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Directorate of Public Relations & Publications
Cochin University of Science and Technology
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LET SCIENCE PERCOLATE TO THE GRASS-ROOTS

Jawaharlal Nehru was a visionary Prime Minister who considered science as the basic pillar of national development. At the time when India became independent, he was instrumental in moulding modern India in a planned manner with utmost importance to science and technology. *“It is science alone that can solve the problem of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people. Who indeed can afford to ignore science today? At every turn we have to seek its aid. The future belongs to science and to those who make friends with science”*, Jawaharlal Nehru once observed.

Based on the ideas and ideals of the first Prime Minister of India, a scientific policy resolution of the country was adopted by the Govt. of India during March 1958. However it was realized later that mere infrastructural Science and Technology development will not help to improve the destiny of the toiling millions of the country. The only option is to impart scientific awareness and scientific temper. Until the citizens become aware of the impact of science and an element of scientific temper is inculcated in their mindset, it is difficult to convert the population to the world of science and thereby pave the way for development.

As we know, Jawaharlal Nehru initiated the process of scientific progress by establishing a number of S&T organizations, Public Sector Establishments, IITs and other institutions of higher learning and research. This was followed by his efforts in popularizing science and establishing scientific temper among the citizens. In his book, *Discovery of India*, Panditji referred to scientific temper as “a way of life, a process of thinking, a method of acting and associating with our fellow men”. However the vision of Nehruji can be considered as an extension of the great tradition of our country-the tradition of skepticism and humanism. It is not new to Indian culture because the spirit of enquiry was the essence of Indian philosophy and an essential part of the Indian ethos.

The essence of the spirit of science popularization was followed by all the leaders of the nation. With the 42nd amendment of

the Indian Constitution by the Parliament, a new dimension was given to the constitution by incorporating a separate article, 'Fundamental Duties', where one of the major duties of the citizen is visualised as to 'develop the scientific temper, humanism and the spirit of inquiry and reform [51-A(h)]. Then onwards special interest was given by the Government for science communication. Extensive brain storming sessions were held in many places where the cream of the society took much effort to evolve an effective strategy for popularizing science thereby making people scientifically aware. One such major step was the preparation of the statement of scientific temper under the leadership of Nehru Centre, Mumbai. The statement prepared and signed by leading lights of the society recorded that 'the spread of scientific temper in society is much more than the spread of science or technology. Scientific temper is neither a collection of knowledge or facts, although it promotes such knowledge, nor it is rationalism although it promotes rational thinking.

The Union Govt has established a number of institutions with a mandate to make people scientifically aware. Vigyan Prasar, National Council for Science and Technology Communication, National Institute of Science Communication and Information Sciences, and state level councils for Science, Technology and Environment are major examples. The State Councils for Science, Technology and Environment are actively engaged in the field to encourage and promote Science and Technology related activities and science popularization activities by strengthening science communication. The Science and Technology Universities like Cochin University of Science and Technology are in the forefront of such activities.

Many such organizations are conducting workshops and brain-storming sessions both international and national in nature, and bringing out very creative suggestions and recommendations. But such offshoots are not discussed seriously or implemented by the concerned authorities. What we need is a strong will to implement such resolutions on a war-footing. I think it is the right time for all Science Communicators to ponder over this issue, besides devising active plans to send the message of Science to the grass-roots. Let Science percolate to the grass-roots and the downtrodden.



S. Anil Kumar

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INDIA'S MANY TRYSTS WITH SKEPTICAL HUMANISM

Gangan Prathap

Several thousand years ago, when human thought rose to organize itself to understand the laws that govern the natural and moral universes, two divergent streams began to form. This was particularly true of our part of the world than any other, even at this early date, four thousand years before the present. One, more resilient than the other, argued in favour of supernatural forces, and wisdom received from these sources through divine intervention through teachers specially appointed and texts specially written, reinforced this teleological understanding of what was the beginning and the end of all phenomena. They even made the case for an all pervading spirit, ineffable and immeasurable, yet to be accepted as fact and truth.

Even in those days, the alternate route to truth was also emphasized, by many movements that we identify with the materialist tradition, the Samkhyas, the Carvakas, the Jains and the Buddhists. They arrived at the most parsimonious of explanations, that the moral and natural universe are one, that the same laws govern their operation, that understanding of causality is what allows truth to be sifted from fact. In effect they said, the removal of doubt using the instruments of reason and evidence, and the alleviation of suffering by compassion and humanism, were the most noble of all principles of right action. Thus, 2550 years ago, what the enlightenment philosophers re-discovered as skeptical humanism, was born in our part of the world.

Thus, when India re-gained independence on the midnight hour on 15 August 1947, Pandit Jawaharlal Nehru promised that India will keep its tryst with destiny by enshrining the following article of faith:

'To develop the scientific temper, humanism and the spirit of inquiry and reform' (Fundamental Duties Articles, 51-A (h))."

Dr. Gangan Prathap Director, National Institute of Science Communication and Information Resources (CSIR) Dr. K.S. Krishnan Marg, New Delhi E-mail: gp@niscair.res.in Excerpts from the Speech delivered during the valedictory session of the International Seminar on Science Communication and Scientific Temper at New Delhi on January 2012.

It is a given in the euro-centric world-view that reason originated with the Greeks. One factor that promoted this was that there has been an unbroken (or nearly unbroken) thread of continuity from the ancient Greeks till now, a world dominated for nearly five hundred years by European or North American powers.

To illustrate my point, let me quote from an essay by Andrew Baker which appeared on 13 April 2008,

“The Ancient Greeks sowed the seeds of science. They invented science’s golden rule – reason – to ask questions of the world. The Greeks asked, how do we know what we know?”

From Thales, through Anaximander and Anaximenes, and then through Socrates, Plato and Aristotle, it is this legacy that is always emphasized. It is in echoing this spirit, that Whitehead once said that “The entire history of western philosophy is a series of footnotes to Plato.” Indeed, Plato attributed to Socrates, the famous saying, “The unexamined life is not worth living.”

However, on closer examination, we find that the first person that reliable written historical accounts give credit to for emphasizing the primacy of using reason to conduct ones life was from our own part of the world. Gautama Budhha had said, “Do not take the authority of the teacher or the text. Always, question yourself.” He meant that one should not accept received wisdom but should always seek empirical evidence.

How do we know what we know? Seemingly, there are four irreducible steps. They are:

1. There is a phenomenon (something) that needs to be explained.
2. That this must have a cause.
3. That this cause can be found by the exercise of reason.
4. Having found the cause, one is then in a position to promote that phenomenon (if that is something we want) or eliminate that phenomenon (if that is something we do not want) by addressing the root cause itself.

Let me repeat that:

1. There is a phenomenon (something) that needs to be explained.
2. That this must have a cause.

3. That this cause can be found by the exercise of **reason**.
4. Having found the cause, one is then in a position to promote that phenomenon (if that is something we want) or eliminate that phenomenon (if that is something we do not want) by addressing the root cause itself.

Note the emphasis on **reason**. The other steps are commonplace and no one will be surprised by its appearance in this four-fold formula of logic. However, reason is emphasized, and not an appeal to the authority of teacher or text.

This four-fold logic is exactly the procedure that all trained doctors use in diagnosing an illness.

1. There is an affliction and the associated symptoms.
2. That this must have a cause.
3. That this cause (virus, bacterial, etc.) can be found by the exercise of **reason**.
4. Having found the cause, one is then in a position to eliminate that affliction by removing the root cause itself.

Again, one would find that the first person to use this four-fold logic was from our part of the world. And not one book that is commonly found and read, seems to recognize that such logic was the foundation for one of the greatest religions ever invented.

This religion (if one can call it a religion) was unique in that it believed that a moral order could be found based only on reason and without recourse to the intervention of an Almighty. Unfortunately (or fortunately, who can tell in such things), the most recent evidence from evolutionary biology seems to indicate that groups that do not believe in reason but prefer to accept blind faith have greater chances of survival in the Darwinian sense. But again, a society that is based one hundred percent on blind faith is likely to destroy itself.

So it would seem that an optimal society will have a large number of the faithful and a smaller but crucial number of critical thinkers who are the insurers of its long term survival.

About 250 years ago, in the tradition of western philosophy, emerged the great empirical philosophers, of whom, David Hume is well remembered for the positions he took on the issue of God, the eternal soul and the unalterable ego.

Empiricists believed that “there is nothing in the mind except what was first in the senses,” that man has no “innate ideas...about the world we are brought into before we have *seen* it.” Experience is the ultimate test.

These ideas were first expounded by our eastern sage, in almost exactly the same fashion, nearly 2500 years ago. Life “[was] an unbroken succession of mental and physical processes which keep people in a continual state of change”. “The infant is not the same as the adult; I am not the same today as I was yesterday. There is nothing of which I can say ‘this is mine’ and nothing of which I can say ‘this is me.’ There is thus no ‘I’ or unalterable ego.” To continue this idea further, there is no eternal soul, and no way to prove or disprove the existence of God. It was for this reason that it was imperative that any moral order should be founded on reason and not by appealing to an authority that went beyond reason.

As we begin this conference, we must keep in mind that the absolute truth may never be known but one can closer and closer to it. Our ancient sage, knew this 2,500 years ago. A learned man once said to him, “The things you teach, sir, are not to be found in the Holy Scriptures.”

“Then put them in the Scriptures,” said the sage.

After reflecting for a while, the learned man took courage and added, “Sir, some of the things you teach actually contradict the Holy Scriptures?”

“Then amend the Scriptures,” said the sage.

The authority of teacher and text can never be final. It is always provisional. So always add to or amend what is found in the fund of human knowledge.

So we had long ago established a tradition of reason and wisdom that somewhere down the course of history, we neglected. Doubt, removed by reason and evidence, and compassion and humanism, is the twin-edged Occam’s razor for a fair and sustainable brotherhood of man.

TAKING “SPACE” TO COMMON MAN THROUGH ISRO WEBSITE

Padmavathy A S and S Satish

Abstract

Dissemination of scientific information to the general public is a very complex task, which has been undertaken very well by the Indian Space Research Organisation. The mandate for Publication & Public Relations Unit of Indian Space Research Organisation (ISRO) is to inform the general public on the achievements of Indian space programme and create awareness as well as to evoke public interest and to garner support for the space activities in the country. This paper attempts to provide details on ISRO website where an attempt has been done to translate the scientific information into common man's language and published in the Website. ISRO Website provides comprehensive information about ISRO, its programmes, its centres and technical facilities, about the satellites, launch vehicles, Projects of ISRO, the people behind, the summary of the budget, satellite applications, publications, job opportunities, tender notices and student's corner. Navigation of this Website is easy and user friendly with search option.

1.1 Introduction:

Indian Space Research Organisation (ISRO) under Department of Space, Government of India is entrusted with the responsibility of developing Space Science and Technology in the Country. Towards this, ISRO has evolved the following space programmes:

- ◆ Indian National Satellite (INSAT) programme for telecommunication, television broadcasting, meteorology, developmental education, societal applications such as tele medicine, tele-education, etc;
- ◆ Indian Remote Sensing (IRS) programme for using space based imagery in the management of natural resources and developmental projects across the country;

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- ◆ Design and development of spacecraft and associated technologies for communications, navigation, remote sensing and space sciences;
- ◆ Design and development of launch vehicles for access to space and orbiting INSAT, IRS spacecraft and space science missions;
- ◆ Research and development in space sciences and technologies as well as catalysing application programmes for national development;

1.2 Information Dissemination:

ISRO follows an open policy on providing information on its programmes as far as possible to general public and students. Information on Indian space programme is disseminated through the following modes:

Annual Report: Annual Report of the Department of Space is published every year in English and Hindi highlighting the activities during the year. The Annual Report is placed in parliament and published on the website.

News Letter: Space India, a quarterly publication in English and Hindi brought out and distributed widely to media, government and private organisations, educational institutions and other agencies as well as published in ISRO website.

Press Release: Press releases are issued on all important events such as launch of satellites, major tests, establishment of facilities etc. More than 300 press releases have been issued so far and archives are available in the website.

