, necessary for human development, education is one of the most important investments for the future, and new media sources raise new challenges for education (Cornu, 2007).

The ever increasing number of people accessing online sources may have considerable implications for teaching, learning and research. Teachers and students are depending more and more on the Internet for their various educational purposes. The present study is, therefore, an attempt to assess the effectiveness of online media as an educational tool in higher education scenario in India.

Knowledge Society and Education

We speak of "Information society": the society in which information becomes a valuable good. But in an education scenario, the fundamental element is not just "information", but "knowledge". The meaning of the terms "knowledge" and "information" must not be confused with each other. While information is made up of facts, comments, opinions, expressed through words, images, sounds, etc, knowledge is the output of the reconstruction of information according to history and context. Information can be transmitted, but knowledge must be acquired and constructed. Learning is the acquisition and construction of knowledge, and of course it needs processing information. Knowledge is not only a set of data, it also has to do with competencies, abilities, and capacities to correlate information and then communicate. Knowledge has to do with the relationship between persons. A "knowledge society" is a society in which knowledge plays a central role to bring development, solidarity, democracy, peace, a society in which knowledge could be a force for changing. According to the report of the UNESCO international commission on education for the 21st century, acquiring knowledge means learning to know, learning to do, learning to live together with others, learning to be. While learning is a lifelong process, in a formal education scenario, learning is a structured process of acquiring knowledge about primarily curriculum subjects, but at a broader level about the interrelationships in the world (Cornu, 2007).

In a knowledge society, new media sources provide new possibilities for accessing and sharing knowledge. New media sources include all the forms in which information can be found, processed and transported. They include web logs or blogs, video web logs or vlogs, podcasts, wikis and many more. It means of course the technological aspect, but also the way it is organized and accessed. New media sources provide possibilities of 'networked society' where interactivity is high and where everyone is learning and contributing a bit in acquiring knowledge resulting in 'collective intelligence'. New media sources such as "wikipedia" can be considered as first attempts of developing a collective intelligence (Cornu, 2007).

Media and Education

In building a knowledge society, there can be no second opinion on the role and importance of media. Given its wide reach, media is often found to be a useful medium in the field of education and learning. In India, it was in 1961, the Delhi TV took the decision to broadcast curriculum-based lessons on selected subjects, particularly on science. The aim was to improve standards in the teaching of science at the secondary level. The initiative was funded by Ford foundation. The Verghese Committee in 1978 strongly recommended granting broadcast franchise to educational institutions. This would empower national institutions of higher education for the propagation of quality education to large masses of students and others. The UGC Higher Education Project launched in August 1984, serves this purpose. Known as Countrywide Classroom, and coordinated by UGC Insat Cell, its Education TV programmes are beamed across the country every weekday afternoon. The SITE (Satellite Instructional TV Experiment) in 1975 was the first experiment ever to relay educational television programmes direct from a satellite to receivers in 2400 villages in six states (Kumar, 1999).

The Emergence of Online Media Sources

Driven by vast technological changes, a number of new media tools have emerged. A number of new media sources make the Internet more collaborative and participatory, resulting in a huge amount of consumer-generated content driving social connections between people. Web logs, or blogs, video web logs, or vlogs; downloadable audio files known as podcasts; and collaborative web projects called wikis and many more – all represent new forms of individual expression. Today's media consumer is not captive, mass media audience; thanks to internet and other new media sources, they are now active, participatory and engaging.

The seamless linkage of all the smart devices would be of great convenience to communicate critical information affecting both sides. New media sources are transforming how the sender and receiver share and interpret information and acquire knowledge. The emergence of new media tools and technologies has provided further impetus towards enhancing learning capabilities. These tools have significantly changed the way students in higher education enhance learning.

Communication technologies are generally categorized as asynchronous or synchronous. Asynchronous activities use technologies such as blogs, wikis, and discussion boards. The idea here is that participants may engage in the exchange of ideas or information without dependence on involvement of other participants at the same time. Electronic mail (Email) is also asynchronous in that mail can be sent or received without having both the participants' involvement at the same time.

Synchronous activities involve the exchange of ideas and information with one or more participants during the same period of time. A face-to-face discussion is an example of synchronous communication. Synchronous activities occur with all participants joining in at once, as with an online chat session or a virtual classroom or meeting.

Online Media Sources and Education

In the recent years we have seen a tremendous increase in use of online communication in all aspects of human life and the education sector is no exception to this 21st century phenomenon. Everyone in this sector is aware of the vast potential of online media as a tool for efficient teaching and learning purposes (Islam, Baharul, 2004). Driven by the emergence of online technologies as faster and easy ways of transacting, we have for example commerce as e-commerce, business as e-business, banking as e-banking and still ahead Government as e-Government. The currency has been converted from paper to e-cards or e-money. Even electronic signature has been considered legal in some countries. So also we have e-learning or e-education fast catching up.

Electronic learning (e-Learning, or eLearning) is a type of education where the medium of instruction is computer technology. Developments in internet and multimedia technologies are the basic enabler of e-learning, with content, technologies and services being identified as the three key sectors of the e-learning industry. Lately in most Universities, e-learning is used to define a specific mode to teach and learn a course or programmes of study where the students supplement face-to-face on-campus class room sessions.

Today many technologies can be, and are, used in eLearning, from blogs to collaborative software, ePortfolios, and virtual classrooms. Most eLearning situations use combinations of these techniques. E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching, in which case the term 'Blended learning' is commonly used. A growing number of physical universities, as well as newer online-only colleges, have begun to offer a select set of academic degree and certificate programs via the Internet at a wide range of levels and in a wide range of disciplines. While some programs require students to attend some campus classes or orientations, many are delivered completely online. In addition, several universities offer online student support services, such as online advising and registration, e-counseling, online

textbook purchase, student governments and student newspapers.

The term eLearning 2.0 is used to refer to new ways of thinking about eLearning inspired by the emergence of Web 2.0. eLearning 2.0 is built around collaboration and places increased emphasis on social learning and use of social software such as blogs, wikis, podcasts and virtual worlds. eLearning 2.0 assumes that knowledge is socially constructed. Learning takes place through conversations about content and grounded interaction about problems and actions (Karrer, 2007).

eLearning can also refer to educational websites such as those offering learning scenarios, worksheets and interactive exercises for children. The term is also used extensively in the business sector where it generally refers to cost-effective online training. Many websites have nice features such as interactive examples, animation, video, narrative and written text. These websites are designed to provide students with a "self-help" learning resource to complement traditional textbook (Arsham, 2002).

Emerging online media sources offer wonderful environment for enriching, improving, and even revolutionizing education through interactive hypertext, collaboration and communication, dynamic content, and much more than one can dream of (Taylor, 1997). These online media sources have been viewed as valuable sources of information that can assist students in the pursuance of knowledge, learning, research, and increasing their capacity for social interaction. They are seen to promote inquiry and creativity through interaction of various forms of knowledge such as text, multimedia, graphics, photos, music, video, sound, animation, etc (Karisiddappa, 2002).

Visualizing the role of Information Technology in the contemporary world, the Government of India setup a high power 'IT Task Force' to break India's shackles and make her "a Global IT Superpower and front runner in the age of Information Revolution". The first report brought out by the Task Force has a section on 'Operation Knowledge', consisting of 29 recommendations. The report talks about strengthening IT programmes in various universities and about starting SMART schools in each state. The popularity gained by the University Grants Commission's Country Wide Classroom and the programmes of Audio Visiual Research Centres (AVRCs) and Educational Media Research Centers (EMRCs) have created a sensation amongst the students community. The initiation taken by Indira Gandhi National Open University (IGNOU) in introducing on-line education programmes is laudable.

Communication technologies play a pivotal role in IGNOU's instructional system. IGNOU has taken initiative in launching on-line education in January 2000. It launched two of its web-based educational programmes, viz. The Bachelor of Information Technology (BIT) and Advanced Diploma in Information Technology (ADIT). In addition to IGNOU there are many more new education providers who have recently entered the Indian scene. They include the (i) training organizations in the private sector (IT), (ii) professional areas such as Management, (iii) development of on-the-job training establishments and (iv) some institutions sponsored by foreign agencies (Karisiddappa, 2002).

A number of studies have been conducted affirming the effectiveness of online communication on education. A research study conducted on the use of Internet by the librarians in Malaysia indicated that 90% of the respondents used the Internet for work related purposes. Most of the respondents were recent users. Another study examined the use of the Internet amongst students and academicians in the Netherlands. The study revealed that the Web was being used primarily to search general, factual, ephemeral or very specific information. A study conducted to find the purpose of using Internet at Pune University revealed that for research workers, it was to conduct literature search; for students to know curriculum based information; for teachers to find supporting information to write articles. A study was conducted on the Science & Technology community of Lucknow city to assess the level of awareness and demand of web-based learning environment among Science & Technology information seekers.

The major findings of the study revealed that 49.2% users browsed the Web for more than 2 to 4 hours and 14% for more than 5 hours a day. The study further showed that 36.6% users consulted e-journals regularly on the Internet, 40.4% used Internet for consulting technical reports, 24.8% to find online databases and 10.4% for telnet service. Another study was conducted to know Internet utilization pattern of the undergraduate students of G B Pant University of Agriculture and Technology, Pantnagar, Uttaranchal. The findings of the study indicated that a majority of the students (85.7%) used the Internet. The findings of the study also showed that 61.5% of the males and 51.6% of the females used Internet for preparing assignments. A majority of the respondents i.e. 83.1% male and 61.3% female respondents indicated that they faced the problem of slow functioning of Internet connection. (Kumar & Kaur, 2005)

Impact of Online Media Sources on Education

Online media help for a better individualization of teaching and learning. The individual needs of the learner can be met better; appropriate activities and appropriate pace can be offered to the learner. Online media and ICT makes possible a more collective way of teaching and learning, through collective activities, through cooperation, through projects which must be carried on by the pupils as a group. Online media complements synchronous class room teaching. This enriches the teaching and learning; it enables both formal and lifelong learning activities (Cornu, 2007). A Web-based learning class is a more effective learning experience, since the learner is participating in the learning process and receives individual attention. Though the instructor and the learner are at different locations, this participation in learning is by itself a positive learning experience. The Web-based learning atmosphere allows more effective interaction between the students and the instructor. Therefore, it can be effective as traditional classroom learning environment where the space, seating, etc., could be inadequate (Arsham, 2002).

The space required for keeping thousands and lakhs of books (which is not available in big cities) will not be needed in paperless higher education. Due to networking (both internet and intranet) good connections will be generated among academicians, scholars and students. That is educational activities can be spread all over the world through world wide web. One specialist or subject expert can provide his services anywhere in the world. It will increase the quality of education along with a decrease in the expenses. More availability of eminent professors and scholars will be possible through teleconferencing and e-symposium. Now video cameras are attached with computer monitor and keyboard so we can interact face-to-face with more than one person on screen. The present institution centered system will be converted into more and more students centered system. The teaching-learning approaches like classroom lectures will be complemented by student centered approaches. The teaching-learning approaches are more flexible, easily available, self-pacing and users friendly.

eLearning allows people to avoid travel, thus reducing the overall carbon output. The fact that it takes place in a virtual environment also allows some

reduction of paper usage. With virtual notes instead of paper notes and online assessments instead of paper assessments, eLearning is a more environmentally friendly solution.

The fact that instructors of the highest calibre can share their knowledge across borders allows students to attend courses across physical, political, and economic boundaries. Recognized experts have the opportunity of making information available internationally, to anyone interested at minimum costs. This can drastically reduce the costs of higher education, making it much more affordable and accessible to the masses. An internet connection, a computer, and a projector would allow an entire classroom in a third world university to benefit from the knowledge of an opinion leader.

Students can be provided with an exciting learning environment but they need to develop search skill and students require leadership from their teachers in order to find the resources they need. The Internet can bring new benefits to the students learning experiences:

- Use of the Internet as a means of supporting a more holistic, multi-facet approach to education;

- Removing constrain of time and place, and dependence on conventional resources for learning;

- Providing a resource for lifetime learning which is already widely available in the workplace and will become increasingly so in people's own home;

- Provision of facility which enables students and educators to publish their project, writing, and curriculum materials in a way that is both similar to, and different form, traditional methods;

- Providing supports for collaborative working which various researchers believe to be extremely important for learning experience;

- Access to information which is not readily available to students using traditional methods;

- Exchange of information between fellow students via web pages or e-mail or asking an expert a direct questions by e-mail;

- The variety of resources that are available such as graphics, images, text, sound, video, all help to stimulate thinking;

- The excitement of search and discovery not only assist students to widen their knowledge bases but also their confidence and self esteem.

Network such as Internet can help the teacher bring back the students' enthusiasm for learning by adding a new educational medium to the classroom that can be integrated into total curriculum. Internet can be used as a resource tool, helping students to discover new and exciting areas of exploration and investigation.

Numerous research studies have shown that the new media tools are as educationally effective as 'live' classroom instruction, although they are usually tested under laboratory conditions that make it difficult to fall asleep or channel-hop to MTV. But with non-traditional students (working adults), it is found to be more effective because they take one course at a time and are better motivated and more knowledgeable than on-campus students.

Universities around the world are vying to become the leaders in cyberspace, as the first virtual universities, institutions with no campuses and no buildings. Online education and learning model use internet communication media such as email, newsgroups, and chat-rooms to conduct virtual seminars, which may be even more effective than conventional instruction. Others seek to take full advantage of the emerging interactive multimedia capabilities of the internet, immersing learners in a compelling learning environment (Straubhaar & LaRose, 2000).

Conclusion

There is a positive impact of new media tools on learning and education purposes in higher education. Orientations related to information technology should be organized timely for academicians and teachers of higher education. Educators have to rethink on educational policy with an intensive thought and emphasize on information technology and higher education. Collaboration with corporates and privatization will be able to solve funding problem.

Technology will change from time to time, resources and tools will improve constantly. The aim of education is not to be permanently technologically up-to-date, but to meet the needs of the learners in a changing society. The new challenges include how to make the information society to a knowledge society, how to give access to knowledge to everyone, how to develop a worldwide digital solidarity in order to reduce the "knowledge divide" (Cornu, 2007).

With the rapid advances in technology, the proliferation of Web-based tools at the disposal of our universities, and the increasing technical skill level of

incoming freshman, there remains an urgent need to understand the pedagogical roles online communication tools can play and how to get the most out of their use.

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Exploring New Media for Science Popularization

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Abstract

Science communication has become imperative in present scenario to bring the masses in the mainstream of development. The role of media in communicating science is inevitably very important. The traditional media like newspapers, radio and television offer science in which the audience has no option except to receive it passively. But the new media has got tremendous potential in presenting science in more comprehensive and user-friendly manner. It is more technology driven on one hand and offer more control in the hands of user on the other hand. Harnessed intelligently the new media can bring miraculous result.

Keywords : New media, Science, Communication, Interactivity, Hyperlink

Introduction

Science communication is the need of the day to make people scientifically aware and to bring them in the mainstream of development. Our government is also investing a good amount of money on research and development but still the fruits of science and technology are not percolating to grass-roots level. It is amazing that the tangible and intangible benefits derived from science and technology confine to only a few privileged groups of people and a large population remain deprive of it. Therefore it becomes essential to communicate science among the layman, to let them know about new developments as well as to make them scientifically aware, so that they may also participate in the march of development and enjoy the benefits of science and technology.

Science communication is "the use of appropriate skills, media, activities, and dialogue to produce one or more of the following personal responses to science (the AEIOU vowel analogy): Awareness, Enjoyment, Interest, Opinion-forming, and Understanding" (Burns et al. 2003, p. 183). "Scientific communication is the process by which the scientific culture and its knowledge become incorporated into the common culture" (Bryant 2004, p. 1). Media play a significant role in this process. The media like print, radio and television offer no control over the messages on the receiver end but with the advancement of civilization and new developments, media are lending more control over message and it is becoming more and more user friendly. The new media encompass numerous characteristics which may be exploited for communicating science in more efficient, impressive and comprehensive manner.

The new media, that is www (World Wide Web) or internet has tremendous potential in creating science awareness and widening mental horizon of the people which may further help the country to emerge as enlightened and a really advanced country. The present paper deals with the unique characteristics of new media which can be harnessed to popularize science.

What is new media?

New media in the present era is internet or www. It is a global network which connects millions of computers with a number of agreed format protocol, enabling users to transfer data from one to the other. Even though the internet evolved more than three decades ago, the web was introduced only in 1991.

Deuze (2003, p206) considered the internet as a hybrid medium, and online news as the fourth kind

Table 1: Internet Usage and Population Statistics of World

World Regions	Population 2008	Internet Users 31 Dec 2000	Internet Users 2008	Usage Growth 2000-2008
Africa	955,206,348	4,514,400	51,065,630	1,031.2 %
Asia	3,776,181,949	114,304,000	578,538,257	406.1 %
Europe	800,401,065	105,096,093	384,633,765	266.0 %
Middle East	197,090,443	3,284,800	41,939,200	1,176.8 %
North America	337,167,248	108,096,800	248,241,969	129.6 %
Latin America	576,091,673	18,068,919	139,009,209	669.3 %
Australia	33,981,562	7,620,480	20,204,331	165.1 %
World Total	6,676,120,288	360,985,492	1,463,632,361	305.5 %

Source: www.internetworldstat.com

of journalism. The World Wide Web allows users to locate and view the multimedia based documents on almost any subject. Today there are millions of clients in the internet scattered over 65 countries with more coming online every day. Table 1 shows 305.5% increase in the number of internet users in the world from 2000 to 2008. In India also the growth of internet is unexpectedly very high as shown in Table 2.

Characteristics of new media

New media has certain unique characteristics which distinguish it from other media and make it superior. In fact the new media is the combination of all the earlier known media and thus can be exploited for popularization of science.

The features that distinguish websites from other media are: multimedia, speed for updating information, horizontal distribution, decentralization, accessibility, no hierarchy, no censorship and interactivity (Lasica, 1996). Interactivity is the primary characteristics of new technologies and it has caused a considerable reassessment of communication research (Rice and Williams, 1984: 35; Heeter, 1989: 221; Morris and Ogan, 1996; Pavlik, 1997; Rafeli and Sudweeks, 1997; Ha and James, 1998, 459). According to Ward the specific characteristics of online journalism are hypertext, interactivity and multimedia (Ward, 2002, p20-22).

Multimediacy

Use of multimedia is a vital element of online journalism. News stories published on the web can be complemented with graphics, photographs, animations, audio streams and video footage. Part of the reason such multimedia is available is due to the use of convergence, where sounds or images used in other mediums are repurposed for the online environment (Wendland: 2002).

Table 2: Internet Usage and Population Statistics of India

Year	Users	Population	% Pen.	Usage Source
1998	1,400,000	1,094,870,677	0.1 %	ITU
1999	2,800,000	1,094,870,677	0.3 %	ITU
2000	5,500,000	1,094,870,677	0.5 %	ITU
2001	7,000,000	1,094,870,677	0.7 %	ITU
2002	16,500,000	1,094,870,677	1.6 %	ITU
2003	22,500,000	1,094,870,677	2.1 %	ITU
2004	39,200,000	1,094,870,677	3.6 %	C.I. Almanac
2005	50,600,000	1,112,225,812	4.5 %	C.I. Almanac
2006	40,000,000	1,112,225,812	3.6 %	IAMAI
2007	42,000,000	1,129,667,528	3.7 %	IWS

Source: www.internetworldstat.com

This is the characteristic which can be very useful in science popularization. The purpose of science popularization is solved when it is understood even by the lay person who usually equate science with difficulty and it is possible that such type of audience may not understand science only through text or through text and graphics. Here the new media can play a significant role by providing the audience an opportunity to choose the media which is most suitable to them. If only the text can make the topic clear then well and good otherwise he can opt for the combination of a medium like audio or audio-visual, etc and thus the subjects can be made more comprehensible. In many cases this characteristic may be more useful as merely writing about certain phenomenon like volcanic eruption or blood circulation may not be as comprehensive as depicting them with animation. Thus new media can explain the process

more clearly and making science communication more successful.

Interactivity

It is usually agreed that the major difference between new media and traditional media is interactivity (Morris & Ogan, 1996; Pavlik, 1996; Rafaeli & Sudweeks, 1997). Rafaeli (1988) defined it as "a variable quality of communication settings?" based on the assumption that a reciprocal, two-way communication is a common desire of both the communicator and the audience. For full interactivity to occur, communication roles between sender and receiver need to be interchangeable.

The advantage of interactivity is that it can help an audience from the non-science background to clear their doubts whenever they wish. In other media like print (newspapers, magazines, etc.) and electronic (radio or television) have also the facility of interactivity but it takes time. The online environment, however, is even more suited to interactivity and provides many opportunities for involving and communicating with web-users (Deuze, 2003, p213). In case of new media this interactivity is not only fast but also of diverse type. Here the audience can interact with the writer who posts their write-ups on the web as well as with other audiences and thus the doubts may be cleared and the points which are non-comprehensive can be made clear by interaction with creators of the website.

Hyperlink

Hyperlinking means giving links of related sites in news, features, etc. The founding fathers of hypertext Ted Nelson writes, that it creates "a delivery system for separate closed units – a system which allows only embedded links pointing outward" (Nelson, 1999). The science communicators can augment their online content in a number of ways; one of the simple and effective ways is by adding hyperlinks. According to Paul hyperlinks can enrich the user's online journey by adding background information and providing more contexts to a developing news story (Paul, 1995). For example, links can be used to break down a long story into logical pieces or "chunks" (Pape & Featherstone, 2005).

Hyperlinks can be created internally if these refer the text internally (to other texts within the text's domain) or externally (to texts located elsewhere on the Internet). These are two quite different types of hypertextuality, as one opens up new

content; the other in fact leads to a spiraling down of content. These are the wonderful qualities of the new media due to which it may surpass the other media in popularization of science. For example if there is a news in traditional media about scientists warning warmer years in the coming decade and more flood and drought due to global warming, the reader may be at his wit's end if he goes through this news only and not knowing anything about global warming. But if the same news is given on the www and suitable links are given in the same news about what is global warming, what are its consequences, its curative measures, etc. then it may bring amazing results as it not only gives the latest news but also provides detailed information on the topic and thus enhance the interest of the audience in the topic. Thus this hyper-linking characteristic of new media can serve the purpose of science popularization by giving the details and answering all the queries which may arise in the mind of the audience.

Immediacy

Immediacy in case of new media means the opportunity to update the information immediately. Here the creator of the website need not wait for the next day edition or the next news bulletin (as in case of print or electronic media) but he can make changes as soon as he gets the new and latest information. Thus it can keep its audience updated with the most recent information. This characteristics can also be useful in science popularization by providing the news quickly and updating it frequently.

Archive

In case of other media, if the audience wants to go through an old edition of a newspaper or news bulletin it will be a little bit difficult and if a month or year old edition is needed then it will become a Herculean task to go to the press and turn the editions month wise, but in case of new media the archive facility may provide you last editions no matter how old without loss of time. This facilitates its audience to get to an old edition without much effort.

User-friendly

The new media is very much user-friendly as it may be used at the user's convenience. The audience can go through it at a convenient time and in a form more suitable to them. This is the required quality in today's fast moving life.

Non-linear structure

The non-linear structure helps the audience to reach the news of their own choice and interest. In the case of radio and television we can not jump to news of our choice rather we have to sit and wait. But in case of new media we can reach the required news/feature just by a single click or view only those sites which are more interesting. Thus if an audience is more interested in going through the news on AIDS vaccine, he can reach the news immediately. It not only saves time but also sustains interest in science.

Limitations

Though the new media has vast applicability in case of science popularization, it has certain limitations also as given below:

Limited to a privileged group

Our country is still a rural country where a majority of the population is still residing in the rural areas. Though the rural area is electrified, there is immense power cut and a lack of proper telephone facility. As a result internet facility is a distant dream for such remote areas of the country.

Out of reach of rural audience

The rural audience is still deprived of the new media with such a great potential. Lack of electricity, access to computers and computer literacy are highly responsible for it.

Language is a problem

Our country is a country of diversity not only in culture, tradition but also in languages. According to The Hindu "The simple fact is that most of India's billion people are denied access to the Net because they do not speak English, the dominant language of the Web. It is a known proposition that the content has to be in a language that is understood by most of the users. In the Internet space, this is highly unbalanced. Twelve out of the 6,000 popular languages spoken globally account for 98% of the content of the Web, with English dominating, even as efforts are underway to provide user-friendly tools for language-independent search and retrieval and machine translation of text from English to another language, and vice-versa.

A multilingual Internet would whet local interest in Net content and augment the possibilities for all language groups to share and access information in their vernacular. But the challenge in increasing local content includes the standardization of fonts and

Internationalized Domain Names (IDNs), an issue the Indian government is seized of and working on. There needs to be relevant content in the local language, such as prices of crops for farmers, and weather conditions for farmers and fishermen to enable wider use of the Internet in rural India. There are more than 850 living languages in India, of which 22 are official languages". (The Hindu, Feb 2008) Table 3 also shows that the dominant language on internet is English followed by Chinese as shown in having data of top 20 languages on the net. Our national language Hindi or any other regional languages did not find a place among these 20 languages.

Table 3: Internet World Users by Language

Top Ten Languages in the Internet	% of all Internet Users
English	29.4 %
Chinese	18.9 %
Spanish	8.5 %
Japanese	6.4 %
French	4.7 %
German	4.2 %
Arabic	4.1 %
Portuguese	4.0 %
Korean	2.4 %
Italian	2.4 %
TOP 10 LANGUAGES	84.9 %
Rest of the Languages	15.1 %
WORLD TOTAL	100.0 %

Source: www.internetworldstat.com
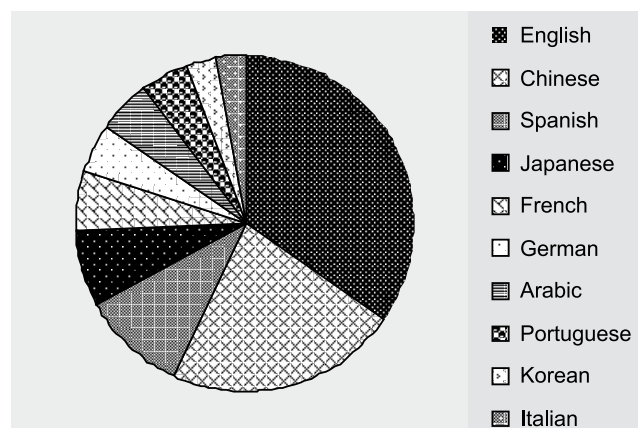
High cost of setup

In urban areas although the facility of internet is available, the cost of owning computer, internet connections, etc.

is not affordable to a large population. The problem of owning cost has been solved to some extent by providing the facility at the cyber café at a minimal expense. Expansion of Internet access in poor areas is facilitated by arrangements for public use, such as Internet kiosks, cybercafés, or multipurpose community tele-centres (Rogers & Shukla, 2001). The Internet café (or cybercafé) concept has been successfully spread to poor countries mainly because it combines a reasonably priced access to the Internet with the comfortable environment of a coffee house or a bar and the chance to socialize with fellow users and to pick up new knowledge and ideas in computer usage.