Popular Lectures: Lectures on Indian Space Programme and on specific events are delivered by senior personnel of ISRO including Chairman, ISRO at various seminars / symposia / conferences. Also, invited lectures on space programmes at professional bodies, schools, colleges and other institutions are given for the benefit of the students.

Video Clippings : Video clippings of important events are being provided to electronic media and are put on website for wider dissemination. Also, ISRO supports many organisations / media to produce special programs on our space endeavour / activities.

Brochures & Pamphlets: Illustrative Brochures, pamphlets in English, Hindi and other local languages are brought out on important events highlighting the achievements.

Posters: Eye catching posters are brought out for distribution among the general public and student community.

Interviews: Exclusive interviews are arranged with senior executives including Chairman, ISRO on space programme, policies and achievements for print and electronic media of the country as well as from abroad.

Scientific Publications: Publication of articles in journals, newspapers, magazines in English and other local languages are being done regularly.

Website: Maintaining the website showcasing ISRO and its activities, the details of which is the theme of this paper and is given below.

Apart from the above, ISRO participates in many Space Exhibitions, conferences arranged at various places in India and abroad.

Also, brings out Mementoes, Souvenirs, Models of launch vehicles and satellites, Clocks etc., depicting ISRO and release of stamps on important occasions to coincide the events.

1.3 Salient features of ISRO Website :

- ◆ ISRO Website was developed as per guidance prepared by NIC, Dept. of Information Technology issued by Ministry of Personnel, Public Grievances & Pensions, Dept. of AR&PG, Government of India.
- ◆ The website was developed using .Net, IIS Web Server and SQL 2000 as database with cross browser compatibility.
- ◆ The website provides comprehensive information about ISRO, its programme along with the latest news scrolling in the right, forthcoming conferences, related links, specialized programmes like DMS, Tele Medicine, Tele Education, Bhuvan, Respond, industrial interface, Antrix Corporation, Site map, Contact Us, Disclaimer, Terms and Conditions etc., and “Vision 2025” in the center.

- ◆ The website provides up-to-date information and obsolete information or services are removed as and when required. Presently, the website contains nearly 12,000 pages and 5,000 images.
- ◆ The website has been visited by nearly 12.5 Million internet users since its launch during August 2009. The users are from various parts of the world, who are keen to know about ISRO and its programmes.
- ◆ There is a feedback option where visitors are free to post their opinion, comments, views etc., which are accepted and valued high.
- ◆ Website is available both in English benefiting the users world over and in Hindi for the benefit of local population.



1.4 ISRO Website - Usage Analysis

The visitor counter of ISRO Website at present shows more than 12.5 Million hits by Lakhs of users across the world. The log of

the website was taken for the past six months and analyzed for total number of hits, average hits per day, average hits per visitor, total number of views, total number of visitors, total number of unique IP addresses etc. It was observed that, the average hit shoots up during the events of launch or other important occasions.

This type of analysis helps to improve the website based on the user requirement like, the browsers, the operating systems etc.

1.4.1 Year-wise Usage

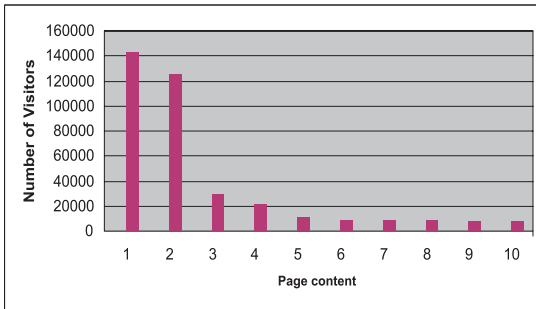
The following table shows the year-wise usage of ISRO Website. There is a steady increase in the average hits per day and presently has increased to 5.7 Lakhs from that of 19,000 during 2002.

Year-wise usage of ISRO Website

Year	Total Hits	Average Hits per Day
2002	6,780,944	19,429
2003	20,143,971	54,888
2004	28,864,088	78,648
2005	41,222,794	115,147
2006	19,141,279	62,349
2007	27,8 60,949	76,122
2008 (1 st Quarter)	9,000,650	74,385
2009	115,649,495	312,405
2010	170,641,117	491,138
2011 (till July2011)	182,270,284	570,946

1.4.2 Most Popular Pages

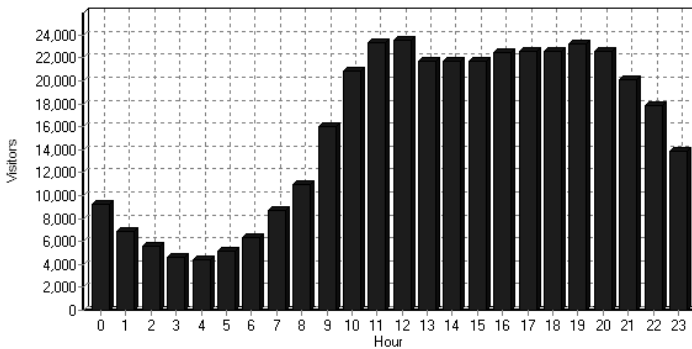
The figure shows the 10 top most popular pages of ISRO Website. It is observed from the figure, the most popular page among ISRO website is the “Job Opportunities”, as many aspiring candidates are enthusiastic to join ISRO. The next popular page is “Press Release”, as the general public is eager to know about the major events of ISRO which is published in the form of news bulletin. The “Search” facility is being used extensively to locate the topic of their interest within ISRO.



- Page 1: Index
- Page 2: Job Opportunities
- Page 3: Press Release
- Page 4: ISRO Centres
- Page 5: Student's Corner

1.4.3 Activity by Hour of Day

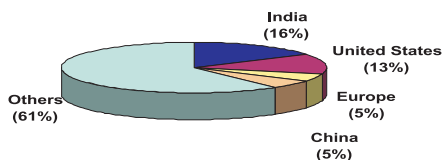
ISRO Website is accessed throughout the day. The above figure shows the hour-wise activity of a typical day. It is clear from the figure the most active hours are 9 A M – 10 P M (IST), peaked around the middle of the day.



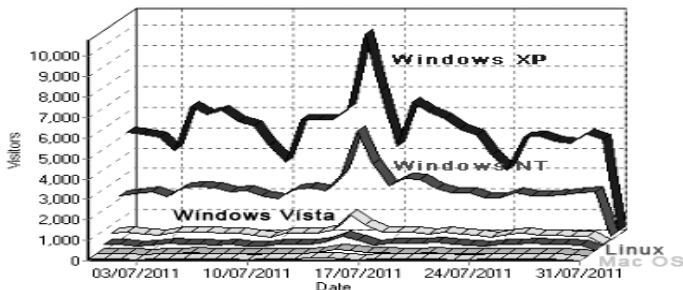
1.4.3 Usage by the Countries and the Operating System

ISRO Website is being accessed by many countries across the world. Only 16% of the total usage is by India followed by 13% from USA. Analysis of a typical month (July 2011) clearly shows the major operating system used is the Windows XP followed by Windows NT.

Most Active Countries Accessing ISRO Website



Most Used Operating Systems



1.5 Future Plans

Presently, the website is being updated from a centralized unit. Content Management Tool (CMT) will be introduced in order to facilitate the individual groups to upload their information directly.

Students Corner will be made more interactive with additional features like “Live Quiz” and how to join ISRO, how to take up project in ISRO etc.

A blog will be introduced with a selected group of Scientists to answer the questions from the general public / students on space related topics..

1.6 Conclusion

The website of ISRO provides a platform for large number of students, researchers and general public to obtain information on the activities of ISRO. Every effort is made to provide detailed, accurate and up-to-date information on the programmes and projects of ISRO. The website receives a lot of feedback / query mails from the visitors, which are answered and many times, the modifications / improvements are done accordingly as ISRO values the user’s opinion very highly.

Acknowledgement

We are thankful to Dr. K. Radhakrishnan, Chairman, ISRO and Shri V. Koteswara Rao, Scientific Secretary, ISRO for their kind support and guidance during various steps of development of ISRO Website and also for useful suggestions during the preparation of this manuscript.

A COMPARATIVE STUDY ON TEACHING SCHOOL CHILDREN ON WATER ISSUES USING CONVENTIONAL AND MULTIMEDIA METHODS

Sunitha Kuppuswamy and Priya Madhan

Abstract

With rapid technological innovation sprouting in every other industry, education sector is no exception. It is equally challenging for teachers as well as students to equip them to adapt to such innovative and technologically enhanced teaching methods. With many schools switching over to multimedia based teaching methods, it is also essential to study and analyze the existing teaching methods and then to investigate the impact of multimedia based teaching amongst school children.

Water issues being one of the major concerns of today, it is important that school children are best taught about various issues concerning this natural resource essential for life existence. This article aims to study the teaching practices of water issues among school children by using conventional and multimedia methods. The main objectives would be to study the existing teaching methods of water issues among school children in Chennai and to investigate the impact of multimedia based teaching of water issues among school children in Chennai. This is a Qualitative and Quantitative type of research and the method is Experimental research. Expert interviews are also done and analysis and interpretation is done with the results from the data collected in the Experimental and Control group Study. Suitable suggestions are drawn.

Introduction

It not only matters how well a teacher instructs to his/her fellow students but it is equally important to analyze how effective and productive the content of the teaching material is. Technology

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enhanced teaching practices are here to contribute and supplement to the conventional teaching methods. But it is also the need of the hour to analyze the effectiveness and reach of the new age teaching methodologies among the recipients of the course – students. Lindstrom (1994) says that multimedia “provides a means to supplement a presenter’s efforts to garner attention, increase retention, improve comprehension, and to bring an audience into agreement”, which consequently results in people remembering 20% of what they see, 40% of what they see and hear, but about 75% of what they see and hear and do simultaneously.

According to Neo Mai and Ken Neo TK (2006) with multimedia, the teacher is now the director of the knowledge and can use the various combinations of media elements to create interactive educational content. The result is a stimulating environment for learning and retaining the information delivered. The marriage of content and multimedia technology results in interactive multimedia materials which can be delivered to the students in teacher-centered, or student-centered, or mixed teaching and learning modes.

Agnew, Kellerman and Meyer (1996) say that on the part of the creator, designing a multimedia application that is interactive and multi-sensory can be both a challenge and a thrill. Multimedia application design offers new insights into the learning process of the designer and forces him or her to represent information and knowledge in a new and innovative way.

Objectives of the study

- ◆ To investigate the impact of multimedia based teaching of water issues among school children – IX standard students of Government Girls’ High School, in particular.
- ◆ To compare the conventional book based teaching methods with technology assisted teaching through multimedia packages.

Teaching of Science and Multimedia

Candace Braun in the website www.sciencewithme.com says that “For many children, learning science from a textbook can be boring and confusing. But if children were entertained by science, perhaps they wouldn’t develop negative feelings towards the subject, which can linger on into adulthood.” That’s why Elva O’Sullivan and

Scott Rickard have created a science video series, Science with Me, for children aged four to seven years. The series features Mr. Heisen-Bear™ and Schrödinger-Bear™, two animated bears that work together to solve Heisen-Bear's everyday problems using the scientific method and other science concepts. The video encourages young children to get excited about science, and encourages parental involvement. Science with Me began as an afterschool program in Princeton, which became a video series to reach a larger audience.

www.glogster.com is an interesting website that provides students with applications to create their own creative posters. The application lets the user to link images, video, audio and graphics. Such websites can be introduced by the teachers to their students in order to enhance the imagination and creativity skills of students. Many posters related to various science based topics such as rainwater harvesting, global warming, pollution, etc. can be created by students and they can be posted in the school campus. This not only develops the artistic skills of the students but also spreads awareness of an issue. <http://www.eea.europa.eu/themes/water/multimedia> provides many multimedia contents such as Animations, Images, Interactive Maps, Interviews, Mind Stretchers, Presentations, Videos etc related to water issues. The Water Cycle Song by David Bydlowski, Charles Kline and Fred Ribits deals with the water cycle – evaporation, condensation, and precipitation and is available at their website ScienceExplosion.com. www.teachertube.com invites users to buy, sell and trade education items for free. Educomp Smart class website quotes testimonials from a few of its customers - education practitioners. "It has always been my dream to see technology becoming an integral part of a teacher's life inside the classrooms and the smart class program implemented by Educomp in our schools has indeed been like a dream come true." - says Mrs.Y.G. Parthasarthy, Dean and Director, Padma Seshadri Group of Schools, Chennai.