Lack of computer education–a problem

The majority of the population in our country is still lacking a computer education and sufficient proficiency in it. Thus the use of internet is limited to only a small population having computer education.

Suggestions

1. Expansion of internet facility. At least there should be one cybercafé in each village which can provide them all the facilities.

2. Software in Hindi and other languages are being developed but it should be made available widely, easily and at lower cost.

3. As internet exploring or in common language net surfing needs only nominal knowledge of computer or computer literacy, which may require hardly 10 to 12 hours training. Arrangement should be made to train people in computer in small sessions.

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Tackling Tuberculosis with Self-help Group and Short Film–An Evaluation

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Abstract

Health communication is the study and use of communication strategies to inform and influence individual and community decisions that enhance health. It links the domains of communication and health, and is increasingly recognized as a necessary element of efforts to improve personal and public health. The role of communication in health cannot be overemphasised. Health for all, which is a laudable vision of the World Health Organization, cannot become a reality without effective communication. The various mediums of communication have to be put to maximum use for communicating messages. The medium could be visual (print medium, hoardings, posters, flash cards), audio (radio), audio visual (television, films), interactive (online, web), etc. Each medium has its own advantages and limitations. For a successful health message campaign a judicious blend of all mediums is necessary. This study investigates the changes in awareness levels of tuberculosis in a group of self-help group women using a short film and recommends strategic lessons for public health agencies to design effective messages. The study also highlights an integrated approach, which involves training of volunteers to disseminate information, and counsel families and patients on health issues. The participant's views and acceptability of the methods are also highlighted. Tuberculosis continues to be a major public health challenge in India with nearly one person dying of this dreaded disease every minute. Women are the prime caregivers and advocacy programmes targeted at them are important for the welfare of family and society at large. They are the opinion leaders particularly in the arena of health and they spread health messages.

Introduction

One of the main challenges in the design of effective health communication programmes is to identify the optimal contexts, channels, content and reasons that will motivate people to pay attention to and use health information. Mass media campaigns or other single-component communication activities have been shown to be insufficient to achieve programme goals.

Communicable diseases are a major threat to the promotion of public health in developing countries. Tuberculosis (TB) is a major public health problem and has been declared as a "global emergency" by the World Health Organization (WHO) in recent years. TB is an infectious disease caused by bacterium mycobacterium tuberculosis. A person suffering from Pulmonary TB spreads it through the air. A single patient can infect 10 or more people in a year. India accounts for one-third of the global TB burden. It has more TB cases than any other country in the world and twice as many patients in treatment as China, which has the next highest number. Everyday, more than 20,000 people become infected with TB bacillus and about 5,000 develop this disease.

Theoretical framework

The Personal Influence Theory of Communication is the outcome of a classic study of the 1940 presidential elections in the United States. Paul F. Lazarsfeld and others conducted this study in 1948. They were interested in the general impact of the mass media on voting behaviour and especially in the people who changed their voting behaviour during the course of the
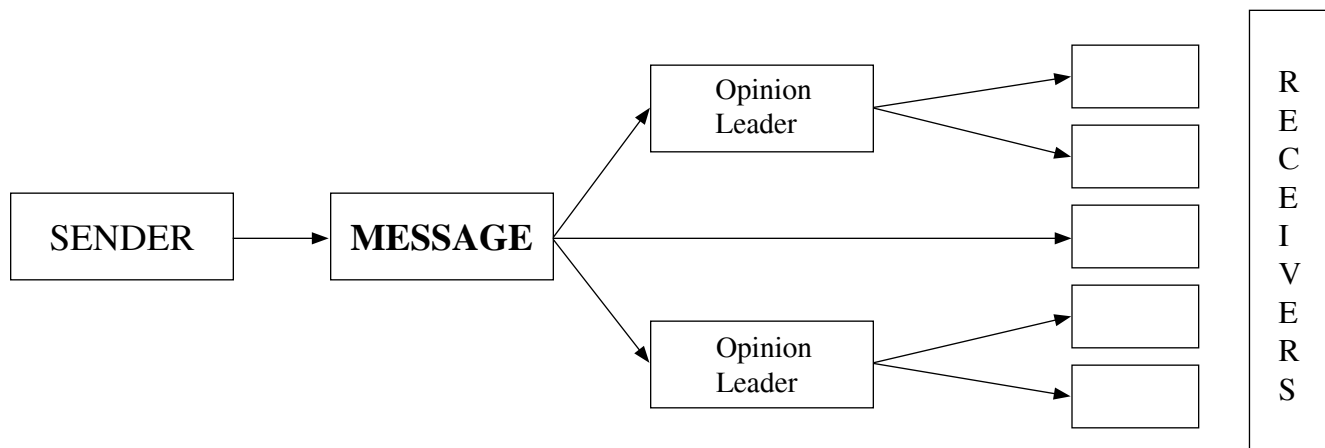
campaign. Their findings were that broad coverage of the campaign by the mass media simply reinforced the initial preferences. It was only the personal influence or interpersonal relationship that changed the voting pattern and behaviour.

Researchers suggest that within a group to which we belong certain people have strong influence. These people are called opinion leaders–individuals who through day-to-day personal contacts influence others in matters of decision and opinion formation. These people can come from any social, economic or occupational level. Within different levels of society there are different opinion leaders. Opinion leaders tend to be better-informed and heavy users of the mass media and tend to be influenced by them. The influence is passed on to others in face-to-face communication. This discovery generated the Two-Step Flow of Communication Theory.

Health communication can contribute to all aspects of disease prevention and health promotion and is relevant in a number of contexts, including (1) health professional-patient relations; (2) individuals' exposure to, search for, and use of health information; (3) individuals' adherence to clinical recommendations and regimen; (4) the construction of public health messages and campaigns; (5) the dissemination of individual and population health risk information, that is, risk communication; (6) images of health in the mass media and culture at large, (7) education of consumers about how to gain access to the public health and healthcare systems; and (8) development of health applications.

The practice of health communication has contributed to health promotion and disease prevention in several areas. One is the improvement of interpersonal and group interactions in clinical situations (for example, provider-patient, provider-provider, and among members of a healthcare team) through the training of health professionals and patients in effective communication skills. Collaborative relationships are enhanced when all parties are capable of good communication.

Increasingly, health improvement activities are taking advantage of digital technologies, such as CD-ROM and World Wide Web (Web), that can target audiences, tailor messages, and engage people in interactive, ongoing exchanges about health. An emerging area is health communication to support community-centred prevention. Community-centred prevention shifts attention from the individual to group-level change and emphasises the empowerment of individuals and communities to effect change on multiple levels. Effective counselling and patient education for behaviour change require healthcare providers and patients to have good communication skills.

Need for the study

Television and radio serving specific racial and ethnic populations can be effective means of delivering health messages when care is taken to account for the language, culture and socio-economic situations of intended audiences. An audience-centred perspective also reflects the realities of people's everyday lives and their current practices, attitudes and beliefs, and lifestyles. Some specific audience characteristics that are relevant include gender, age, education and income levels, ethnicity, sexual orientation, cultural beliefs and values, primary language(s), and physical and mental functioning. More considerations include their experience with the healthcare system, attitudes toward different types of health problems and willingness to

use certain types of health services. Attention should be paid to the needs of underserved audience members. Targeting specific segments of a population and tailoring messages for individual use are two methods to make health promotion activities relevant to audiences.

Compared to traditional mass media, interactive media may have several advantages for health communication. These advantages include (1) improved access to personalized health information, (2) access to health information, support and services on demand, (3) enhanced ability to distribute materials widely and update content or functions rapidly, (4) just-in-time expert decision support, and (5) more choices for consumers.

Often, people with the greatest health burdens have the least access to information, communication technologies, healthcare and supporting social services. Even the most carefully designed health communication programmes will have limited impact if underserved communities lack access to crucial health professionals, services and communication channels that are part of a health improvement project.

Health literacy is increasingly vital to help people to manage their own health better. Differences in the ability to read and understand materials related to personal health appear to contribute to health disparities. People with low health literacy are more likely to report poor health, have an incomplete understanding of their health problems and treatment, and be at greater risk of hospitalization. In this context, an audio-visual medium of short films can play a vital role in creating awareness. There is also a need to evaluate their effectiveness.

TB as a public health threat

TB is a leading killer of adults–it kills more adults than any other infectious disease. Despite being completely curable, TB claims the lives of more than 4,00,000 people in India every year. It affects the most productive age (15-54 years). It causes enormous social and economic disruption and hampers the development of the country. According to the WHO, TB account for 9% of deaths among women between the 15-44 year age group, while war accounts for 4% of deaths of women in that age group, HIV 3% and heart disease 3%.

Women of reproductive age are more susceptible to develop active TB disease once infected with TB than are men of the same age. In India deaths from TB are 27-41% higher among young women and children 5-24 years compared to males of the same age.

But TB case detection is much lower in women than men nearly in the ratio 1:2.5 due to various reasons. Recent studies on TB lay emphasise on gender related issues. It has been found that women especially in developing countries have less access to healthcare due to various constraints. The following could be some of the major reasons: Women delay seeking care so as not to use precious family resources, could be missed by health promotion programmes and therefore have a lower awareness of TB symptoms. Women tend to stay at home rather than come to health workshops. Women are often scared to tell family they might have TB due to possible rejection. Women in some families cannot leave the home without explaining where they are going, but are too afraid to say they want to go to a TB clinic because of social stigma.

TB has been on the rise since the 1980s, with its spread concentrated in south-east Asia and sub-Saharan Africa. Much of TB's resurgence is directly connected to the HIV/AIDS pandemic especially in Africa, where two-thirds of those living with HIV also carry TB. Worldwide, an estimated one-third of the 40 million people living with HIV/AIDS are co-infected with TB, and up to 35 million people worldwide could die of TB over the next two decades unless greater action is taken to treat and prevent the disease.

TB is the most common opportunistic infection in people living with HIV. As the Immuno-deficiency virus breaks the immune system, HIV infected people are at greatly increased risk of TB. HIV is also the most powerful risk factor for progression of the disease from TB infection to TB disease. TB is one of the diseases, which often go without proper treatment; but the government and non-government organizations (NGOs) are giving much emphasis on its treatment. Directly Observed Treatment, Short-course (DOTS) is a comprehensive and cost effective strategy for TB control (See Appendix 1). This strategy has proven effective in controlling TB on a mass basis. It is the strategy adopted by the Revised National Tuberculosis Control Programme (RNTCP) in India. NGOs play an active role in health promotion in the community and many patients seek treatment through them. With the widespread network of NGOs in India it becomes essential to involve them in RNTCP.

The heart of the DOTS programme is "directly observed treatment" in which a health worker or any other trained person who is not a family member directly administers the drugs for curing the

disease. Sometimes it could be cured patient too. The Information, Education and Communication (IEC) strategy for RNTCP aims at awareness generation about symptoms, curability and free availability of high quality diagnostic and treatment services for TB in a patient-friendly environment. Their major target groups are patients, including family and the community, health providers and opinion makers. They reach out to such targets by standardised messages through appropriate media options. They aim to achieve better patient satisfaction, ensuring greater involvement of the private sector and continue advocacy efforts to keep TB control at the top of opinion leaders' agenda. They aim at the use of local media (rath yatra, puppet shows, rangoli, bhavai, nautanki and the like). The sensitization of the health providers is important and a media campaign can bring about a change in knowledge, attitudes and practices regarding TB. Such local people become opinion leaders as the local community regards them as more credible and authentic.

Self-help group as a solution

Self-help groups (SHGs) are being seen as mainstay for poverty alleviation in emerging markets. They are broad-based micro institutions that can prove highly rewarding. Institutions that monitor SHGs seek this powerful solution that can track performance covering both financial and non-financial (social, educational, health, etc) parameters. This information can then be evolved to generate reports on local, regional and district levels.

While doctors can provide the medical care, the patient needs emotional support as well, which very few doctors provide. While friends and family members usually provide such support, often this is not forthcoming in the case of certain sensitive problems such as communicable diseases, AIDS, infertility or cancer, which makes the lives of patients miserable. This is where support groups come in. Such groups bring together people troubled by the same problem to share emotional and moral support, plus practical information. Support groups traditionally meet face-to-face, but now many meet over the Internet as well. Support groups act as a complement to medical care. The very act of sharing the emotional side of an illness and exchanging helpful advice can encourage recovery or simply make it easier to cope with problems.

In many places, access to healthcare is difficult and there are not enough health workers, so we need to look at other approaches, outside the clinic and hospital setting, to make TB care more widely available. There is a growing interest in the role of communities in TB control. The need is particularly acute in sub-Saharan Africa, where the combination of severe resource constraints and the rise in TB cases fuelled by HIV is straining government health services.

Role of women in health education

The community will contribute towards ensuring a high level of health protection by encouraging cooperation between the member-states and, if necessary, lending support to their action. Community action shall be directed towards the prevention of diseases and in particular promoting research into their causes and their transmission as well as health information and education. Health protection demands shall form a constituent part of the other policies of the community. Women are a social force and hence can consciously and collectively change their social place. Women are also targets or recipients of health information because of their socio-economic position in society. Women have been targets of these issues in relation to their own health and the health of others.

In relation to the restoration of health, e.g. secondary prevention following an illness, women are seen as carers for others. If a man has suffered a heart attack his wife will be invited to the rehabilitation classes to ensure food is correct for her husband. Women are targeted in health promotion interventions as the main health carers for others not just because of biological factors but also because of social expectations. This has implications for the women's health and that of her family as well.

Public health messages

Communication interventions intended to affect health behaviour are an increasingly important strategy for improving the health of the people. But effective communication is highly dependent on the social and cultural milieu that shapes the individuals, families and communities that are the intended recipients. Because we live in an increasingly diverse nation, it is important to understand more fully how these different messages should be constructed and delivered.

A key challenge facing health professionals is to mobilise the power of mass communication to empower individuals to adopt healthy behaviours, to direct policy makers' attention to important health issues, and to frame those issues for public debate and resolution. To address this challenge, the Centre for Health

Communication has helped pioneer the field of mass communication and public health by researching and analyzing the contributions of mass communication to behaviour change and policy, by preparing future health leaders to use communication strategies, and by strengthening communication between journalists and health professionals.

The tools used to reach out health messages could be myriad and vast. The five sensory perceptions of humans help in understanding the essence of communication. The audio-visual medium could prove more effective as a single-prong approach. A combination of sound, light and action can be used effectively to convey a message. The effective combination leaves a mesmerizing effect on the audience. A mass of people pick up the message effectively and prove to be a natural medium for societal transformation. A systematic assessment of the different awareness techniques is sparse and there is a need to study this.

This qualitative study on communication for creating TB awareness included an experimental research using focus group discussions to find out the relative effectiveness of short films in creating awareness of tuberculosis among urban women. The participants' views and acceptability of these methods have been looked into and so was the importance of selecting the appropriate communication methods that are acceptable to the target audience to disseminate key messages on health issues.

Review of literature

Development Communication is the use of communication for further development. Government policy makers have used the mass media to decrease the number of deaths in their countries, to produce more food so as to decrease hunger, to overcome certain limitations of illiteracy. These developmental goals are of unquestionable benefit for the society; no one has opposed them. Developing countries like India have become increasingly interested in the possible use of new communication technologies such as computers, telecommunications and the Internet to enhance connectivity, boost business, streamline governance and improve the quality of life of their citizens.

Successful health promotion efforts increasingly rely on multidimensional interventions to reach diverse audiences about complex health concerns, and communication is integrated from the beginning with other components, such as community-based programmes, policy changes and improvements in services, and the health delivery system. Health communication best supports health promotion when multiple communication channels are used to reach specific audience segments with information that is appropriate and relevant to them and the promotion and communication activities reflect audiences' preferred formats, channels and contexts. These considerations are particularly relevant for racial and ethnic populations, who may have different languages and sources of information. Credible channels of communication need to be identified for each major group.

David Domke et al. (2002) in their study suggest that visual images influence people's information processing in ways that can be understood only by taking into account individual's predispositions and values and at the same time appear to have a particular ability to trigger considerations that spread through one's mental framework to other evaluations.

T. Subramanian et al. (1999) in their study highlighted the effectiveness of direct and indirect methods of communicating to the public on TB awareness. The study was undertaken in a south Indian rural community to assess the initial level of TB awareness and again after providing health education on TB to evaluate the effectiveness of health education after 2 years. Twenty-four villages in Sriperumbudur taluk in the state of Tamil Nadu, India were randomly selected and the community was educated on important aspects of TB by means of pamphlets, exhibitions, film shows, role plays and group discussions. After 2 years, the respondents were revisited and interviewed using the same interview schedule and there was an overall increase of knowledge on various aspects of the disease ranging from 18% to 58%.

Nirupa Rani Charles (1991) in her study "Influence of Initial and Repeated Motivation on Case Holding in North Arcot district" emphasises on the personal influence of social workers in motivating the patients to complete treatment. The patients were counselled individually and flash cards were used to give a visual impact. There was an increase in treatment completion among patients who had been motivated individually.

Rajeswari Ramachandran et al. (1998) in their study on "Sensitizing an Urban Community to Tuberculosis–TRC Experience in Madurai" assesses the feasibility of training and using National Service Scheme volunteers for case finding and sensitizing the community on TB. The effectiveness of various methods of communication in mobilizing chest symptomatic to attend screening camps was also proved.

Media's Role in Health Promotion by Waheeda Sultana (2002) analyses the vital role played by various mediums of communication in disseminating information on health. Coverage of health issues is part of the media's fulfilment of the surveillance function.

Films are the best media for imparting health education. The Films Division annually produces a number of documentaries in areas of health, family welfare, nutrition and environmental sanitation. Special films are distributed in connection with World Health Day, World Aids Day and No Tobacco Day; besides films on immunization and leprosy control are shown to the public. The Films Division has been motivating the broadest spectrum of the Indian public to enlist their active participation in nation building activities. The aims and objectives of the Division are to educate and motivate the people in the implementation of national programmes and to project the image of the land and the heritage of the country to Indian and foreign audiences. The Division also aims at fostering the growth of the documentary film movement, which is of immense significance to India in the field of national information, communication and integration. The distribution outlets are Doordarshan, DAVP and Field Publicity units of central and state governments, educational institutions, and industrial houses, social and cultural organizations.

Creating Awareness among Women Folk by S. Kalaivani (2003) emphasises the need to create and improve awareness among women by educating them to avoid illiteracy and encouraging them through the mass media. The success or failure of development plans in education, family planning, community development, health and nutrition depends on the involvement and participation of women.

Practising Participatory Communication for Development (Tripathi and Nair, 1998) looks into people's participation as an essential requirement for development and suggests how to practice participatory communication approaches while keeping in mind ground realities and complexities for rural areas in developing countries.

Methodology

This study is aimed to assess the effectiveness of short films as a tool for disseminating health related messages. Hence it follows the experimental research design. This type of research design helps discovery of ideas and insights into constructing effective messages and providing support for patients. The approach is qualitative and the research technique used is Focus Group Discussion.

The study was conducted on 54 members belonging to self-help groups coordinated by ROSE Trust, an NGO functioning in MGR Nagar, an urban habitat in Chennai. The organization has been recognized by the Women's Development Corporation of the Tamil Nadu government. The women belonged to the 25-30 year age group. The literacy level varied from primary to secondary school level. Seventy per cent of the women were married.

The 54 members were divided into three groups. One group was the control group. This group was not exposed to any special technique of creating TB awareness. Their knowledge on causes, symptoms and treatment of TB were assessed through two Focus Group Discussions of nine members each.

The other two groups were treatment groups; Treatment Group 1 was exposed to health education on TB using flip charts. The flip charts were 15 in number, which visually represented the causes of the disease, the symptoms and the medial treatment details. The moderator interpreted each visual to the members of the group. Their awareness levels after education was assessed through two Focus Group Discussions of nine members each.

Treatment Group 2 was exposed to a short film. The short film was a 20-minute documentary on the life of a female TB patient. The film focussed on the causes of TB, its effects on health and the treatment. The story line is interwoven with a family drama. The protagonist is a newly married bride who is afflicted with the disease. The husband dreads her and shuns from her once the diagnosis is made. The mother-in-law empathises with her and takes good care of her, gives her psychological support and the healthcare providers give the necessary medical support. She recovers in the stipulated time. The husband eventually realises his folly and accepts her and supports her fight against the disease. There are comic interludes amid explanations about the disease and the responsibility of the family towards the patient.

Focus group discussions were held in Tamil–the vernacular language with a moderator and an observer. On-site Summaries and field notes were taken. The question guide and the probes (Appendix 2) were followed to get the required information.

Results and discussion

The main findings that emerged out of the Focus Group Discussions in relation to the probes conducted among the three groups are summarized in the following table.

Table 1: Results of focus group discussions

Probe	Control Group	Treatment Group 1 (Flip Chart)	Treatment Group 2 (Short film)
Aware of TB	✓	✓	✓
Will affect both men and women	✓	✓	✓
Main symptom	Cough, Weight loss	Cough, Weight loss, Fever.	Cough, Weight loss, Fever, Breathlessness and tiredness
Diagnosis	Not Aware	Sputum Test	Sputum Test
Treatment 1. Duration 2. Free treatment 3. Place	3 months–1 year Not sure Any doctor	6-month–1-year Were aware Private and Government doctors	6 month Were aware Private and Government hospitals Healthcare providers–DOTS
Is the disease communicable?	Yes	Not sure	Only through sputum
Do you think family care is essential?	No	Yes	Absolutely yes
Have you heard of healthcare providers?	No	No	Yes
Do opinion leaders have a say in influencing community decisions?	Not Sure	May be	Yes
Does mass media affect community decisions?	May be	May be	Yes
Is the audio-visual medium more effective in disseminating information?	Probably	Yes	Yes
Do you think women should be exposed various health messages?	May be	Yes	Yes

From the discussion, it is evident that all are aware of the disease and are aware that both men and women are at equal risks. Although all the three groups are aware of most of the symptoms of this disease, Treatment Group 2 is aware of all the symptoms. The Control Group treated the disease as a dreaded one; Treatment Groups 1 and 2 treated the disease to be curable and Treatment Group 3 appreciated the family support and psychological support to be given to the patients. The comic interludes amid explanations about the disease in the short film reach out to the population and highlight the responsibility of the family towards the patient. The respondents appreciated the message given out through the popular medium and the celebrities who they regarded as demi-gods. The benefits of self-help groups and the need for providing basic health education to the local communities were well accepted and appreciated.

Hence it is evident that it is important to involve the local community and take help of their opinion leaders to disseminate the health messages to reach out completely to the community. The NGOs and self-help groups play a major role in providing wholesome health education. Hence the various health organizations should design messages that reach out to all sections of society and should aim at integrating the healthcare professionals and local volunteers to reach out to the community.

Conclusion

Health literacy is increasingly vital to help people to manage their own health better. Differences in the ability to read and understand materials related to personal health appear to contribute to health disparities. People with low health literacy are more likely to report poor health, have an incomplete understanding of their health problems and treatment, and be at a greater risk of hospitalization. There is also a need to study the effectiveness of various mediums including short films. The study found that an audio-visual medium of short films could play a vital role particularly in the context of creating tuberculosis awareness.

It is clear from the study that women play a vital role in disseminating information on health and well

being of the family and hence the society at large. They become strong opinion leaders who can magnify the impact of the message.

Also, visual aids are effective in conveying health related messages among women. The short film as a method of communication was well received by the participants and they comprehended the key messages and were appreciative of the need for family support to the affected persons. The better the quality of the short film (with a dialogue style) the more negative affectivity was stimulated and the more cognitive processing was induced and a more favourable attitude towards preventive behaviour was stimulated.

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Appendix 1: What is DOTS?

DOTS (Directly Observed Treatment, Short-course) has been identified by the World Bank as one of the most cost-effective health strategies available. DOTS costs only US $3-7 for every healthy year of life gained. DOTS get people back to school, work and their families. The DOTS strategy combines appropriate diagnosis of TB and registration of each patient detected, followed by standardized multi-drug treatment, with a secure supply of high quality anti-TB drugs for all patients in treatment, individual patient outcome evaluation to ensure cure and cohort evaluation to monitor overall programme performance. DOTS is the most effective strategy available for controlling the worldwide TB epidemic today.

DOTS is an inexpensive and highly effective means of treating patients already infected with TB and preventing new infections and the development of drug resistance. Between 1995 and 2003, more than 17.1 million patients were treated under the DOTS strategy. Worldwide, 182 countries were implementing the DOTS strategy by the end of 2003, and 77% of the world's population was living in regions where DOTS was in place. DOTS programs reported 1.8 million new TB cases through laboratory testing in 2003, a case detection rate of 45%, and the average success rate for DOTS treatment was 82%. WHO aims to achieve a 70% case detection rate of TB cases and cure 85% of those detected by 2005. The UN Millennium Development Goals include targets to halve the 1990 TB prevalence and death rates by 2015.

DOTS uses sound technology–the successful components of TB control–and package it with good management practices for widespread use through the existing primary health care network. The technical, logistical, operational and political aspects of this treatment (DOTS) work together to ensure its applicability and success in a wide variety of contexts.

Appendix 2: Focus group questions

1. What are the common diseases that you have heard of?

Probes:

What are communicable diseases? Which of the diseases are curable? What are the common symptoms of tuberculosis?

2. Are you aware that the government provides free treatment for tuberculosis?

Probes:

How expensive is the treatment? Does the fear of debt prevent you from accessing care? Did it enhance your knowledge on access to such centres?