Research method

For the purpose of study, experimental research method is adopted for performing the research and questions were asked based on the lesson taught. This study was done to find the impact of the educational multimedia package on the understanding capability of science concepts among Government school children. In this study, the participants were 50 English medium students who belonged to

ninth standard of a Government school. These 50 students were divided into two groups of 25 students each. One group was exposed to the teaching supplemented by the multimedia package which is the experimental group. Another group was exposed to the traditional classroom teaching without any multimedia package which is the control group.

The type of sampling used in this study is non-probability sampling. Non-probability sampling is the sampling procedure which does not afford any basis for estimating the probability that each item in the population has of being included in the sample. Non-probability sampling is also known by different names such as deliberate sampling, purposive sampling and judgment sampling. In this type of sampling, items for the sample are selected deliberately by the researcher. Thus, there is always the danger of bias entering into this type of sampling technique. But if the investigators are impartial and work without bias, the results obtained from an analysis of deliberately selected sample may be tolerably reliable.

Analysis and interpretation

The experimental study was done with 50 students of English medium students who belonged to ninth standard of a Government school to find the impact of the multimedia packages on their understanding capability of water based subject.

The inferences and graphical presentation of data collected from the questionnaire are:

(a) Data presentation of post test done with the experimental and control group

The research design was experimental study. Totally 50 students were selected from the ninth standard out of which 25 were tested with the multimedia package. Another 25 students were taught in the traditional classroom teaching method. The mean score of the experimental group in the post test was 92.4 whereas the control group scored only 74.4. This clearly states that the students taught with the help of multimedia packages were able to understand much better than the control group.

Graphical representation:

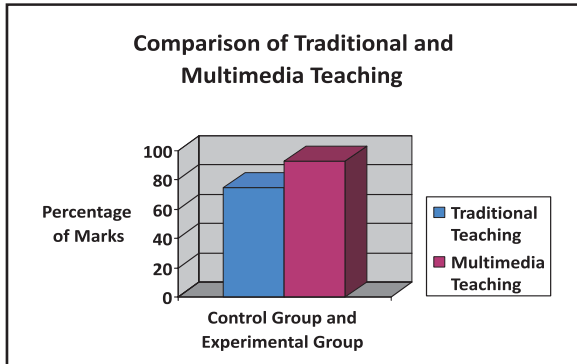


Fig. 1 Comparison of Traditional and Multimedia Teaching

(b) Data presentation of survey done with the experimental group students

1. When the students were asked whether they liked the usage of computer to teach lessons, it is found that they liked the experience of being taught using computers.

Graphical representation:

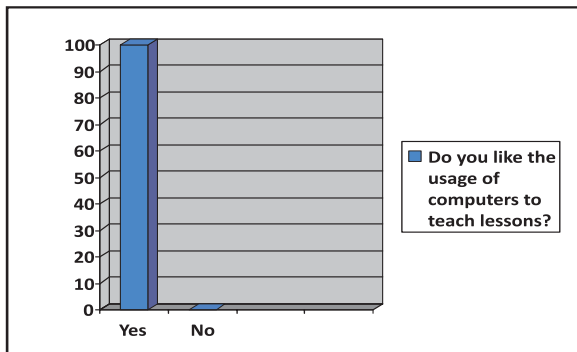


Fig.2. Whether students liked the usage of computer to teach lessons?

1. When the students were asked whether they were taught lessons using the computers previously, the results indicate that they had never been taught using computers before.

Graphical representation:

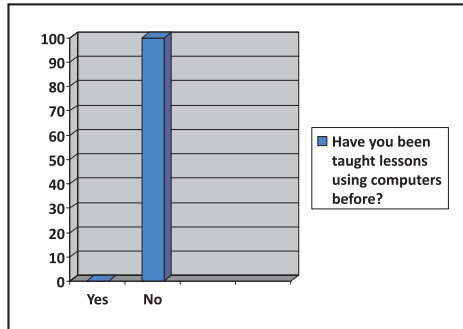


Fig. 3 Usage of computers in teaching subjects

1. When the students were asked what they liked the most in the presentation today, the result was such that 72% of the respondents liked the animation element of the presentation with 16% of them liking the images and with 12% for the audio while the textual content of the presentation has not really been very attractive when compared to the other elements.

Graphical representation:

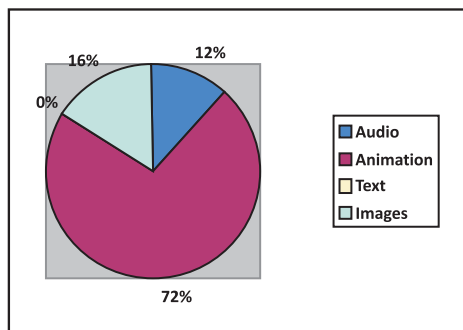


Fig. 4 Multimedia elements that attracted the most

1. When the students were asked whether they read the words that were present in the presentation, 100 % of the respondents have also noticed the textual content in the presentation apart from the other attractive multimedia elements in the presentation.

Graphical representation:

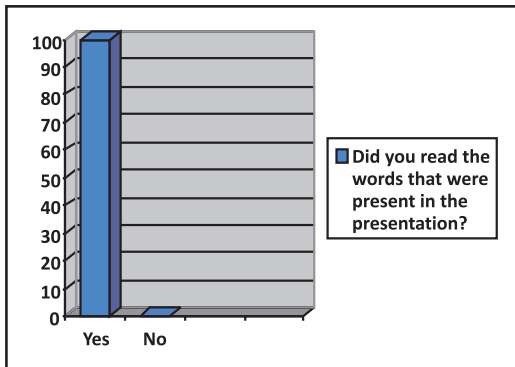


Fig. 5 Awareness of the usage of text in the Multimedia Package

1. When the students were asked whether they were able to understand the lesson taught, all the respondents said that they have understood the presentation that was shown to them.

Graphical representation:

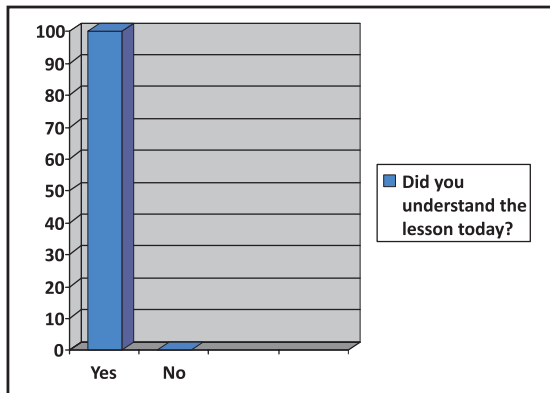


Fig. 6 Understandability of the subject

1. When the students were asked whether there was any difficulty in understanding the lesson, the result shows that the majority of the students did not have any difficulty in understanding the presentation as 96% of the respondents have chosen the option No while 4% have said that they had difficulty in understanding the presentation.

Graphical representation:

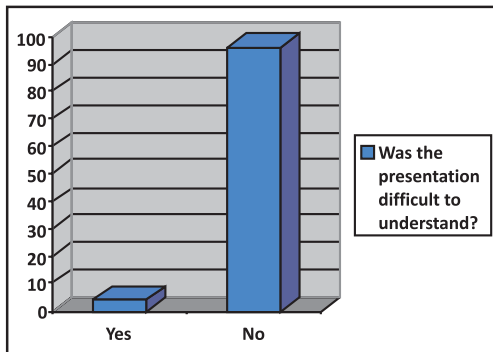


Fig. 8 Ability to imagine things and learn

1. When the students were asked whether they were able to understand the subject taught using multimedia package in a short time, all the respondents said that they were indeed able to understand the taught subject though this was shorter in time when compared to their usual classes.

Graphical representation:

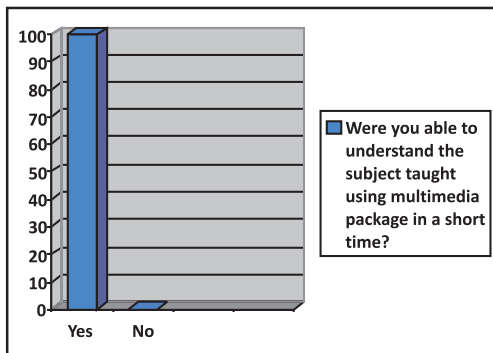


Fig. 9 Understandability of the subject in a short time

1. When the students were asked whether it was exciting and interesting to learn from this presentation, all the respondents have replied that the presentation was interesting.

Graphical representation:

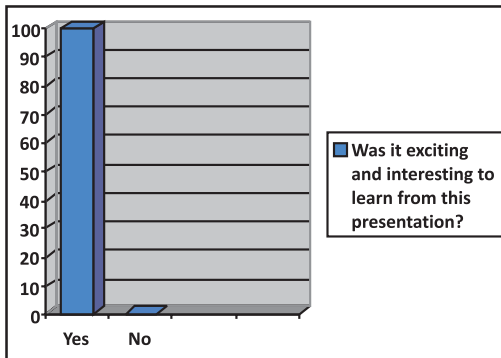


Fig. 10 Usage of computer is a motivational factor to learn

1. When the students were asked whether they like to be taught like this with colorful pictures, animation etc, all the respondents have mentioned that they liked the usage of such colorful presentations as part of the lesson and that they find it interesting too.

Graphical representation:

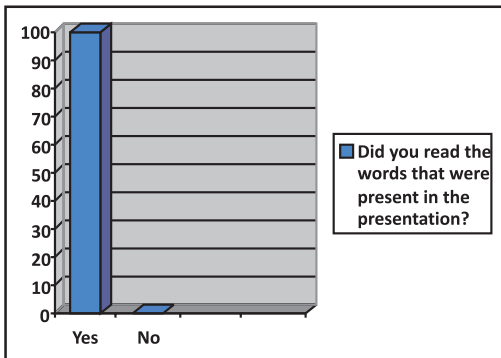


Fig. 11 Do students like multimedia style of teaching?

Statistical analysis

- ◆ The post test score of the experimental group is 92.4% whereas the post test score of the control group is 74.4%
- ◆ All the students of the experimental group liked the usage of multimedia packages to teach the lessons in the classroom.

- ◆ The respondents have never been taught using computers earlier.
- ◆ 72% of the respondents liked the animation element of the presentation with 16% of them liking the images and with 12% for the audio while the textual content of the presentation has not really been very attractive when compared to the other elements.
- ◆ 100 % of the respondents have also noticed the textual content in the presentation apart from the other attractive multimedia elements in the presentation.
- ◆ All the respondents said that they have understood the presentation that was shown to them.
- ◆ The result shows that the majority of the students did not have any difficulty in understanding the presentation as 96% of the respondents have chosen the option No while 4% have said that they had difficulty in understanding the presentation.
- ◆ 100% of the respondents have said that they saw pictures in the presentation and were able to imagine and relate to them easily and also that in spite of this session being shorter in time when compared to their usual classes they were able to understand the subject taught. All the respondents have replied that the presentation was interesting and was highly motivating too and that they liked the usage of such colorful presentations as part of the lesson and that they find it attractive.

The post test score of the experimental group is higher than the post test score of the control group. The results clearly indicate that the students liked the use of multimedia packages in classrooms. Various multimedia elements like audio, text, images and animation enable the students to understand the lesson better when compared to the traditional methods of classroom teaching which only involves oral communication or usage of boards and very rarely pictures/models/maps at the maximum. The students were also observed to be highly motivated as the usage of computers to teach seemed to be an entirely new concept to the respondents.