3. Name some health campaigns conducted by the government.

Probes:

Was it heavily publicized? What were the different media through which such messages reached you? Was there a celebrity who enhanced the impact of message?

4. Why do you think any health communication message should first reach out to women?

Probes:

Why women of household? Why not men? Why women are considered caretakers and care givers? Why do you think women empathise with patients more?

5. Serious messages when given out with a punch and humour reach out subconsciously. Do you agree?

Probes:

The short film you saw had a lot of humour. Did it dilute the message? ∎

SCIENTOON
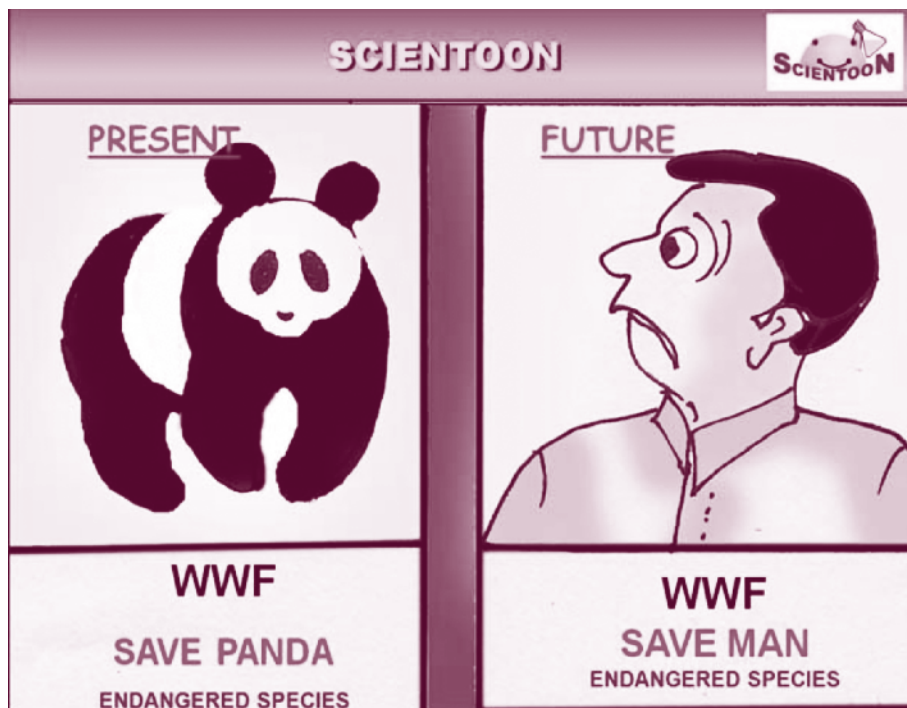
SYNTHETIC CELL

Genomics pioneer **Craig Venter** created first synthetic cell at a cost of $40 million, this experimental one-cell organism, which can reproduce, opens the way to the manipulation of life on a previously unattainable scale, several researchers and ethics experts said. Craig further said "These are very much real cells."
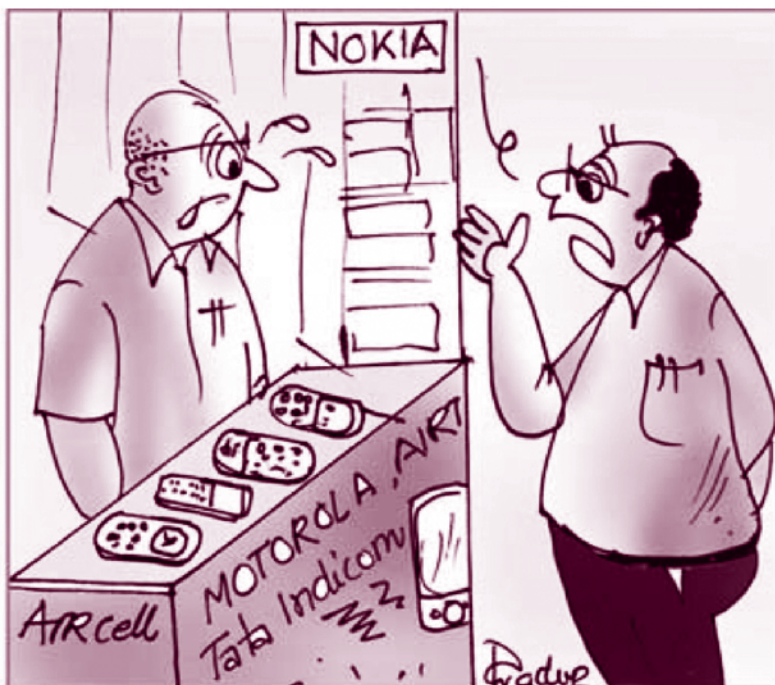
"No, No! I don't want all these cells made by Nokia, Motorola, Spice, Balckberry etc. You know my nature that I always go for the latest. I want the latest cell developed by Craig Venter.

Science and Folk Music

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Introduction

The aim of science, is to describe the impersonal facts of experiences in verifiable terms as exactly as possible and as completely as possible. The scientific temper makes it possible for one to be the creator and the destroyer. By destroying the obscure, the misleading, the irrelevant and ugly; and creating in its place the clear, the relevant and the appropriate we maintain the universe of science and music and guarantee harmony. Folklore is an important mechanism to maintain the stability of culture of communities. A careful analysis of sound, of folk music, can reveal cultural patterns, social values and national identities. The folk songs in various dialects are related to environmental education, family welfare and astronomical issues. Folklore validates culture and its institutions. It is education in non-literate society. It also helps in maintaining conformity to the accepted patterns of behaviour and in nation building. Folklore reflects inter-caste grudges .There is an urgent need to define the language of folk music to preserve and recreate through computers if we are interested to pass on this information to our future generations. The folk traditions are dwindling and the genetic material is not going to pass on this information to the next generations.

What is music? Music is a painting drawn with invisible lines and colours of sound on the canvas of silence. Music is also defined as emotional and scientific correlation of sound in space and time.

Many centuries ago, Plato, the great philosopher, said "Music is the general principle of human sciences. The Gods have given it to us not only for the delight of the ear but also to establish harmony in the faculties of soul." Socrates had a definition which was much simpler: Music is "the art that combines the playing of instruments with song and dance."

Music is a part of our life and thought. It has to be understood and appreciated and criticized in the perspective of our life, thought and philosophy. However, music has evolved as a definite art form during the childhood of civilization in *folk music*. The agony, ecstasy and anxiety of life, meanderings and fascination of nature, desire and hope for fruitful future, all get its forceful expression in different art forms and *folk music* in particular.

Folklore

It is said that all types of classical music have originated from the folk music, which itself is a part of the folklore. The word folklore was used for the first time in 1846 by a British archeologist William John Thomas. (*Dictionary of Folklore*: Maria Leech). The word folklore is a combination of two words *FOLK* and *LORE*. The word *FOLK* has Anglo-Saxon origin. It has been derived from the word *FOLC*. In German language the word *VOLK* is used. The word *LORE* is a related Anglo-Saxon word LAR meaning to learn.

The Mental World

Folklore includes folk living styles, folk customs, folk belief, medicine, receipes, art, crafts, tools, costumes, music, dance, ballads and songs. It also includes dramas and festivals, rituals, gestures, folk speech, folk tales, legends, myths, proverbs, riddles, poetry, foods, dresses, housing pattern, etc. In fact it is the collective heritage of the community. It is the pulse of the society.

"Folklore is an important mechanism", says Herskovits a noted folklorist, "to maintain the stability of culture of communities." Folklore is the mental world of non-literate or formally untrained or unschooled and scientifically unstructured people. Folklore is very important as they are part of memory recollection and reinvention in performance.

Functions of Folklore

Prof. Kwabana N'Ketia, a noted musicologist says that the current studies have demonstrated that a careful analysis of sound, of folk music, can reveal cultural patterns, social values and national identities. Folklore is the product of the community as a whole and not the creation of individuals.

Everything, every faith had a function to fulfil, the folklore fulfils the following functions:

• Folklore validates culture and its institutions.

• Folklore is education in non-literate society.

• Folklore helps in maintaining conformity to the accepted patterns of behaviour.

• Folklore helps in nation building.

• Folklore reflects inter-caste grudges.

Science and Technology

What is Science? Science is nothing but knowledge–an organized, systematic formulated knowledge based on observation, experimentation and induction. Technology, on the other hand, is mechanical art of doing things.

"The aim of science," says a noted scientist, T. A. Thomson "is to describe the impersonal facts of experiences in verifiable terms as exactly as possible and as completely as possible."

The scientific temper makes it possible for one to be the creator as well as the destroyer. By destroying the obscure, the misleading, the irrelevant and ugly; and creating in its place the clear, the relevant and the appropriate we maintain the universe of science and music and guarantee harmony.

Rhythm and Rhyme

The effect of rhythm of a poem or music, wrote I. A. Richards, is not due to our perceiving pattern in something outside us, but to our becoming patterned ourselves. Rhythmic periodicity is a fundamental characteristic of life. All automated functions of the body are patterned by rhythmic pulsations: heart beat, respiration, peristalsis, and brain waves are merely the most obvious ones. On the other hand, we do experience a common kind of 'waking trance', when we keep repeating a silly phrase to the rhythm of the wheels of the railway carriage, rocking motions accompanying the prayers of 'Vedic Mantras' serve the same purpose.

The 'rhyme' is a relatively late offspring of 'rhythm'. Both words are derived from the Greek root, *rhutomos*.

Rhyme is nothing but glorified pun—two string of ideas tied in acoustic knot. Music is basically a sound or *'nada'* generating particular vibrations which moves through the medium in the atmosphere and affects the human body.

'Matanga' (9th-10th century AD) was the earliest writer to define 'raga'. According to him "*raga* is that kind of sound composition consisting of melodic movements which has the effect of colouring the hearts of men". "There are four sources of raga: folk songs, poetry, devotional songs of mystics and compositions of classical musicians. While 'harmony' is the characteristic of Western Music, Indian music is pure melody. The general term for melody in India is *raga* or *"ragini"*. (Kangra *Ragmala*—M. S. Randhawa).

Folk songs are very important with reference to classical music. Although, most of the folk songs are not based on classical ragas, it may not be fair to say that they are devoid of ragas. In many of the folk songs *Tal Kaharva, Tal Khemta and Tal Jat* are being used. In *Tal Jat* there are 14 Matras while in *Khemta* only 6 Matras are used. On the other hand in *Tal Kaharva* 4 Matras are used. In almost all the folk songs portions of four *'Thats'* are used. They are—*Vilaval, Khamaz, Kafi and Bhairav*.

Music Therapy

Music therapy is a scientific method of effective cures of diseases through the power of music. It restores, maintains and improves emotional and psychological well being.

Some studies show it can lower blood pressure, basal metabolism and respiration rates, thus lessening physiological responses to stress. Other studies suggest music may help increase production of endorphins (natural pain relievers) and S-IgA *(Salivary immunoglobulin-A)*. S-IgA speeds healing, reduces the danger of infection and controls heart rates.

Music therapy is proving especially effective in three main areas:

• **Pain, anxiety and depression:** It has been found that during the delivery of a child the pain of the mother is reduced if relaxing jazz music is played.

• **Mental, emotional and physical handicaps:** Music therapy is also useful in case of mental retardation, autism, and severe-to-moderate learning abilities.

• **Neurological disorders:** Music therapy is very useful for the patients suffering neurological disorders. The positive results have been noticed

in the patients who cannot talk or move. In some of the cases the patients who lost their voices were able to sing and dance again.

Hindustani classical music considers ragas as depicting specific moods. *Raga kafi*, for example, evokes a humid, cool, soothing and deep mood while *Raga Pooriya Dhanashri* evokes sweet, deep, heavy, cloudy and stable state of mind. *Raga Mishra Mand* has a very pleasing, refreshing, light and sweet touch while *Raga Bageshwari* arouses a feeling of darkness, stability, depth and calmness.

Dr. Balaji Tambe has proved that *Raga Bhupali* and *Todi* give tremendous relief to patients of high blood pressure. On the other hand, *Raga Malkauns* and *Raga Asawari* help to cure low blood pressure. Similarly, *Raga Chandrakauns* is considered very helpful for certain heart ailments. For patients of insomnia and sleep disorders *Raga Bihag* and *Bahar* have excellent effects. It is therefore, very essential to study the effects of folk music of different parts of the country on the health of the people.

Environment and Folk Songs

The folk songs have depicted a number of plants available in their vicinity. The ritual songs, seasonal songs, romantic songs, caste songs and the action songs include different types of 'plants' and their description. For instance, a house wife may weep keeping a leaf of *Tulasi* and sing:

> *Tulasi ki Patiya ei hatawa men na*
> *Ham khat bani kiriya sunahu piya na*
> *Mor dosh kuchhu na ham sach kahi na*
> *Piya Tulasi ka patiya ei hatawa men na.*

In another folk song a lady is comparing her husband with Anar:

> *Hari hari sainyan anare ke phool*
> *Dekhat nik lage a har*i

In one of the Kashmiri folk song a plant himself is personifying and making request to save it.