Findings and conclusion

It is found that the Government school children liked the multimedia based teaching as most of them have very limited or no

access to computers in their daily life. It is also the first time that these children are being taught using this medium. The researcher observed enthusiasm amongst the students on being exposed to video/audio/graphics etc. Of all the multimedia contents used in the study, it was identified that animated videos had a stronger impact than audio or images or textual content. In spite of the multimedia based teaching methods being new to the respondents, they did not find it complex to understand. Rather it has helped them to better visualize the concept of water cycle, rain water harvesting etc. It was also found that the students were able to understand the subject in a short time. The respondents also have noticed the usage of text in the multimedia package. The post test score of Experimental group is higher than the post test score of the control group which clearly indicates that the students were able to better understand and remember the content that was taught to them. The findings have also proved the two hypotheses to be true. There are significant differences between test scores of Control and Experimental groups and the performance of the experimental group is significantly greater than the performance of the control group.

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FM RADIO RESURGENCE IN INDIA- AN AUDIENCE RECEPTION ANALYSIS

K. Padmakumar

Abstract

The private FM radio channels in India have given radio a new lease of life and expanded the listener base. An auction of three dozen FM licenses in India in the year 2000 started what is now being called India's "radio boom." *Times FM*, *Mid-day*, were some of the early players followed by other FM Radios such as *Radio City* 91.1 (MBPL), *Radio Mirchi* 98.3 (ENIL), *Suryan FM* 93.5 (Sun TV group) Big FM92.7, Hello FM, Red FM, Radio Indigo, Fever FM, Radio One, Radio Mango, Club FM and the list is endless. Once these stations went on air, the listeners found some new friends in the FM Radios. Celebrity hosts, jazzy jingles and big prizes as gratification for the listeners is changing the face of FM radio in India. As the number of listeners kept increasing, new FM radios began to surface region wise. Growth in the number of FM stations has more than doubled their listeners share in the past five years. Radio's national footprint is also expected to rise with the geographical expansion of FM from 12 to 91 cities in the next phase. Most of these stations will be active by mid 2011, when phase III will be around the corner. However, corresponding to the increasing number of FM radios, enough study of reception analysis of each FM radio has not been done region wise. This grey area leaves open a lot to debate on the existing radio shows and formats of the radio shows in India besides the contents of each FM radio currently being aired. Though there are some programmes which attained peak listenership at some hours of the transmission of each FM, a study to substantiate the extent of democratization achieved through the FM radios contrary to their commercial posture and features is still wanting at academic level. The present study is undertaken to establish whether there is a positive relationship between increasing number and popularity of Indian *FM Radio* and its listeners and its current trends. The study also seeks to establish the prioritization of the programmes from the listeners'

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perspective. On the other side of the commercial face of *FM Radio stations*, my study found an increasing face of democratization of the FM with slots such as *live traffic updates, farm tips, health tips, weather reports, program's relieving the audience of their personal life stress through emotional content in the form of songs/movie bits, employment notices etc* having high impact on the audience as audience friendly programmes. The Government driven top-down model of communication has become irrelevant, thanks to the FM boom. The days, when the listeners had to wait for their favourite shows that often came once a week have become a thing of the past. Now listeners turn on the audio station they connect to best. The study in effect not only tests the Media Uses and Gratification theory but also relates how the increasing democratic face of commercial FM radio is redefining the posture and content of current commercial FM radio stations in India.

Introduction

Radio is the oldest of the broadcast media and the simplest. The ear is the main source of information and as a carrier of the spoken word or music and sound, radio is direct and uncomplicated. No other medium now has the potential to reach so many people so efficiently for information, education, cultural and entertainment purposes. Radio can be used easily and economically to reach outlying regions. Radio is perhaps today the least transnationalised communication medium both in terms of ownership and programme flows. Music needs no interpreter and radio has achieved a great deal in preserving, encouraging and popularizing the music of various countries, especially folk music. More than 80 years after the world's first station was founded, radio is still the most pervasive, accessible, affordable and flexible and non-intrusive mass medium available. Low production and distribution costs have made it possible for radio to focus on local issues, to interpret the world from local perspectives and to speak in local languages.

FM Broadcasting in India:

FM was introduced in 1977 but was activated in 1992. The launch of FM stations in the metros (other than in Mumbai where private FM is already on air) has been fraught with implementation issues. First, Media Cast (the Indian subsidiary of TDF, a French transmission infrastructure provider), which was appointed as the

technical integrator, walked out of the negotiations. The process was further delayed when the Government refused to relax stipulations regarding payment of the license fee. Since all this took a lot of time, the launch of services in the various metros got delayed. The other hassle was the Government stipulation regarding a single tower for all FM players. For the record, the government had allowed FM players in Mumbai to set up their own interim transmission infrastructure (radio towers et al) to start operations. Delhi, Mumbai, Kolkata and Chennai have a 24 hours FM service.

Times FM, Mid-day were some of the earliest players on the Indian FM scene and once they went on air the listeners could not believe their ears. They could hear vibrant and chirpy voices of RJ s, their favourite celebrities being interviewed on shows, get the latest traffic updates, talk shows, music countdowns and of course the immensely popular dial-in shows. It was nothing short of a mini revolution. Listeners could request their favourite songs and listen to them too. The demand was such that from thrice a week, the request shows were made a daily feature.

Need for the study:

FM radio has become an inevitable medium for entertainment followed by communication and information. But seemingly all the listeners do not tune in to radio in the same manner. A typical listener engages in different types of activities. Since FM radio is in India for less than a decade, the introduction of FM radio in Coimbatore has been a very recent phenomenon. Hence, no studies have been conducted on the same. With commercial FM radio stations having overtaken all other radio stations; this study is aimed at gaining a fair understanding of its listenership. This research will be valuable input not only for the FM radio stations but other researchers as well.

A study on the use of this medium with respect to the demographic types is mandatory. The amount of time spent listening varies according to their needs. Thus, a study on the gratification sought by the FM radio listener will give an able answer to this question. This study focusing on various demographics' perception towards commercial FM radio will help us gain insight into the reasons behind its success in Coimbatore. This study attempts to decipher the frequency, nature of use, duration of commercial FM radio stations and also analyses the listeners' level of habits.

Statement of research problem:

This study seeking an insight into the FM radio listenership in Coimbatore presents the problem as “A study of FM radio listenership in Coimbatore with special reference to commercial FM radio stations”. In the present context, it becomes necessary for a researcher to explore how people perceive and use the new age radio as a medium of entertainment in order to understand its implications which is evident from the mushroom growth of private FM stations in major cities and towns.

Objectives of the study:

The prime objective of the study is to understand the FM radio listenership in Coimbatore. The specific objectives are as follows:

- ◆ To understand the purposes for which listeners tune in to commercial FM radio stations.
- ◆ To find out the place of access of commercial FM radio stations by the listeners.
- ◆ To find out the variation in listening habits with respect to the listeners’ exposure to the medium.
- ◆ To understand the general attitude of listeners towards commercial FM radio stations.

Limitations of the study:

- ◆ Since the diffusion of commercial FM radio stations in Coimbatore is boundless and rapid, the results of the present study would only offer an understanding of the trend that existed at the time of data collection.
- ◆ Findings of the study may not be generalized to the entire population of FM radio listeners.

Review of literature

Review for the present study of “FM radio listenership with special reference to Coimbatore” was collected online since only a few studies have been carried out on the FM radio listenership patterns.

Radio Audience Surveys:

AC Nielsen ORG-Marg launched a first-of-its-kind study to measure radio listenership in India, called Radio Audience Measurement. The study aimed to track the performance levels of various FM radio stations due to the mushrooming of FM channels in India. Structured questionnaires were distributed to a sample of 1000 people.

Some of the nuggets revealed by the agency are as follows:

- ◆ Vividh Bharati was still the most listened to or preferred radio station, followed by AIR FM and Radio Mirchi.
- ◆ Listenership by time slots revealed that between 7 am and 11.30 am, the FM listening is at its zenith, followed by 7 pm and 11 pm, when it picks up again, after having dipped between 11.30 am and 6 pm.

Zenith Media undertook a dip-stick study to find out the penetration, listenership and acceptance of FM radio in the city. The sample composition was 20% students, 45% professionals and 35% housewives spread equally across Bangalore.

Findings of the study are as follows:

- ◆ Listenership was high in the mornings and early evenings (the pre-prime time on TV) as well as late nights.
- ◆ Apart from content and audio clarity, what appealed to the listeners were the Radio Jockeys. A good radio jockey can definitely improve listenership of a programme.
- ◆ The most preferred content across all audience segments was of film Songs.
- ◆ Radio City seemed to be a hit among the interviewed radio listeners with 82% awareness levels and 70% listenership within the first few days of its launch. And this figure was considerably higher among students and professionals with 92% of radio listeners in these two audience segments tuning in.
- ◆ The listenership was nearly equally high among males and females, with 95% and 88% tuning in respectively.
- ◆ On specific programmes, the Morning shows gained popularity among the audience.

According to a Radio Audience Measurement (RAM) study undertaken by AVRC, Anna University, Chennai Sun Network's commercial FM radio stations is the "leader" among the private FM operators in Chennai. The channels surveyed included FM Rainbow, FM Gold, commercial FM radio stations and Radio Mirchi. During the first week of May 12 to 18, 2002, the research concentrated on a field survey covering 10 blocks. In the second week, the scale was enlarged and it carried out a telephonic survey on the listenership of FM channels in Chennai

Findings of the study are as follows:

Average weekly awareness of commercial FM radio stations is 54% followed by Rainbow FM (35%), Radio Mirchi (30%) and FM Gold (14%).

Average listenership of Commercial FM radio stations is 35%, Radio Mirchi (21 %), Rainbow (20%) and Gold (7%)

The day-wise awareness of commercial FM radio stations ranged between a low of 34% and a high of 70%; for Mirchi it fluctuated between 19% and 42%; for Rainbow it recorded. 28 to 48% and Gold hovered at 7 to 23%.

Research methodology

The study was an attempt to understand the FM radio listenership in Coimbatore with special reference to commercial FM radio stations in Coimbatore. The specific aspects taken up for the study include amount of time spent, frequency, purposes and perceptions of commercial FM radio stations among different demographic categories of users. A descriptive analytical design has been adopted for the study.

Published information on the private FM radio listenership forms the secondary data of this research. The primary data was collected through a survey conducted in Coimbatore during April-July 2010.

Sample selection:

The sample for the study consisted of commercial FM radio stations listeners in the age group of 15 to 45 years and above who had listened to commercial FM radio stations at least once. Demographic variables such as age, gender, marital status, education,

occupation and income were used as factors to find out their relationships with the dependent variables.

The targeted sample was selected by purposive sampling method. The places of data collection were selected in and around Coimbatore, considering researcher's easy access and convenience. Different sources were employed to collect the data. However, in order to increase randomness in the sample, about 300 respondents with adequate representation for each independent variable were initially selected from Coimbatore in order to get an expected sample size of more than 200. Thus, the effective final sample size used for the study was 235.

Data collection

A structured questionnaire with closed-ended questions was the main data collection tool in the present study to obtain the data pertaining to the following aspects:

- ◆ General demographics
- ◆ Time spent listening to “commercial FM radio stations”
- ◆ Purpose of listening to “commercial FM radio stations”
- ◆ Attitude towards “commercial FM radio stations”

The questionnaires were distributed among the respondents by the researcher in person. Filled-in questionnaires were collected later and were checked for completeness. The final number of questionnaires thus completed and returned was 235 registering a return rate of 78.3%. Thus, the effective sample used for the study was 235.

Data analysis

The data collected were coded and processed with Statistical Package for Social Sciences (SPSS) 8.0 version using percentage analysis, students t' test, chi-square test and Analysis of Variance (ANOVA). The data were analyzed in relation to the objectives and the null hypotheses formulated for the study were tested for significance.

Hypotheses of the study:

The following null hypotheses were generated for the present study:

Ho1. There is no significant association between age and time spent listening to “commercial FM radio stations”.