> *Bali gam tashok bag vasnastaya,*
> *Astay astaya nov bahar aao.*
> *Cheri kur fariyad bar sahibstaya,*
> *Suli hai aapas cheer vyom naav,*
> *Grisyastis yam bakar nyand kalastaya,*
> *Astaya astaya nov bahar aao.*

A Garhwali folk song illustrates the seasonal variation in a very beautiful way:

> *Aai gain ritu baundi, dayan jaiso phero,*
> *Uba deshi uba jata, uda desinuda.*
> *Mauli gail anaman, bhanti phool dale,*
> *Phooli gain banu manje gwaril–burans.*
> *Jhapnyali dali ya ghooghooti ghoorali,*
> *Ucchi dandi-kandiyon hilans barali.*
> *Dauri gadanyo ya melwadi bolali.*
> *Gyon jaun sari hari bhari hoin,*
> *Dandoo ya ghoorali gwairoo ki.*
> *Chhoti nauni nauna delyo phool chadala,*
> *Gon-gon dhol bajala barat ka,*
> *Jaunka hola bhag, u saujdya pali.*

In a *Maithili* folk song the conservation of plants has been given the most importance:

> *Aha nahin katoon, nahin katoon*
> *Neemak Ei gachh aachhi.*
> *Kehen jhoom rahal, jhoom rahal*
> *Neemak Ei gachh aachhi.*

In *Malayalam* folk songs along with the paddy and rice the description of coconut and beetal nut have been given:

> *Nellelam katru kuniyum paruvittal*
> *Nellinte mutil permavum kawa*

Dyre T. has given a lucid account about the folklore of plants. A similar account of folklore of birds and beasts of India has been given by Fitzpatrick W (*J. Bom. Nat. Hist. Society,* Vol. XXVIII, 1921-22).

The Life Cycle

The scientists study the life cycles of various animals and plants through minute observations. They have noted that all the living beings including *homosapiens* passes through certain phases to complete their life cycles. The life cycle of a butterfly is having four distinct stages–eggs, caterpillar, pupa and adult butterfly. In case of man the social scientists have found four stages—childhood, youth, adult and old age. In our Vedas also there is description of *Balyavastha, Grihast Ashram, Vanprasth and Sanyas*.

If we study the folk songs of any part of the country it will be noted that they depict the entire life cycle of the people living in that area. A noted anthropologist Elvin V. has written in the *Introduction of Folk songs of Maikal Hills* that "if you want to know the story of my life then listen to my (Karma) songs."

Hindu culture believes in 16 'sanskar' during the entire life. However, only six are very prevalent.

They are *Child birth, Mundan, Yagyopavit, Marriage, Departure (Gavana) and Death.*

Folk songs related to child birth are popularly known as *'Sohar'* or *'Mangal'*. The main topics covered in these songs may be classified in four categories in Braj region—*Janti ke geet, chhathi ke geet, jag mohan lugara and taga.* The naming ceremony is another important occasion for singing the folk songs. In *Mundan* songs ladies normally pray the 'Lord Indra' not to give orders for the rain. In threading ceremony *janeoo songs* are used.

The marriage songs have large number of varieties in different parts of the country. At the bridal side around 22 categories may be noted. They include: *Tilak, Sanjha, Mando, Mati, Kalsa, Haradi, Lava bhujai, Matri-puja, Dwar puja, Gurhatthi puja, Vivah, Bhanvar, Choomne ke geet, Dwar rokane ke geet, Kohabar, Parihas, Bhat, Ubtan to groom, Mando khilai, Barat ki bidai, Kankan Chhurai and Chauthari ke geet.*

The word *Gavana* is related to Sanskrit–*Gaman*. In some parts of the country child marriage is prevalent. In that case although the marriage ceremony is completed as per schedule, the bride is sent to the groom's house only when she becomes mature. In death songs, praise of the departed soul is the main theme. These folk songs are mostly pathetic as they also express the sorrow of the wife and family.

The Music of the Spheres

The founder of Greek Mathematics, Pythagoras found a basic relation between musical harmony and mathematics. Pythagoras had found that the chords which sound pleasing to the ear—the western ear–correspond to exact division of the string of whole numbers. To the Pythagoreans that discovery had a mystic force. For example, Pythagoreans believed that we should be able to calculate the orbits of the heavenly bodies by relating them to the musical intervals. They felt that all the regularities in nature are musical; the movement of heavens was for them, the music of the spheres.

Our folk songs are more romantic in nature with reference to the stars, planets and other natural phenomena. The depth of thoughts and powerful imagination may be seen in the following *Nimari* folk song:

> *Shukra ko taro re eishwar oongi rahyo'*
> *Teki makh..a Teeki gharav.*
> *Dhruva ki badlai re eishwar tuli rha*
> *Teki makh..a tahbol rangav..a*
> *Sarag ki bijalai re karaki rahe*

> *Teki makh..a magazi lagav..a*
> *Navlakh tara re eishwar chamaka rhya*
> *Teki makh..a Angiya silav..a*
> *Chand Suraj re eishwar oongi rhya*
> *Teki makh.a tukki lagav..a*
> *Vasuki Nag re eishwar dekhai rhyo*
> *Teki makh..a veni guthav..a*
> *Bari hat Balai re Gaural Gauriri.*

O' my husband! The star Venus (?) which is shining in the sky I want a *Bindi* may be carved out of that. And the pole-star you see in the north, is covered with rainy cloud, my *'chunar'* (scarf?) may be dyed in that beautiful colour. And listen, the striking lightening you see, I want the border of that in my *chunari*. The millions of stars twinkling in the sky, please make a *'kanchuki'* (blouse) of that and embroider the sun and moon on the front side of that *'kanchuki'*. Thus, after demanding the entire universe—planets, stars, sun, moon–she demands the *Vasuki Nag* (the mythological *cora*) for decorating her hairs as *'Veni'*. The husband simply replied that O' fair lady you are very demanding.

Physics and Physiology

The modern age scientists also pondered over issues, like can music be explained in terms of physics and physiology? Can harmony be reduced to numbers and can rules of selection of notes be traced to certain innate and analyzable responses? The French mathematician D'Alembert and the German physiologist and physicist Helmholtz had given a theory of consonance in relation to the "scheme of nature". Sir James Jeans, in his book *Science & Music* deals with the subject, but the matter is not yet settled.

Among musical instruments, the drum is undoubtedly the oldest instrument. Its design testifies to the hunting age of man. Animal skin, thongs of leather and a hollow wooden box—may be from the trunk of a felled tree—furnish all that is required to make this musical instrument. The spirit-stirring qualities of the drum, to use the words of Othello, would soon have been felt by the primitive man. The quick sharp beats sent warriors into action and the slow deliberate beat of a deep-voiced drum became the symbol of mourning. The instrument that frequently stands out in Beethoven's compositions is the drum.

The design of the drum in India has attained an extremely high degree of sophistication, as the work of Prof. C. V. Raman has showed. In the brilliance, incisiveness and variety of tones it can produce, it is equaled by the complexity of time patterns and

modes of execution, developed over many centuries. The simple notion of cyclic rhythm is completely transcended in the Indian *Tabalas* (drums).

In the last century, Helmholtz in Germany had made a deep study of the physics of sound as it affects human beings in sensation. One of his findings was that the quality and effect of a tone is determined by the harmonics or overtones of fundamental note. (That is, components having frequencies 2, 3, 4 times the fundamental frequency.) Taking up this idea Prof. Raman made a study of the Indian drums to demonstrate their acoustical perfection which bears "remarkable testimony to the inventiveness and musical taste of its progenitors", as he put it. Among his many publications on Acoustics, one of the earliest was on the musical drums.

Computer and Music

The computers may help in planning and production of all types of classical and folk music. They may be used in recording, editing, dubbing, transmission and preservation of the music.

The digital recording is not only space saving but also maintains the quality of the programmes. The Internet has converted the entire world into a global village. The MP3 is standard in digital audio music players now. This facility is widely used by the western countries to popularize their folk music all over the world. However, in our country much effort is needed to use this medium.

Dr. Hari Sahasrabuddhe, Head, Computer Division, Pune Vidhyapeeth has done monumental research for using computers in the field of classical music. He has prepared software to produce and present 38 ragas. They include–*Gaud Malhar, Asavari, Basant, Pahari, Bageshri Bahar, Bilaval, Bhairavi,* etc.

Dr. Sahasrabuddhe has used HCL Horizon and PC-XT to prepare the software. The music notations are handed over to ALPFA (FARNIGHT AUTOMATOR). The printout is taken and the music is played on PC-XT. Similar efforts may be made to prepare softwares for producing folk music of different parts of the country in future.

Some other softwares developed by a German company are also available in the market. One such software is 'cubesis' and the other is 'VST'. With the help of these softwares one can compose any type of music and prepare the re-mix also. In these software programmes the technique of MIDI–Musical Instrument Digital Interface–has been used. It has audio CD support.

DNA Music

A number of enthusiasts in USA are producing DNA (deoxyribonucleic acid) music. It is easier to produce as DNA molecule is made up of four simple letters T-C-G-A. As a matter of fact, the DNA molecule is made up of sugars and phosphates, and four specific small molecules or bases. Two of them are very small molecules, thymine and cytosine, in each of which atoms of carbon, nitrogen, oxygen and hydrogen are arranged in a hexagon. And two of them are rather larger, guanine and adenine, in each of which the atoms are arranged in hexagon and pentagon joined together.

Prof. J. Bronowski, in his famous book T*he Ascent of Man* has said "The DNA spiral is not a monument. It is an instruction, a living mobile to tell the cell how to carry out the processes of life step-by-step. The cells specialize: nerve cells, muscle cells, blood vessels. The cell specializes because they have accepted the DNA instructions to make the proteins that are appropriate to the functioning of that cell and no other. This is the DNA in action."

There is an urgent need to define the language of folk music to preserve and recreate through computers if we are interested to pass on this information to our future generations. This is the only way because the ecology and the environment of the rural India is changing very fast. The folk traditions are dwindling and the genetic material is not going to pass on this information to the next generations.

Psychology and Folk Songs

Dreams have traditionally been regarded as windows on personality, predictors of the future or messages from Gods or demons. As we enter sleep, thoughts consist of fragmented images or what physiologist, Jonathan Winson terms 'minidramas'.

Sigmund Freud believed that dreams express irrational, usually sexual, infantile wishes, of a sort necessarily repressed in everyday life and indeed, so abhorrent even to our dreaming personalities that they can appear only in symbolic disguises.

Our folk songs also use dream sequence in which the sweetheart generally expects from the lover or husband to interpret the actual meaning of the dreams. These folk songs, in one sense, challenge Sigmund Freud as far as their scientific interpretation is concerned. In one of the famous *'Nimari'* folk song a newly married bride is asking the interpretation of her dream from her husband. The folk song narrates the dream as follows:

Suti Na Ho ghanyer, Sapano ho dekhyo,
Sapano ko arath batao bhola ghaniyer.
Mansarovar man .. a sapana men dekhyo
Bharyo Turyo bhandar man .. a sapana men dekhyo,
Bahati si Ganga man .. a sapana men dekhi
Bhari Turi Bawari man .. a sapana men dekhi
Shravan Teej man .. a sapana men dekhi
Karakati Bijalai man .. a sapana men dekhi,
Gokul ko Kanho men sapana men dekhyo,
Tartarav Bicchhoo man .. a sapana men dekhyo,
Gulab ko Phool man .. a sapana men dekhyo
Jhapalak diyo man .. a sapana men dekhyo
Kawla ri Kel man .. a sapana men dekhi
Bar ooper ki vanjuli man .. a sapana men dekhi
Pela Balai Nar man .. a sapana men dekhyo
Ugato S Suraj man .. a sapana men dekhyo
Sapana ka arath batao bhola gheriyer.

O' dear! In my dream I have seen *Mansarovar* and full of granary. I have seen flowing *Ganga* and water up to the brim of a *'Bawari'*. I have also seen greenery of *Sawan* month and striking lightening. Gokul's *Kanha* and angry *scorpion* were also seen. In dream I have seen a *rose* flower and a twinkling lamp, *Banana* tree and barren field of *sugarcane*. A lady with yellow scarf and a rising sun were also visible in my dream. O' my husband, please tell me the meaning of this dream?

Sigmund Freud might have interpreted the above dream song in the light of his theory as sexual infantile wishes. However, let us see how the husband of the lady has interpreted the song?

He said that *Mansarovar* is your father, granary is your father-in-law. *Ganga* is your mother, *Bawari* is your mother-in-law. Shravan teej depicts your sister, striking lightning is sister-in-law. Kanha is your brother; scorpion is your younger brother-in-law (Devar). Rose is your son and twinkling lamp is your son-in-law. *Kel* in backyard is your daughter and barren field is your maid servant. The lady with yellow scarf is the second wife of your husband *(saut)* and the Sun is your husband. Ranu the wife is very happy with this interpretation.

If we analyze we may be surprised to note that this interpretation is closer to the theory of a Swiss Psychiatrist, Carl Jung, who was a close associate of Freud and later formed his own school of psycho-analysis. Carl Jung held that dreams may also reflect the higher aspects of the mind and often provide the dreamer with wise guidance and sound advice.

Mother and Child Care

A family is a small group of people who live together as a unit or household, sharing same food, customs and environment. One of its central roles is reproduction and rearing of children. The family is having five important areas of functioning; all are interrelated.