Ho2. There is no significant association between gender and time spent listening to “commercial FM radio stations”.

Ho3. There is no significant association between occupation and time spent listening to “commercial FM radio stations”.

Ho4. FM Radio ownership does not have any significant influence on listeners’ attitude towards “commercial FM radio stations”.

Data analysis and interpretation

TABLE 4.1

Respondents’ Place of Access to ‘Commercial FM Radio Stations’ N=235

It may be inferred that a majority of the respondents have access to commercial FM radio stations at home followed by traveling.

Place of access	Frequency	Percentage
Home	141	60.0
Travel	45	19.1
Workplace	25	10.6
Personal vehicle	21	8.9
Office	3	1.3
Total	235	100.0

TABLE 4.2

Table showing the frequency of preferred time slots by ‘commercial FM radio stations’ listeners N=235

Preferred Time Slot	Frequency									
	Often		Sometimes		Rarely		Never		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
6 am - 10 am	125	53.2	50	21.3	23	9.8	37	15.7	235	100.0
10 am - 2 pm	53	22.6	62	26.4	56	23.8	64	27.2	235	100.0
2 pm - 6 pm	76	32.3	66	28.1	38	16.2	55	23.4	235	100.0
6 pm - 10 pm	122	51.9	53	22.6	30	12.8	30	12.8	235	100.0
10pm-2am	20	8.5	38	16.2	44	18.7	133	56.6	235	100.0
2 am - 6 am	8	3.4	14	6.0	17	7.2	196	83.4	235	100.0

Table 4.2 shows the preferred time slots by the commercial FM radio stations listeners in Coimbatore.

It may be inferred that majority of the respondents preferred the time slots 6 am -10 am and 6 pm -10 pm, followed by 2 pm to 6 pm.

TABLE 4.3

Showing the purpose of 'commercial fm radio stations' listenership among respondents

N=235

Purpose	Often		Sometimes		Rarely		Never		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
To relax during working hours.	91	38.7	91	38.7	26	11.1	27	11.5	235	100.0
1 To overcome boredom and relieve tension	89	37.9	98	41.7	40	17.0	8	3.4	235	100.0
To get to know about the latest movies and songs.	98	41.7	77	32.8	43	18.3	17	7.2	235	100.0
To listen to my favorite RJs voice.	88	37.4	73	31.1	45	19.1	29	12.3	235	100.0
To lift up mood when lonely.	90	38.3	91	38.7	39	16.6	15	6.4	235	100.0
To make my work easier.	71	30.2	94	40.0	39	16.6	31	13.2	235	100.0
To reduce my expenditure on CDs and cassettes.	76	32.3	48	20.4	45	19.1	66	28.1	235	100.0
To listen to my favorite songs wherever I go.	77	32.8	88	37.4	45	19.1	25	10.6	235	100.0

Table 4.3 shows the purposes of listening to commercial FM radio stations by the respondents.

It may be observed that the main purposes for which people frequently tune in to Commercial FM radio stations are to overcome boredom and relieve stress (79.6%), to relax during working hours (77.4%), to lift up mood (77%), for latest movies and songs (74.5%) and to make work easier (70.2%).

TABLE 4.4

*Time Spent Listening To 'Commercial Fm Radio Stations' Among
Different Occupational Groups N=235*

OCCUPATION												
	Student		Professional		Employed		Business		Housewife		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Up to an hr	10	19.2	11	40.7	16	22.5	6	13.0	4	10.2	47	20.0
1-2 hrs	11	21.1	8	29.6	24	33.8	11	23.9	9	23.0	63	26.8
2.4 hrs	20	38.4	5	18.5	16	22.5	8	17.3	10	25.6	59	25.1
>4 hrs	11	21.1	3	11.1	15	21.1	21	45.6	16	41.0	66	28.0
Total	52	22.1	27	11.4	71	30.2	46	19 ⁵	39	16.5	235	100.0

Table 4.4 shows the time spent listening to commercial FM radio stations among different occupational groups.

It may be inferred that majority of the students spend 2-4 hrs listening to commercial FM radio stations, professionals for up to an hour, Employed for 1-2 hrs, business persons and housewives for more than 4 hrs.

An analysis of the general attitude of listeners toward commercial FM Radio Stations shows an overwhelming response by the respondents on their attitude towards commercial FM radio stations. Majority (51.9%) of the respondents strongly agreed to the statement commercial FM radio stations should also play pop songs and other language songs as 47.2% strongly felt commercial FM radio stations to be the best source of entertainment today. 45.1 % strongly agreed that more informative programmes should be included on commercial FM radio stations as 43.8% strongly stated that programme concepts on commercial FM radio stations' should be changed every month. Commercial FM radio stations is a boon for night shift workers as strongly stated by 43.8% of the respondents.

There are differing opinions by the respondents in terms of their other media use. 54.9% agreed that commercial FM radio stations provides more entertainment than television while 19.2% disagreed to it. There is a decline in TV viewing after the arrival of commercial FM radio stations agreed 50.6% of the respondents while 25.6% disagreed.

49.8% agreed that commercial FM radio stations gives one company during travel, makes work easier (43%), raise one's spirits (45.5%). Another 45.5% agreed that commercial FM radio stations complements young peoples' lifestyles. 46.4% agreed that radio as a powerful medium is highly commercialized because of private FM stations but 43% agreed that radio has regained its popularity only after the arrival of commercial FM radio stations.

With respect to the RJs on commercial FM radio stations, 44.3% agreed that RJs are very informal and friendly and that the speed of jockeying makes commercial FM radio stations more popular. No wonder! 35.3% stated that RJs are the real mood setters of the day. 16.4% felt that it is only the RJs who make programmes more interesting. On contrary, 26.8% felt that RJs talk more and play a few songs. RJs ask too many personal questions, felt 24.7% of the respondents.

With regard to the music played on commercial FM radio stations 34.5% felt that there is repetition of songs on commercial FM radio stations. A majority 46.4% felt that much importance is given to new songs on commercial FM radio stations. 40% felt that balance and right mix of both old and new songs on commercial FM radio stations will enhance commercial FM radio stations listenership. Commercial FM radio stations will replace cassette industry in future showed differing opinions by the respondents.

With regard to advertising on commercial FM radio stations, 39.6% agreed that *it is the best medium of advertising today* but 31.5% felt that *too many advertisements on commercial FM radio stations is irritating*.

With respect to the services provided by commercial FM radio stations, 47.2% agreed that *quality of sound makes commercial FM radio stations more popular* while 43.4% agreed that *quality of programmes on commercial FM radio stations should be improved*. A majority 50.6% agreed that *commercial FM radio stations makes possible communication between people at different levels*.

Findings and discussion

The demographic profile seems to play a vital role where males dominate the *new age* radio - FM radio generation than females. A majority of the listeners fall in the age group of 25 to 35 years.

In this present study, commercial FM radio stations seemed to be a hit among the FM radio listeners with the highest listenership recorded within the first few months of its launch and was considerably higher among those into business and housewives with a majority of the respondents in these two audience segments tuning in.

Listenership was found to be high in the mornings and early evenings. This is because people are less occupied with work. Moreover, they tune in to FM to overcome boredom and relieve tension and also to relax with good film music. Considerably preferred content across all audience segments was film songs. Thus, commercial FM radio is yet another medium for those people seeking information and entertainment and has already become a part of every household.

A majority of the respondents were found to have access to commercial FM radio stations at home followed by elsewhere wherein they could turn on FM set as per their convenience and comfort. On the other hand, people were also found to have access to commercial FM radio stations from multifarious places, thus, they tend to listen to it quite often at the wish and will of the owner. In recent years, a wider audience has become available through the rapid growth in the number of car radios and the development of cheap pocket transistors. The quality and portability more than any other single factor has helped radio to survive as a mass medium in the face of competition from other mass media and new media.

The present study of FM radio listenership in Coimbatore with special reference to commercial FM radio stations revealed that a majority of the respondents have been exposed to commercial FM radio stations for more than six months irrespective of their age, gender, marital status, occupation and income (monthly family).

With respect to the time spent listening to commercial FM radio stations, the study found that majority of the respondents have been listening to commercial FM radio stations for more than 4 hrs irrespective of their age, gender and income. On the other hand, it was found that married respondents tend to listen to commercial FM radio stations for more number of hours than the unmarried. Among the different occupational levels, the study found that those into business were found to listen to commercial FM radio stations for more number of hours. This is because they go on long business

trips and tend to relax listening to commercial FM radio stations. The movement is restricted for those employed to a limited space like hotels, banks, petty shop owners, merchants, etc. that results in listenership with more concentration and involvement than the working class community.

Respondents with a monthly family income between Rs.5001 to Rs.1 0,000 were found listening to commercial FM radio stations often than other income groups. More than any other mass communication medium, radio speaks in the language and with the accent of its community. Its programming reflects local interests and can make important contributions to both the heritage and development of the cultures, economics and communities that surround it. Since, the ear is the main source of entertainment and a carrier of the spoken word or music and sound, it has touched all walks of life. Radio once perceived as a medium only for the rural masses has set a firm footing on the grounds of Coimbatore and has become a medium for all masses.

A majority of respondents perceived commercial FM radio stations as the best medium of entertainment today. They are of the opinion that commercial FM radio stations should also play pop songs and other language songs and more informative programmes should be included. Programme concept should also be changed every month was suggested by a considerable number of respondents.

Respondents felt that radio has regained its popularity only after the arrival of commercial FM radio stations. This has resulted in the decline of television viewing as commercial FM radio stations provide more entertainment than television.

With regard to the Radio Jockeys on commercial FM radio stations, most of the respondents felt that RJs are the real mood setters of the day and being more informal and friendly make programmes more interesting. Some felt that RJs on commercial FM radio stations ask so many personal questions.

Most of the respondents believe that balance and right mix of both old and new songs on commercial FM radio stations will enhance FM listenership as they agreed that commercial FM radio stations gives importance only to new songs.

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COMMUNICATION REVOLUTION: A CATALYST TO THE MARINE FISHERIES SECTOR

Mary Antony

Introduction

The marine fisheries sector plays a critical role in the socio economic development of Indian economy. This sunrise sector has been accepted not only as a powerful income and employment generator but also as a stimulant behind the growth of number of subsidiary industries, as a source of cheap and nutritious food as well as a chief livelihood option for majority of coastal population. As far as Kerala is concerned, marine fishing industry with its spectacular potential of marine bio diversity is the pride of Kerala economy.

Modern technological equipments have made significant contribution in changing the status of marine fisheries sector in our economy into a vibrant one. In technology terms, marine fishing industry in the past, in every part of the world was entirely different from the present scenario. Apart from using trawling techniques and other technical equipments, information and communication in fisheries sector was limited to radio. Latest technological externalities like Information and Communication Technologies in the marine fisheries have brought about a great transformation of fisher folk population both in their personal life styles as well as in their livelihood activities. In fact, expansion and development of marine fisheries sector through Information and Communication Technologies like GPS navigation, satellite communication and wireless connectivity etc. are quite significant.

Statement of the problem

The new Information and Communication Technologies are being used across the fisheries sector, from resource assessment, capture or culture to processing and commercialization. Some are specialist applications like sonar for finding the vicinity of fish, GPS for navigation and finding location, mobile phones for trading, exchanging information and emergencies and radio programming with

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fishing communities etc. The study looks at how their new mobility could be used to bridge the growing economic and social digital divide between the fisher folk and the mainstream sectors of the Kerala society through modern methods of communication and technology.

Hypotheses

- 1) Modern communication parameters especially mobile phones are widely used by the coastal community in the fishing villages of Kollam.
- 2) Electronic communication equipments help the fisher folk to transfer and exchange information onshore and thereby arranging their business terms.
- 3) Remote sensing equipments like Global Positioning System (GPS) enable the marine fisher folk to locate fishing grounds.
- 4) New technological inputs viz., Information and Communication Technologies in the marine fisheries sector increase productivity and thereby increase the profit margin.
- 5) The coastal communities in Kollam still lag behind in using E-log books or On-Board Data Integrator in fishing activities.
- 6) The impact of ICT gadgets increases the marketing potentiality of fish products by the fishermen community.
- 7) Literacy among the coastal community play a significant role in adopting ICT instruments in their livelihood activities.
- 8) The coastal fisher folk using ICT have better leverage in socio-economic matters.