These five areas are: biological, psychological, socio-cultural, economic and educational.

Biological: Reproduction, child-rearing, nutrition, protection of health, and physical recreation

Psychological: Emotional security, identity of individuals, maturation of personality, psychological protection and making relationship outside family

Socio-cultural: Transfer of behaviour, tradition, culture, socialization of children; determination of norms of behaviour at different ages and relationships

Economic: To obtain resources, distribution and use of resources, protection of family members

Educational: Teaching of skills appropriate to age and way of life; preparation for adult life and fulfillment of adult role

Our folk songs reflect the variety of ways for mother and child care. Bundelkhand area is having a rich tradition of folk songs related to the various stages right from the conception to child birth and child rearing. *"Aagannon"* also known as *phool chowk*, is the ceremony organized in the sixth-to-ninth month of conception. A few lines of this song are worth noticing:

Sone ke diyal jarao
Gori dhan chowke aain,
Chandan chowk purao,
Gori dhan chowke aain.
Bamman bulao ved dikhao gun ke ganat lagao,
Gori dhan chowke aain.
Sahdeya lakhana lyayo devara gin var batao,
Gori dhan chowke aain.

A different form of *"Sohar"* is popular in Bundelkhand region. It is known as *"Dohad"*. In these folk songs the unbearable labour pain of a lady is expressed:

More kamar dhan peer ab naiyyan jeene ki,
Sun raja more maharaja re,
mori sasu khon deo bulay
Ab naiyyan jeene ki.

Another *"Sohar"* is called *charua charai*. During this period the herbal drinks are offered to the pregnant

lady. The folk song discusses the instrument which may be used to cut the placenta.

> *Kahe ko chhura main nara chinayo*
> *Kahe ke pare asnan*
> *Kanhaya ne janam liyo*

The nutritional requirement of a lady immediately after the delivery of a child should be kept in mind. This *Bundeli* folk song reminds of the same:

> *Badhav lyai nandi are sanvariya*
> *Khan se aai peeper kahan se aai sonth*
> *Kahan se aai nanadi are sanvariya.*
> *Puriya men aai peepar dabba main aai sonth*
> *Kahe kho aai nanadi are sanvariya*
> *Jaccha khon aai peepar baccha khon aai sonth*
> *Neng khon aai nanadi are sanvaria.*

After-delivery care is also very important. The ladies are supposed to fetch the water from the nearby well. *Bundeli* folk songs related to *kuan pujan* take care of that.

> *Ooper badar ghumrayan ri*
> *Gori dhana paniyan ko nikari*
> *Jao jo kaiyo raja sasur se*
> *Angna main kuiya khudav*
> *Tumai bahu paniya ko nikalri.*

Traditions: Winds of Change

Every society moves under the impulses of two contradictory forces: tradition and innovation. The former would see it ruled by the past, the latter looks towards the future. The traditional music of Asia has always evolved, and continues to do so, whether the defenders of pure traditions like it or not.

- In order to admire beautiful monuments and relics of past civilizations, one goes to the museum; but music is something alive, destined to develop, and is bound to open to influences from almost anywhere. The most important thing is to reconcile the splendour of the past with possibilities of the present. In other words, safeguard our heritage without involving it in the speculations of those who should perpetuate it.

- There is an urgent need to define the language of folk music to preserve and recreate through computers if we are interested to pass on this information to our future generations. This is the only way because the ecology and the environment of the rural India are changing very fast. The folk traditions are dwindling and the genetic material is not going to pass on this information to the next generations.

- It is nothing but the association of different organisms, so as to bring one or all of them certain advantages to improve their existence. The Indian film music is a very good example of this symbiosis. A large number of film songs have been using folk tunes as well as folk songs.

It is said that nothing is permanent in this world except the necessity for change. The folk traditions constantly change according to time, history and culture contact. They are never fixed and isolated objects. They are historically conditioned inventions.

In India, the tradition of folklore has enough vitality to absorb new elements. Our father of the Nation, Mahatma Gandhi has long back rightly said that "I do not want my house to be walled in on all sides and windows to be stuffed. I want the cultures of all lands to be blown about my house as freely as possible" He was very sure about the deep roots of our culture that is why he could say it very emphatically "But I refuse to be blown off my feet by any one of them."

The media have a vital role to play in this situation. There is a rich and variegated treasure-house of folk music in our country. This has to be rediscovered, resuscitated, and placed in its correct perspective.

Tribal Music

- Some of it tonally quite simple and involving two or three notes.

- Some using as much as a full octave, usually pentatonic.

- Most of their music is monophonic with the exception of tribes of Manipur, Assam, where simple form of polyphony is common.

- A variety of instruments is used. Some tribes have perhaps no more than a drum, while others have quite a number, including some in each of four major categories—chordophones, aerophones, membranophones and idiophones.

- Two distinct types of music—'outdoor' ensembles, and members of tribe or a Hindu caste, and their own characteristic tribal songs, weddings and festive occasions.

- Songs are mostly functional and often have sanctity of ceremonial rite, events of life cycle—birth, initiation, marriage and death.

- Agricultural songs—burning and preparation of fields, planting, harvesting etc., have an element of ritual.

- Hunting and food gathering tribes have songs to propriate diety success for venture or successful conclusion of hunt.

- Most tribes do, however, have more or less secular songs—such as greetings, lullabies, lore and courtship songs, ballads and humourous songs.

- At festival time—songs describing their ancestry and origin of tribe.

Folk Songs

- Associated with the cycles connected with life and death, agriculture and season.

- Vary in detail—inter- and intra-regions of society.

- "Outdoor" ensemble—festival music, weddings and funerals.

- Nettle proposes that folk music is an oral tradition found in those areas which are dominated by high cultures, having a body of cultivated music with which it exchanges material and by which it is profoundly influenced.

- Hindu mythology and religious philosophy are integral parts of much of Indian folk music. Songs sung at the time of childbirth for example 'Soha' songs of U.P. often describe birth of Krishna or Rama and wedding songs of Shiva and Parvati. A fisherman could begin with invocation to protective deity.

Devotional Songs

- Saint singers, Bhajan, Kirtan Abhang

- These devotional songs are intermediate stage between classical and folk music.

- Less abstract than classical more sophisticated than folk.

- Mystical and emotional experience.

- Sound produced was incidental to the act of singing and did not need to be good musician to derive spiritual benefit from the songs.

- Songs, however, have 'catchy' tunes derived from ragas of classical music.

- Wide appeal due to lively rhythms.

- Temple service, Bhajan mandalies.

Classical Music

- Classical music placed emphasis on technique and beauty of performance.

- Fundamental element is the use of drone, usually provided by wind instrument or plucked stringed instrument.

- Based on melody and rhythm.

  Modal in character

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Generating a Science Programme for Television

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Introduction

Television has emerged as a powerful medium and has proved to be a boon for the science programmes by enhancing their educational and informational value. The production of science programmes includes three main stages, i.e. Pre-production, Production and Post-production. Though at all these stages a sense of responsibility and attentiveness are needed, the path taken at the pre-production stage is the prerequisite for success. In the production of a science programme one cannot ignore an interactive nature because it presents science as a subject of the common man and also breaks the traditional image of science as a subject practiced only at the laboratory. In this way a genuine and susceptible science programme can be produced.

In the present time television has emerged as an effective and powerful means of communication, information, education and entertainment. It is the power of the medium, that has turned the world into a global village. The desired information is just available on click of the 'remote' or switch. Due to advancement in technology, it is very necessary to move along with technology. Television has got visuals and that's why it develops clear understanding and is of great worth as far as science and technology is concerned.

Television programme: Scope & Utility

Dominance of television lies in conversion of virtuality into reality. Through visual and audio effect imagination and reality can both be exhibited on the screen. The programme on television reflects manifold aspects of a topic, particularly one that is science and technology based. It reveals invention, discovery, application, functioning, history, present scenario, principle, theory, devoted aspect and futuristic pathway with further hopes or constraints. The utility of science programme has got widened. Television programme generates understanding, visual literacy, and acquaintance with new phenomena and finally results in enhancement of perception.

Stages of Production

Whether a programme is produced for television or radio the production includes three stages.

- Pre-Production
- Production
- Post Production

Pre-production

The prevailing part of pre-production as well as overall production is idea. Idea is the platform on which a programme takes shape. The most important part is whether the chosen idea can be exhibited visually. Definitely, the medium of television depends on visualization and it enhances the pace of the programme. While deciding an idea many aspects have to be taken into consideration. At the same time it is also necessary to decide the target audience. If a producer is producing a programme on CT-Scan then first of all he should be able to decide the target group. If the programme is for a general audience then it should be introductory, simple and deal with the applications of CT-Scan. Application includes diagnosis of various organs like chest, heart, aorta, lungs, mediastinum, cancer diagnosis, brain, vessels of the brain, cervical spine, etc.

Thereafter think about the objectives of the programme. For general audience objective of the programme should be to make them conversant with the new technology of diagnosis. It can be achieved through a simple presentation of CT-Scan principle, application and functioning. It can be said that pre-production is the work of responsibility and overall production depends entirely on the pre-production aspects. In this stage, work is done sincerely because programme quality has got plausible relation with this.

A good idea and theme may fail if the pre-production task is underestimated.

After deciding the idea, objective and target audience, move towards the thinking of duration, medium, language and format of the programme. If the programme is introductory then the duration should not cross over 15 minutes. To maintain an even pace in the programme along with maintaining adequate interest is a difficult task and therefore the duration should be monitored carefully if the medium represents radio or television. If the programme can be successfully presented through radio then obviously there is no scope for television. Visual programmes are very expensive and require extensive resources in terms of technology, technicians, skills, research, artist and money (Personal communication with Professor Devesh Kishore). Keeping the visualization view in mind one should have to decide about the production of a television programme. Language is deeply concerned with the theme of the programme. Language of the programme depends upon various factors.

- Need of the subject – For example CT-Scan programme includes different terminologies about various minimally invasive procedures. Translation of terminology kills the originality of the presentation in that language affecting understanding. Therefore subject need cannot be ignored.

- While selecting language, need of the channel is also studied. Sometimes language is chosen according to demand of the channel.

- If the programme is in local flavour then regional language is used.

- If the programme is to be dispersed in different channels then it is better to select English as the medium.

For common and everyday science programme it is better to use Hindi. Because using Hindi as the medium a programme can be communicated more effectively at the grassroots level.

After deciding language select the format of the programme, i.e. film, documentary or any other. For the sake of interest and understanding, a science programme should use documentary form wherever needed. Now it is time for content research of the programme. For example resources for CT-Scan are interview with director, medical officer, radiologist and science magazines, journals, newspapers and science manuals. Today Internet seems to be the most powerful source of information and it should be utilized. The task of content research is of great responsibility as reliability of the fact, inference, figure, information and education lies on it. That is why the entire thing should be studied carefully and genuinely.

After having done content research, generate script for the programme. Following precautions should be taken while writing the script.

- Do not make an attempt to describe visuals as the television is the medium of visuals itself.

- Scripting should not reflect literature but reflect communication with target audience.

- While writing script for a science programme controversial subject should be presented by interview of the subject expert rather than voice-over or commentary.

- Do not use eulogizing words for a science programme because it is meant to be informational and educational.

- Try to write words and sentences in simple form because television is the medium of audio and video. (Personal communication with Mr. Kunwar Anurag Singh Tiwari).

- Repetition of sentences or with some modification creates a bad impression on the viewer.

- There is no room for exaggeration in a science programme.

- Terminologies should be explained properly. In case of highly technical words use a simple synonym or explain it.

- Formal and literary words should not be used in a science programme as well as others.

Now, pathway of production is almost open for the producer. Many times storyboard is generated before going for production. Storyboard reflects sequential arrangement of shots, their pattern, and major and minor details with their voice-over if needed. There is no hard and fast rule regarding creation of a storyboard, however its presence gives you an outline of the programme in a nutshell. Before production one more thing should be kept in mind. It is better to understand the light, sound and angles of various situations before shooting.

Production

At this stage paper work is accomplished and practical works begin. The work of production is a result of teamwork. Experts such as producer, cameraman,

sound recorder, sound technologist, producer assistant and light-man along with attendant are involved in the team. The command over production comes through constant practice and experience. Maturity in production is gained gradually from one programme to the next. Also the whole production task depends upon the sincere work performed on pre-production (Personal Communication with Dr. Waris Ahmad Khan). Observe following things at this stage.

- Check the functioning of camera, battery, lens, monitor, cable and sound recording microphones.

- While shooting something do not follow the storyboard blindly.

- Always try for additional footages.

- Recording of interview, monologue, dialogue or panel discussion should be technically and verbally sound.

- Do not instruct the persons of dignitary post/authority. Be courteous with them and move accordingly.

- Study and shoot the variety of shots for the enhancement of the programme.

- Design interactive pattern particularly in a science programme.

Post-Production

In the post-production stage start from logging preview. In this session, you have to study the various shots and interview. In rough-cut preview observe and note down the shot's description, duration, time and make editing sheet. Editing sheet is also known as Q-Sheet. This will help you not only in editing but also save valuable time. In editing, shots and voice-over (VO) are arranged sequentially and background music is inserted wherever necessary. In this way final touch is provided to the science programme.