Objectives

1. To carve out a new development paradigm for sustainable growth with ICT devices on the basis of existing socio-economic structure of the marine coastal community.
2. To analyze the role of education and the use of communication devices in the promotion of livelihood aspects of fish laborers.
3. To assess the future implication of ICT devices in coastal area with special reference to the age composition of population concerned.
4. To explore future prospects of modern communication tools in the marine fishermen households for income generating activities.

5. To examine the existing socio-economic frame work of the marine fishing economy of Kollam in the presence of the ongoing Communication and Information technologies in the sector.
6. To know the changes in the fishing technology from the traditional fishing crafts and gears to modern equipments and the present communication technologies.
7. To understand how modern communication and information technologies came to Kerala coast.

Methodology

The study is both descriptive and analytical in nature. It is descriptive with respect to the socio-economic features of marine fishers and the impact of Information and Communication Technologies on marine fisheries. The analytical part of the study is that it interprets and analyses the primary data to reach conclusions. The basic approach followed in this investigation highlights the transformation of coastal economy in the wake of Information and Communication Technologies in Kerala.

Sample selection, data collection and analysis

The primary data tends to focus exclusively on the fishermen community of the coastal belt of the fishing villages of the district of Kollam. In order to collect primary data, complete information regarding marine fishermen population has been obtained from District Fisheries Department, Kollam. The coastal belt of Kollam comprises 27 fishing villages from which four sample villages are chosen, viz. Eravipuram south, Eravipuram north, Pallihottam and Sakthikulangara. Total number of registered fishermen in each village was received from the records of the Deputy Directorate of Fisheries, Kollam. Primary data was collected with the help of a structured schedule. The schedule was administered to the respondents by personal interview method. Analysis, explanation and interpretation of the data are mainly done on the basis of percentages and Pearson's Chi-square test.

Major findings of the study

- ◆ The study shows that modern communication parameters especially mobile phones are being used in an exceptionally wider

manner in the coastal villages of Kollam. A huge 81.33% of the populations are using mobile phones in fishing activities. But an 18.67% of the respondents are not using mobile phones for their job purposes.

◆ The results clearly point out that mobile phones, the vital electronic communications equipment do benefit the fisher folk in exchanging information on-shore and off-shore and thereby making arrangements for the business. In the survey 83.03% utilize this equipment to exchange information and 81.95% of the respondents arrange the business with this device. To 54.15% of the population mobile phone is an instrument which alerts during emergency.

◆ The survey points out that 50.67% of the marine fishing workers the use of GPS in their economic activities. All the respondents in the survey agree that GPS helps them to find the exact fishing location. For the 47.08% of the fishers it helps in getting more economic returns. A 44.17% of the marine fish workers are saved from spending more time at sea. But 49.33% are not utilizing this component either for fish location or getting more profit.

◆ The findings show that for the 64.67% of the marine fish workers, the use of new technological inputs like Communication and Information Technologies helps them to increase fish production. Apart from the increase in production, 59.67% of the respondents agree on getting more economic returns. At the same time 35.33% of the respondents are doubtful and respond negatively. They do not believe that the rise in fish production is due to the use of communication devices.

◆ The fish workers in Kollam are not using instruments like On-board Data Integrator or E-log books for the fishing activities. In the case of E-commerce too, response rate is the same. In the selected sample villages, in Sakthikulangara alone the findings show its usage. The overall rate of using E-log books or on board data integrator shows only 1.3%.

◆ The investigation reveals that the impact of communication and technological gadgets has been felt in the marketing area of fishing. A 60 % of the respondents agree that new gadgets have widened the marketing potentialities. On the other hand, 40 % of the respondents do not agree with this argument.

◆ The over all literacy rate prevailing in the sample villages figures 91.2 %. Among the 15+ age group the literacy level stands at

91.4 %. This could be linked with the possible rise in the usage of mobile phones and GPS in the livelihood options of the fisher folk.

◆ The survey finds that 59.33 % of the respondents feel that communication and information devices contribute in increasing their socio-economic status. While 40.67 % disagree with this argument.

◆ One of the leading variables in the socio-economic status of fish workers in Kollam, is the education level. As per the result, the respondents who have primary education are 43.0%, high school 35.7% and 12.3% have college level of education. The high response rates of fishermen using mobile phones (81.33%) and GPS (50.67%) in the promotion of livelihood activities is mainly due to the educational status of the people in the surveyed area.

◆ The long run implication of using modern Communication and Information devices in coastal area from the result of the survey looks very promising with respect to the age composition of fisher population. In the selected villages, a 25.5% of the persons come in the age group 0-19 years. While 63.5 % of the persons come in the age group 20-54 years. A total 89 % of the people are children and adults. This trend is an indication of the potentialities of using new Communication and Information devices in the future. Because younger people and adults have the higher capacity to adapt with any new technical change.

◆ Another aspect of the study is to evaluate the future prospects of modern Communication and Information tools in the marine fishermen households for income generating activities. In the long run, there is no doubt that Information and Communication Technological devices in general will occupy the centre stage of the marine fishing activities. This observation is derived from the survey itself. Because only with the usage of mobile phones and GPS, the fish workers are able to exchange information on shore and off shore (83.03%), to settle the business (81.95%), to find out exact fish location (100%), getting more returns (47.08%), increase in profit margin (59.67%) and of course a rise in social status (59.33%). With the adoption of all major Information and Communication Technology devices in fisheries like Web based applications, Community Radio, Information centres, E-log books, Electronic Sensors, Echo sounders, Print Publication etc., the greatest income generating potentiality of fisheries sector is yet to come.

◆ Regarding the existing socio-economic frame work of the coastal villages, the survey made the following observations.

1. The survey reveals that 92.6% of the fisher folk depend on fishing alone as their prime occupation.
2. An 88.8 % have no alternate employment at all. But 54% of the fisher folk think positively about the need for alternate employment.
3. It is evident from the survey that 98.7% of the fishermen families have no other sources of income.
4. The study also reveals that an 87.9% of the population possesses own land while 12. 1% is landless.
5. A Standard of living Index made for the sample coastal villages shows that 66.4% comes in the medium category and 21.7% and 11.9 % come in the low and higher standard of living category respectively.

◆ A notable fact emerging from the study is that it is the technology that enables the marine sector in Kerala to transform in all areas with its far reaching effects on production trends, income levels, export trends etc. The vital difference in the transition of technology from traditional to the modern fishing crafts and gears is that it evolves due to certain specific policy measures. These policy measures aim at the development of marine fisheries sector of Kerala while the post-modern technologies like new Communication and Information devices in fisheries sector emerge as part of the structural adjustment programmes in the Indian economy.

◆ The study has also made an attempt to evaluate the back ground of the use of modern communication and information devices in the marine waters of other nations. Use of modern communication and information equipments in the European fishing waters and its success there become an integral part of this study. Although, there is difference between Kerala coast and European marine waters, the use and potentiality of Information and Communication Technology devices in the fisheries sector remains the same in every part of coastal region.

Recommendations

- ◆ Create training centres in the fishing villages to train fishers in the usage of Information and Communication Technology instruments.

- ◆ The impact of communication and information devices in the increase of fish products need the development of infrastructure facilities like permanent storage rooms for auctioning and dispersing the fresh fish catch.
- ◆ Each fishing village should have a fish landing mini harbour for the easy dissemination of product increase due to Information and Communication Technology intervention.
- ◆ Strengthen the existing co-operative sector with a special division for the exclusive purchase and distribution of Information and Communication Technology equipments covering all fishing villages.
- ◆ Creation of a nodal agency to oversee the purchase of Information and Communication Technology equipments and ancillary facilities in a cost effective manner.
- ◆ Create a technical institute with trained technicians for repairing and servicing sophisticated ICT equipments.
- ◆ Create a monitoring cell to watch and study the making of ultra new gadgets by Information and Communication Technology engineers world wide and its feasibility and applicability for the fisheries sector of Kerala.
- ◆ Install a signal tower system along with ICT equipped radar facility for tackling emergency situations on the seas.

Conclusion

Communication parameters with its vast technological devices have transformed the Kerala fisheries sector from top to bottom. The reverberations from the application of these equipments can be felt in almost all areas of the fishery segment. The vast positive changes that have occurred in the socio-economic front are quite noteworthy. The livelihood pattern of the coastal fisher folk has been radically altered. They are now better fed, better clothed and better housed with better sanitary facilities. Technology has alerted the youngsters on the need for acquiring the intricacies of technical know how for operating the sophisticated equipments handed over to them. The once alienated, marginalized community is now fast moving towards entering the main stream society. Thus this study has probed into the multi dimensional socio-economic aspects of the coastal fisher folk of the four fishing villages in the Kollam district. But the main

focus has been the Information and Communication Technologies and the influence it has on the fishing community of the four fishing villages in the Kollam district.

The statistical data compiled from the sample fishing villages have a deep and wider research orientation for further study. The fishing industry in Kerala from the data derived from the survey and its scrutiny points in unmistakable terms that the Kerala fishery sector is poised towards a sustainable growth. The marine fishing industry is on the threshold of becoming a major player in the industrial and commercial activities of not only Kerala, but also to some extent the whole country.

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MAKING SCIENCE TEACHING AN EXCITING EXPERIENCE

Prof. S. Sivadas

We are living in the era of information revolution. Information is multiplying like the legendary arrow of Arjuna-one to two to four to eight to sixteen and so on. Information creating information resulting in clusters of information, which produce new and wonderful regions of knowledge, resulting in even new subjects and new technologies, eventually producing new products, creating new opportunities and wealth! Thus new industries flourish, new business opportunities appear, new employment avenues are opened, giving new challenges to young and enterprising professionals. That is why we call the new world as knowledge society. Knowledge has become synonymous with wealth and power. Those who acquire knowledge rule the world, those who fail to amass knowledge become slaves and suffer.

This wonderful drama in the present world is being fully controlled by science and technology. Naturally the future of any nation and society and individual too depend on its ability to imbibe modern science and technology. Here-in lies the utmost importance of teaching science particularly in schools where the foundation of science is being laid.

A lot of activities are going on all over India in the area of science education with particular thrust to activity based teaching and learning. But unfortunately children still find science learning uninteresting. Teachers too never enjoy teaching science. So it is high time that a soul searching enquiry is done by the teaching community and try to evolve totally new approaches and concepts in science teaching as well as learning.

A True story

Here is a true story. I was a member of an interview board, interviewing a few postgraduates for a higher post in a government concern. When a young girl appeared for the interview, I enquired what she was doing now. "Sir, I have completed my Msc, BEd and

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PHd and am now doing post doctoral research in a university,” she said. “Which subject?” I enquired. “Chemistry.” She promptly answered. “Chemistry? What is it? We don’t know anything about chemistry. Please explain something about chemistry. Anything. Anything you like most; so that let us feel the beauty and excitement of your subject.” I prompted her.

We were talking in English. But at this juncture she switched to Malayalam, her mother tongue, because the words were coming from her heart! With all sincerity and emotion she looked into my eyes and said. “Sir, there is nothing interesting or exciting in this subject. If you give me this job, I am ready to quit my research and join now.”

I was shocked! What a great tragedy! A student who has completed her postgraduation and even PhD and still doing research in the same subject openly saying that there is nothing interesting in that subject!

What is the meaning? Students learn simply to get degrees and jobs. They never enjoy their subjects. They are never excited by the wonderful ocean of knowledge to which they are exposed. They never love their studies. They simply pursue mechanical learning because of compulsion.

Whom should we blame? Primarily the teachers! Remember the definition of a teacher: “A teacher is one who teaches. A good teacher is one who teaches well. A great teacher is one who inspires!”

How can a teacher inspire? Only when the teacher is first inspired! The teacher should enjoy the subject. The joy in the heart of the teacher should flow through his words and gestures directly to the minds of his or her students and excite them, illuminate their mind, so that they are thrilled by the teaching. Alas! This never happens, even after all the improvements in school curriculum.

Joy of Science

Why this tragedy? Why the joy of science is never felt by the students and even teachers? Maybe, because they consider science not an avenue or subject to enjoy. They think that science is simply a tool for the welfare of humans; that science is also a necessary evil to be learned just for getting employment. This is a purely utilitarian, mechanical, dry ignorant concept on science and technology.

Science is one of the greatest and noblest activities of man. Its story itself is exciting: how the humans once lived in forests, how due to the innate instinct in man to know, the inherent enthusiasm in his mind to explore, the natural compulsion for him to make use of nature for his better living-due to all these he began to open his eyes and ears and observe nature, began to ask many questions for which he had no answers and thus slowly and steadily changed! Due to a quantum jump in the neuron network of his brain, humans were gifted with that unusual trait of reasoning, this unusual intelligence helped him to discover and improve tools which culminated in technology development. His discovery of fire, his success in using the energy from fire actually started his taming of energy. This story continued and the result is the modern man and his technology. Is there any other story which is so inspiring as this story which is unending and continues even now and surely will continue in future too.

Are we teaching science with the full knowledge of this exciting story? There are stories behind every discovery and also behind every development in theoretical concepts in science. Teaching should unravel these dramatic, thrilling, inspiring human stories behind every lesson of science.

Let me point out one example. Once, the metal aluminium was costlier than gold. There was no way to manufacture aluminium cheaply. One day a professor of chemistry, Frank Fanning Jewett of Oberlin college, USA, told his BSc first year students about this wonderful metal. It is, he said, silvery white, but very light, and if someone discovers a method to isolate it easily and cheaply, it will be a great event. The discoverer will surely become a millionaire, but more than that, cheap aluminium will transform the metallurgical industry, its alloys being light will be used by aviation industry to manufacture lighter planes etc. The Professor was a great teacher, his class inspired a seventeen year old student, who after the class met the professor and declared that he was going to discover a method to manufacture aluminium. The professor was at first shocked, a seventeen year boy saying that he is going to attempt a problem which even expert chemists could not solve! But the professor encouraged him. He started a project, his work place was an old wooden shed adjacent to his house and his assistant was his obedient sister. Within three years he completed his degree and in the fourth year really found an ingenious electrolytic method to manufacture aluminium easily and cheaply.

The professor was thrilled to hear the success story. Eventually the boy started a chemical company to manufacture aluminium in USA which later became “The Aluminium company of America” otherwise known as Alcoa.

This thrilling story shows, that nothing is impossible, that if a boy begins to dream a great dream and begin a ‘thapasya’ for it, ultimately he will succeed. Is this not a wonderful motivating story too?

But in a class what happens? The teacher simply says that the electrolytic method of preparation of Aluminium was discovered by a young man Martin Hall when he was a student. The teacher will then impatiently pass on to the actual electrolytic process, draw the picture of the cell and explain the reaction. There ends the class. Students study this undramatic unemotional dry fact and repeat this on the answer paper and get marks. That is all. The whole human drama is lost. Then we complain that science is dry!

So one way of making science inspiring is to unravel the real human story behind each and every lesson of science. Of course, suitable books should be available and should be used by both teachers and students.

Creative science literature - a new paradigm

A new and novel way is to transform science to literature itself. Creative science writing is a new and wonderful way to transform science to real literature which could be easily enjoyed by students, teachers and even the layman. Literature is something which thrills the heart. It renders enjoyment. It appeals to our emotions. Articles, poems, stories, novels, dramas, picture stories, postures, riddles, puzzles, cartoons etc. could be created with science as the basis. Not only stories of discoveries, but even the difficult or dry concepts of science and mathematics also could be transformed into literature and thus make them enjoyable.

Creative science literature is literature with roots in the soil of science. Naturally its fragrance will be that of science. Once we transform science to literature, it is going to go directly to the heart of the readers. The science then becomes part of his emotion, part of his culture, he gets immersed in it and enjoys it, and thinks about it with interest. Ultimately he easily digests the concepts and even

creates new concepts. Thus he is transformed to a knowledge producer.

Let us see an example of converting 'dry' mathematics to literature below.

Naughty Zero

Once upon a time there lived a zero somewhere. When young, he always used to play by rolling and roaming all around. He was round all around from birth and so it was so easy for him to round around.

One day he was rounding along the road. A 'ONE' standing beside the road saw him. The 'ONE' smiled and teased him saying: "Look! a ZERO rolls around. A mere ZERO indeed!

ZERO pretended that he did not hear that. He continued rolling. Then ONE continued aloud: "A 'nut' with no value! If anyone gets him for an examination it will be a great shame. Friends will laugh saying: Here is the proud recipient of an Elephantine egg."

After teasing so, ONE proudly straightened himself so that he may appear taller.

Zero still continued playing by rounding around. Rolling around he finally positioned himself to the left of ONE. ONE giggled looking at ZERO and said. "See the foolishness of this valueless fellow".

Suddenly ZERO rolled around and stood close to the right of ONE and began to smile.

One was surprised. Did I change considerably? He looked around with bewilderment. "Oh! What has happened to me? Am I not what I am?"

ZERO smiled and replied. "Yes, you are not what you were!"

ONE could not believe it. He examined himself again and again.

"What a change! It seems that my value has increased much!"

"That is right. When I came to the right of you and stood beside you there, your value has increased ten times the original. You are not the old ONE now, but TEN!"

Zero explained what had happened to him.

ONE felt immensely happy. He hugged ZERO close to his right. He felt great love to ZERO.

ZERO then whispered to ONE. "Don't ridicule anyone. Everyone has value when stands at the proper place".

When I read this story for the first time before a group of kids in a primary school, there was electric effect. All the students were hearing the story with smiling faces. As I was reading the final part where the ZERO was moving closer to ONE and going to whisper in his ears, I saw one kid doing the same thing, he moved closer to his neighbour and put his hand around the other's neck and dragged him closer. It is an impulsive act triggered by a literary piece!

You may use this story to dramatize mathematics, to train students to present a skit in the class, to teach language and even for value education. When this story was presented to a group of school teachers in Singapore, immediately the teachers wrote the script and presented it as a skit. Their trainer from USA, discovered to the astonishment of this author, that this could be effectively utilized in class for physical education, since it offers a lot in body movements!

Conclusion

I have been writing for children for the last fifty years and have authored about 150 books, many among them are creative science literary books. I have demonstrated that even values like ecological ethics could be developed in children using such literary creations. Hence I think that it is high time that teachers began a serious attempt to effectively use this novel method to make science teaching and learning exciting, enjoyable and enlightening.

MODERN COMMUNICATION TECHNOLOGIES AND THEIR INFLUENCE ON WORK-LIFE BALANCE

Suresh Kumar G.

Introduction

Communication is the backbone for any organization's activities and in order to efficiently attain its objectives an organization is bound to maintain a seamlessly integrated communications system. The days of dependence on the typewriter, telephone and telegraph are gone forever. Today the modern communication gadgets, the computers with access to the internet and latest gizmos like the palmtop, tablet, etc rule the world of communication. With the advent of these modern equipments this world of communication has without a doubt undergone revolutionary changes.

We now live in a world with a virtual communications infrastructure that is inseparable from our daily activities. Modern communication technologies are an integral part of everyday life in the 21st century, inextricably intertwined with individual activity at home, work and at play. It is fundamental to the functioning of society and our individual lives. Because of this degree of interdependence, social and economic inequalities are simply reflected in patterns of use of many modern communications by groups within society. However, over time, the telephone has become a ubiquitous, potentially democratic tool available to the vast majority in society.

In addition to the corporate or office life, modern communication technologies are affecting individuals and their daily lives. New technology can clearly enable them to work faster and more efficiently, and it facilitates flexible and remote working (fitting in with childcare or avoiding a distasteful commute), but it can also mean that the individual cannot ever really get away and switch off. Many of them now feel strangely insecure and cut off when their mobile is out of action or the internet connection goes down. Many habitually go to check emails first thing when they wake up. Many are so proficient at texting that they can send messages without looking -

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and do so constantly throughout the day! People have even started eating meals at the computer. And many families spend hours in separate rooms at the computer.

Thus we can safely assume that modern communication technologies have an influence on people's lives, their work and consequently their work-life balance. So, instead of the natural question, has the advent of modern communication techniques influenced the work-life balance, it would be better to rephrase it as, in what manner has the advent of modern communication techniques influenced the work-life balance? And it is the answer to this question that has been attempted to be found out through this paper.

Towards this end, a thorough study of all available reports of studies on the topic was undertaken to analyze the influence of modern communication techniques on work-life balance.

Definitions

Work-life balance is "the so-called "balance" that is presumed to exist between the paid work we perform and the lives we lead outside our job". *Robert Taylor, Visiting fellow at London School of Economics and Political Science.*

Generally work-life balance can be defined as a state of equilibrium in which the demands of both a person's job and personal life are equal.

Job satisfaction is defined as 'the extent to which people like (satisfaction) or dislike (dissatisfaction) in their jobs' (Spector, 1997).

Key-words

Employee work (job) satisfaction, work life balance, employee turnover.

Some of the major and obvious benefits derived from modern communication techniques are speed, accessibility, interpersonal relationships, freedom of information and market saturation.

Modern technology is drastically altering the speed at which we communicate. An email is delivered in a matter of seconds. Text messaging allows us to send short messages to each other's phones in seconds. We can reach anyone by telephone almost anywhere with the continued development of network coverage. Instant messaging and video conferencing allow groups of people to speak in real time from all over the country and world.

Modern technology is increasing accessibility for communication. Expanding telephone and internet coverage is allowing individuals from the most remote and rural areas to interact with one another. This is not only expanding experience bases, but also allowing people to work from nearly anywhere. This technology is creating possibilities for communication that never existed before.

Whether it's family, friends or a significant other, distance makes life very difficult and complicated. Phone conversations can only do so much and take place so frequently, which is why modern technology is helping communication so much. Technologies such as video conferencing, text messaging and social networking sites like *Facebook* and *MySpace* can help keep friends and family updated on the individual's life. Friedman and Greenhaus (2000) emphasized that the working adults learn to build networks of support at home, at work, and in the community. Family-friendly firms have a significant impact on the lives and careers of business professionals who work in them. A conflict between work and family has real consequences and negatively affects the quality of family and career attainment of both men and women.

With the ever expanding Internet and increased amount of easy-to-use web writing platforms, people are increasingly posting information online of their own volition. Sometimes, this communicates things about their personal lives via blogging. Other times, individuals will report on the news themselves. This has led to a couple of communicative impacts. First, people know more about each other than they ever have, and are communicating with one another on a much more frank basis. Second, the way they communicate about the news has changed dramatically, increasing transparency in some ways and obfuscating the real issues in others.

Communication doesn't just take place on an interpersonal level, and communication between businesses and their target demographics have been directly impacted by evolving modern technology. Business organizations have been able to better communicate with their potential consumers via directed marketing on social networking sites like *Facebook*. They've also been able to communicate via company run blogs that keep consumers and shareholders up-to-date with the direction that the company is headed.

Major findings of the study

- 1) The popularity of mobiles and e-mail offer a powerful

demonstration of how these highly individualized tools enable whole new ways of interacting and communicating with key networks from different geographic locations, facilitating the blurring of the lines between different environments and locations. Once such tools are in place, patterns of communication can change quickly, capitalizing on the opportunities they create for useful networking activity. 15% of respondents in a *Future Foundation* survey use their home Internet connection for work purposes. In addition to being an indicator of the dedication that employees have towards their jobs, this also shows how much work is transgressing into their personal lives. The time they spend at home for work-related matters is quality time they could have spent among the family and/or friends.