Thus, the medium of television can communicate science programme in an effective way by uplifting the perception of the viewer.

Acknowledgement

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*.

Low-cost Computers:
A Scientific Innovation to Get Have-nots On-line

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Introduction

The past decade has seen tremendous efforts to develop low cost personal computers for personal or community use in bridging third world digital divide. The devices like Brazilian Volkscomputer, Indian Simputer, African village PDA, $100 PC and US HDL have gained much attention as "people's computers" offering the poor a bridge to the Internet Age.

These low cost computers are seen as marvels of efficiency and cost saving. These devices save licensing fees by using free, open source operating systems like Linux. In developing countries like India, Pakistan, Bangladesh, Sri Lanka, African and Latin American countries, where nearly 50% of the population is unable to handle information and communications technology (ICT) based operations due to limited literacy and computer skills, it is not an easy task to take advantage of the wealth of information available on the Net. In many of these developing countries, even the very cost of a computer can amount to more than the average worker's annual salary. That's why to surmount the prohibitive cost of IT hardware, many researches are taking place in these developing countries to design low cost computers which can address the particular needs of the disadvantaged populations.

Volkscomputer

The Brazilian "people's computer or volkscomputer" at first gained attention in 2001, but it was only in the year 2004 that the actual production and consumption came on the scene in real terms. The volkscomputer project was launched by computer scientists at Brazil's University of Minas Gerais, with the expectation that a low cost device for community centres and schools would connect 170 million Brazilian's to the net and will bridge the digital divide once and for all.

The prime objective was to build a computer within the standards of personal computers which could be made available in the market at low cost with a basic functionality so that lower-income people could have access to the World Wide Web and all of the cultural and educational benefits that it represents.

The device includes a basic processor, a 56K modem, an ethernet network card, speakers, a mouse and a micro monitor. The device relied on a 16-megabyte flash disk rather than a hard drive. It also has port for printer, external floppy drive and CDROM. Linux was used as the operating system.

$100 PC

Recently a little known company called Novatium offered a stripped down home computer for about $70 or $ 75. This low cost computer is no doubt a fitting icon for a country like India which is undergoing major changes in the development of its technology, economy and society. ICT practitioners hope that this $100 PC will go a long way in bridging the digital divide between the affluent urban populations and the rural have-nots. However, the success of the device would depend upon how user friendly the interface is, what kind of applications exist, its price and the effectiveness of the distribution and availability in the market.

Simputer

Developed indigenously by the scientists from the Indian Institute of Science, Bangalore 560 012, India and technologists of Encore Software, Bengaluru 560 025 a private enterprise, the Simputer (simple computer) is a low cost, portable alternative to personal computers. It is pegged as the first of its kind in the world as it promises to ensure that illiteracy is no

longer a barrier to handling a computer. It permits simple and natural user-friendly interfaces based on sight, touch and audio. So there is no need to know English in order to operate it.

Expected to be priced at less than US $200 per piece, the simputer will be quite affordable. It is aimed to be a shared computing resource for a local community of users – such as the village administrative committee or a kiosk or a shopkeeper. The farmer and the rural have-nots can use it to browse the net for information and to keep land and other accounts. What makes it different from other hand-held devices is its smart card reader thus enabling it to be personalized and to use it on an individual basis.

Why low cost computers?

The key to bridging the digital divide is to have shared devices that permit truly simple and natural user interfaces based on sight, touch and audio. The low cost computers like simputer meet these demands through a browser for the Information Markup Language (IML). IML has been created to provide a uniform experience to users and to allow rapid development of solutions on any platform.

The global launch of low cost computers is marked more by skepticism than hope and hype. Ironically, when the news about the low cost computers first broke a couple of years ago, it was heralded with much excitement. The media hype raised hopes of development organizations that have been working to bring the benefits of ICT to disadvantaged communities.

Let us be clear about one point: the low cost computers are not the only answer to poverty and illiteracy in developing countries. On its own, it cannot eliminate poverty and it cannot teach the illiterate. No technological invention can claim to be able to do that. Nor low cost computers are the only solution to the digital divide. But what low cost computers can do is to provide quick access to digital information to the rural people. In many rural areas of India simputers are used to receive information via the World Space radio and to learn from consultants across the world. Farmers are using it to learn about the going crop rates, to get local market and fertilizer news and to send and receive e-mails and voice mail.

Doctors in rural areas have developed a portable ultrasound monitor that can be plugged into the simputer. Local government agencies can use it to extend their services to the rural communities. Post offices can use it to service money orders electronically, cutting delays and loss in transit. Local communities, such as village councils, panchayats, schools, and kiosks can loan the device to individual users for different uses. Non-literate users can browse the web using pictures and its text-to-speech capability allows the web content to be delivered in local languages.

Low cost computers as a community building tool

Most important, the low cost computer can help in community building and bridging the social gap. Because the digital divide is not so much about the gap in access to technologies as the social divide between haves and have-nots. Sharing a community resource like the simputer can multiply the effect of traditional open-air theatres or festivities in countries like India, which foster a sense of community among the rural people. This can get a further boost when its users also become part of the online communities that can be created.

The significance of the low cost computer is, however, more to do with its philosophy than its features. Its designers have proved that developing nations can build their own solutions to their problems and need not accept generously doled out pre-fabricated, proprietary and expensive technologies.

The development of low cost computers are totally based on the expressed needs of the communities and they considered the actual information needs, language capacities and potential interface preferences of low-literate villagers in the right direction. That is why they are seen as a watershed in the developing countries efforts to overcome the digital divide.

Conclusions

It is a bitter reality that even in this Digital Age, 90% of the people of the developing world do not have access to internet and other ICT based services. Most of the rural areas still suffer on account of lack of right information regarding the markets, products, agriculture, health, weather, education, etc. and if all these can be addressed through connectivity, a sea change can be brought in the conditions of the rural communities. Here the production and marketing of low cost computers can play an important role to bring digital information to the rural have-nots. It is seen as an effort to harness the potential of ICT for the benefit of the weaker sections of the society.

Of course, low cost computers are not the end solution. Nor is it the only solution. Other efforts are also taking place in this direction. What is heartening is that most experiments in the field of low cost

computers have been initiated by the developing countries. It means that developing countries are now preparing themselves to empower their poor masses through creative innovations in ICT sector thus building progressive self-reliant rural communities, with a holistic approach, by providing services in the areas of healthcare, environment, sanitation, primary education, adult literacy and skills development. The primary objective of practicing low cost computers for development is to create a world-class platform for sustainable rural transformation which is said to be based on the guiding principles that consider people as the wealth, knowledge and technology tools.

Low cost access to information infrastructure is a necessary prerequisite for the successful use of ICT by the have-nots, but it is not sufficient. The need of the hour is to motivate the individuals and the concerned organizations that have the appropriate incentives to work with the marginalized groups, to implement the low cost computer projects to bridge the divide. Further it all depends on how these low cost computing devices are marketed, publicized and made more affordable to the Third World have-nots. Here, more efforts and commitments are required to transform this noble idea into practical steps.

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News

Public Communication of Science, Technology, Culture & Society: Interdisciplinary Symposium & Workshop in Sao Paulo

A symposium-cum-workshop held recently in Sao Paulo, Brazil marked a clear attempt at evolving academic and scientific programmes in the field of Public Communication of Science & Technology and Culture & Society. This was organized in the University of Sao Paulo during October 17-20, 2011. The Symposium was inaugurated by Prof. Adnei Melges De Andrade, Executive Vice Rector, International Relations, Sao Paulo University. Public Communication of Science and Technology (PCST) deals with linking scientific research and development to the people at large so that they are able to appreciate the minimum science confronting to their day-to-day lives and are able to take informed decisions, especially when it comes to issues and aspects of scientific and technical importance and problem solving.

The inaugural session in progress

The ways and means, studies and research involving various mass media for reaching out to the masses with respect to scientific knowledge and scientific temper constitute the core of the subject PCST. Indian Consul Ms. Abhilasha Joshi was present at the inauguration which was also attended by Prof. Adnei Melges De Andrade, Executive Vice Rector, International Relations, Sao Paulo University, Dr. Manoj K. Patairiya, Director (Scientist 'F'), NCSTC, DST, GOI, New Delhi, Dr. Maria Ines Nogueira, Convener and Professor, Institute of Bio-Sciences, Prof. Telma Maria Tenorio Zorn, Provost, Undergraduate Studies, and Prof. Arlindo Philippi, Vice Provost, Graduate Studies, amongst other dignitaries. Dr. Manoj K. Patairiya and Prof. Maria Ines Nagueira delivered keynote addresses of the symposium and workshop.

A Brazilian artiste presented Bharat Natyam

Amongst presentations from India, Dr. Manoj K. Patairiya emphasized on building science communication as an interdisciplinary area combining science, technology, communication, culture and society together for enhancing the level of science literacy and inculcating a scientific culture. Prof. P. C. Vyas, Former Chairman, Rajasthan Education Board and Coordinator, Rajeev Gandhi Study Circle, in his address stressed that Science Communication is a mission to create scientific temper, where scientific approach and ethics are the key factors to be a good human being. Dr. Pramod K. Verma, Scientific Adviser to the Govt. of M.P. and Director General, M.P. Council of Science & Technology said that there is a strong need for teaching Science Communication

as an independent discipline of knowledge at higher levels globally especially in developing world and India can take lead in this endeavor.

A special issue of the Science Newspaper *Vagyanik Drishitikon* was released on the occasion. The newspaper is catalysed and supported by the National Council for Science & Technology Communication (NCSTC), Department of Science & Technology, New Delhi. The symposium was divided in 12 technical sessions, 3 workshops and a plenary discussion, which included networking, dialogue, science and culture interaction, and conceptual and practical frameworks on public communication of science and technology. Prof. Arlindo Philippi, Vice Provost, Graduate Studies, delivered the valedictory address on October 20, 2011 and said that the University of Sao Paulo will support the idea of having a masters' level programme on public communication of science, technology, culture and society, where experiences from India will be important for its successful implementation. The Symposium and Workshop have offered an open, informal, and lively discussion for possible collaborations in future in PCST related areas.

Two international conferences were recently organized in India on PCST related subjects, i) 6th International Conference on Hands-on Science at Ahmedabad in October 2009; and ii) 11th International Conference on PCST in New Delhi in December 2010 with the initiative of the Department of Science & Technology (DST), Govt. of India, which have paved the way for international cooperation in public communication of science and technology, and the Brazil Symposium is a way forward in this direction. Over 200 experts, faculty members, researchers and students interested in science communication participated in the programme.

Visits to National Institute for Space Research, Science Museums and Science Centres were also organised as associated events of the programme during October 21-24, 2011 to have hands-on experience of science and technology at work through exhibits, working models, scaled models, etc.   ■

A folk dance of Brazil

Letter to the Editor

Dear Editor,

I recently came across your journal and was highly impressed for carrying out its multi-faceted publications over the years. I consider this to be a huge achievement! I just wanted to share my experience that reflects several facets of this dynamic world of foreign students in the Western academia. In addition to UK and USA other major destinations for graduate degrees currently have been Canada, Australia, New Zealand, Japan and several EU members nations (most prominent being France and Germany). Over past few decades, foreign students from different developing countries have been increasingly studying in India and China too. Students indeed go through substantial academic, economic and cultural challenges in a new environment and setting to start their degree programmes away from their home country; but in other words it is also culturally rewarding.

Being a graduate student, completing my Masters and currently finishing up my doctoral studies in Canada have been a life altering and joyous experience for me! The new culture and friends in Canada helped me a lot to adjust to the cultural shocks and initial academic trauma more easily than others. I suggest all new graduate students to have an open frame of mind while going abroad for perusing a foreign degree. It is undoubtedly important to enjoy their individual culture, language and food but on the other hand it is also important to break the ice and reach out to new friends who are culturally different and also interact with local students. As long as one is not afraid to take the challenges to meet new culture and people, every experience that one will encounter is always rewarding in some form or another. It is extreme hard work for foreign grads to meet up to the expectation of their immediate new academic environment being educated for a substantial part of their career in a widely different education system; however, when they finish their degree, they would certainly realize how much they have learnt and adapted over the years to make their endeavour into a success.

On the other hand foreign graduate students bring the aroma of diversity to the department, a new culture, language, heritage, new set of skills and training and newer thoughts and ideas that to my mind overall enriches the academia. There has been an increasing trend of foreign graduate students enrolled in graduate degree programmes compared to local students in several departments, faculties and universities across North America over the decades and to my mind this will continue to rise in the near future.

The three most basic skills a foreign graduate student needs while moving abroad for their degrees in addition to their academic qualifications are ability to quickly learn the local language, appreciate a new culture and have an overall positive attitude to welcome unexpected challenges. Of course communication has a strong role to play in this process.

Saikat Kumar Basu, PhD candidate, Bio-molecular Science, Department of Biological Sciences, University of Lethbridge, 4401 University Drive, Lethbridge AB Canada T1K 3M4; Email: saikat.basu@uleth.ca

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Indian Journal of Science Communication

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रावित्रौसंप **NCSTC**

National Council for Science and Technology Communication

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- ✦ S & T Software Development/ Production/ Dissemination
- ✦ Information Networks/ Databases
- ✦ Incentive Schemes
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- ✦ International Collaboration