2) In the BT survey, 90% of respondents agreed that their quality of life is better because of information communication technology (although they were evenly split on whether technology contributed to happiness). This generally positive attitude was reflected in an on-line discussion. Respondents expressed the view that in environments where the phone, internet and mobiles serve as facilitators to achieving goals and fulfilling important connections, they can be seen to make a positive contribution to their lives.

3) In an Australian National University study, logs of actual calls made and SMS texts sent show that the predominant use of the mobile is for contacting family and friends, with work-related reasons far less important. Men make more calls for business purposes, while women use the mobile for social connectivity. From several earlier studies, job satisfaction is found to be higher among the males when compared to the females. A study by *Mishra, Chandargi and Hirevenkanagoudar* (2007) on agriculture extension officers corroborated this observation where the male officers had greater job satisfaction than the female officers. These findings are in line with the previous studies. The main reason behind such findings is that men attach more importance to their work and it is central to their life. Sometimes, they even ignore their family to achieve more in their career. Men feel more satisfied when they are achieving more on the job, even at the cost of ignoring family needs. Conversely, women stress both work and family as source of their satisfaction. For them, family is equally important, if not more. Women feel frustrated when work does not permit them to take care of their family. They draw tighter boundaries between work and family. A study by *Valentine* (2001) showed men perceive greater job responsibility in comparison

to women. All these are in consensus with the results of the Australian National University study.

4) The Australian National University survey also revealed that more than half of the respondents believe that the mobile helps them to balance their family and working lives.

5) The mobile phone is considered by a majority of both men and women to be either very important or important in maintaining the quality of their (marital) relationship while geographically separated.

6) During a research carried out by Michael White at the Policy Studies Institute and Stephen Hill from the London School of Economics under the Future of Work Programme, in a comparison between attitudes to paid employment in 1992, when the first employment survey was carried out, and 2000 they found a significant decline in the level of work satisfaction had taken place among both men and women over a wide range of job facets during the intervening period. A number of changes in the workplace over that decade appear to explain this clear sign of a marked rise in pressures on paid work. More employees are using computers or computerized equipment in their jobs, which is seen as an important factor in increasing work intensity. In 1986 a third of women and 46 per cent of men used such modern technology in their work; by 2000 the proportions had risen to 64 per cent and 65 per cent respectively.

Recommendations

As the work-force is a major contributor to the productivity of any organization, it is imperative that proper work-life balance policies are put in place. Since it is indicated that modern communication techniques have a positive effect on work-life balance of employees, all possible efforts should be made to provide the proper tools for communication. *Workers attempt to achieve work-life balance (i.e., unbinding time) by working nonstandard, "alternate" (non-Monday-Friday or non-day) shifts, and/or flexible job schedules or part-time (Becker & Moen, 1999; Staines & Pleck, 1986).* The use of communication systems for personal/home needs during office hours should not be curtailed as such, since it contributes to work-life balance. Meanwhile, since employees use their own systems for office purposes while out of the office, the employer can encourage such use by offering to pay the mobile phone bills, internet subscription etc. Technologically facilitated home workers who don't regularly go

into an office actually work the longest hours, thereby and negatively impacting on their partners' quality of life. So tele-working or the small office home office (SOHO) concept, although it does away with the daily commute, may not be the final answer for attaining work-life balance. Although modern communication techniques are quite capable of making the job easier, care should be taken to keep the work intensity low, otherwise lower work-life balance and job satisfaction may result.

Conclusion

Work-life balance increases job satisfaction. Poor job satisfaction results in lower morale and productivity. Employees today expect their organizations to help in managing work-life balance and in reducing stress and burnout. Family friendly policies targeted at assisting the employees to attain work-life balance need to be encouraged. Organizations can play a facilitating role. All the same, the prime responsibility to deal with work-life balance is that of an individual. Since modern communications technology can enable individuals to satisfy multiple goals, express different aspects of their personalities and synthesize competing demands, it can be said to be contributing to enhanced quality of life in the 21st century.

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PERSUASION & ANIMAL RIGHTS ADVOCACY: AN IN-DEPTH LOOK AT PERSUASION IN PETA PRINT AD USING ELABORATION LIKELIHOOD MODEL

Ambika Babu

As a non-profit organization advocating animal rights, PETA (People for the Ethical Treatment of Animals) regularly uses unconventional, sometimes shocking advertisements to call attention to animal abuse. Although these tactics stir up controversy, PETA has been successful in persuading many major corporations like Hugo Boss, Abercrombie & Fitch, Timberland, and American Eagle to change their animal care practices (www.peta.org/mc). By artfully combining vivid images and verbal texts, the PETA print ad effectively persuades audience by activating their central and peripheral processing routes and inducing behavioral and attitudinal changes. This paper attempts to not only use the theoretical framework, Elaboration Likelihood Model to examine the effectiveness of persuasion strategies used in the message, but to also explore the effectiveness of the model as a predictor of message effectiveness, and discuss possible improvements to the message set.

The Theory

Among contemporary theories of persuasion, Elaboration Likelihood Model (ELM), formulated by John Cacioppo and Richard Petty remains a major framework for understanding advertising effects. According to the model, there are two distinct ways in which audience process messages, depending on their level of involvement. They have high involvement if the issue is personally relevant and can have direct impact on their lives. The level of involvement is low when individuals believe that an issue has little or no impact on their lives. When the level of involvement is higher, audience process the message through a central route, being persuaded by a strong argument that is central to the true merits of an issue or product (Petty,

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Cacioppo, & Schumann, 1983). The central route is characterized by cognitive elaboration where audiences carefully evaluate the pros and cons of the message arguments, relate information to their own existing knowledge and values and ponder the implications of their attitudinal change (Perloff, 2008).

On the contrary, on a lower-involvement level, audiences process the message through a peripheral route, being persuaded by the attractiveness of the advertisement character. The attitude changes that occur via the peripheral route are induced by simple positive or negative cues or “because the person makes a simple inference about the merits of the advocated position based on various simple cues in the persuasion context (Petty, Cacioppo, & Schumann, 1983, p.135). Thus in peripheral processing, the individual does not engage in extensive cognitive elaboration of the message arguments. Rather, the attitudinal change may be induced by factors that are peripheral to message arguments like the communicator’s physical appeal, speaking style, or pleasant association between the message and the images in the background.

According to Petty and Cacioppo, the key factors that determine which processing route the audiences will take, are their motivation and ability to process the information. An individual’s motivation is mainly influenced by perceived personal relevance which is characterized by the receiver’s personal involvement or need for cognition in the topic. The second determinant, ability, is a function of the message’s nature (level of complexity, repetition), situational factors (environmental noise), and personal variables (intelligence, previous knowledge) (Miller, 2005). Thus individuals who score high on both ability and motivational factor tend to prefer central to peripheral processing.

Furthermore, to fully grasp the concepts of ELM, it is important that we understand the effects of the two message processing routes on the behavioral and attitude changes of the receivers. The model proposes that the change in attitude achieved as a result of central processing will be “relatively enduring, resistant, and predictive of behavior” whereas attitude change that occurs through the peripheral route will be “relatively temporary, susceptible, and unpredictable of behavior change” (as quoted in Miller, 2005).

Message Effectiveness in terms of Theory

“I am Alicia Silverstone, and I’m a vegetarian,” reads the PETA print ad. The organization’s latest celebrity endorsement features actress, Alicia Silverstone unclothed, lying on her side, next to a swimming pool. Silverstone’s ad is part of a greater campaign being launched by PETA to promote the health benefits of a vegetarian lifestyle. The vegan philosophy prohibits eating, wearing, or using any kind of animal products including milk, eggs, honey, and wool or leather products. Rather atypical for a PETA venture, the ad does not shock despite the nudity. Instead it manages to capture one’s attention with the tastefully shot image of a picture perfect celebrity body against a subtle, opulent backdrop. According to Elaboration Likelihood Model (ELM), this PETA ad effectively activates both central and peripheral routes of persuasion, providing multiple opportunities for attitude and behavior change among the audiences. The key factors that determine a message receiver processing strategies are his /her motivation and ability to process the information. Personal relevance is proposed to increase an individual’s motivation for engaging in message content elaboration. Hence an audience member interested in animal rights or PETA may evaluate the message content favorably and seek further message elaboration while those who have no interest in animal rights, might not feel the need for cognition or further information and may ignore the message content. Therefore, in order to centrally process the persuasion message, the audience will need to possess sufficient level of motivation.

The audiences pursue the central route when they also have the ability to ponder message arguments. A message receiver’s ability is governed by individual variables, message variables, and situational variables. According to Miller (2005), individual variable refers to the cognitive ability of the message receiver, such as his or her intelligence, or knowledge about the subject. Thus those people, who champion animal rights or diligently follow the activities of PETA, will have more ability to process the information centrally than those who have no knowledge of the issue or the organization. The individuals with less knowledge are the peripheral processors who are more susceptible to persuasion in most situations (Perloff, 2008). The second factor governing the ability of a receiver refers to the specific qualities of a message, whether it’s too difficult or complex to process. The PETA ad is fairly simple in its design and the level of argument presented. Hence message variable does not have any influence in

determining whether the audience will take a central or peripheral route to persuasion. However, situational factors can limit or enhance audience's ability to process centrally. Individuals are less able to process when they are distracted by environmental noise. For instance, an individual who sees the ad while browsing through a magazine stand at a grocery store will be less likely to think elaborately on the message argument. Thus message receivers must possess the personal ability and must be in a conducive environment to effectively process the PETA ad either through central or peripheral routes. When they lack the motivation or ability to process a message elaborately, they opt for peripheral route.

Advocacy communications function through both central and peripheral processes, by activating beliefs, evoking social norms, and arousing inconsistencies (Perloff, 2008). It may be assumed that since not all audiences have similar abilities and motivation to process persuasive messages from PETA, a majority of message receivers rely on peripheral cues. As mentioned earlier, in peripheral processing, the individual does not engage in extensive cognitive elaboration of the message arguments. Rather the attitudinal change may be induced by factors such as the credibility and attractiveness of the source and attention-grabbing cues like vivid images, graphics and color schemes. To begin with, the PETA ad effectively persuades low-involvement audiences by associating a celebrity with the vegan cause. Celebrities are particularly powerful source factors who transfer meanings from their cultural identity to the product (Perloff, 2008). Though PETA aims to reach out to many different audiences as possible, its target audience is younger, college going segment of the population, a group with considerable motivation for behavior change. Hence a glamorous young celebrity like Silverstone may appeal to this low involvement audience. Moreover, by showcasing her strategically naked body, the ad is making a rebellious if not shocking statement. It is exhorting to the audience to be bold and break the chains of convention by changing old habits and following a cool vegan lifestyle. Thus this ad might appeal to an 18-year-old precisely because it offends his / her mom.

According to Perloff (2008, p.424), "a celebrity's' physical attractiveness can influence attitudes by blending, association style, with the product, or it can work by stimulating identification processes". The well-toned celebrity body seems to convey the message that if the audience follows the vegan lifestyle advocated by PETA, they too

shall have an attractive physique like Alicia Silverstone. Vivid images are easier to access from memory and therefore more likely to influence audiences' attitudes when they are trying to decide whether to accept or reject the messages. In addition to the source factor, the background visuals also effectively persuade the audience through the peripheral route. The indoor swimming pool and the opulent background visuals with large French windows and marble pillars all point to an affluent lifestyle befitting of the hip and the cool. Hence those audiences who process the information peripherally may associate veganism with a cool yet sophisticated lifestyle worthy of emulation. Finally the subtle color schemes with an over tone of green also appeals to the peripheral processing route of persuasion. Alicia Silverstone lies on a stretch of green turf or carpet which may again be a symbolic representation of a vegetarian lifestyle.

Thus all of these visual characteristics of the message may appeal to those low involvement audiences, who prefer peripheral cues than explicit arguments and verbal strategies. Though ELM proposes that attitude change developed through peripheral route will be temporary and unpredictable, repeated exposure of the ad can create more lasting effects. So even if the audiences are peripheral processors, if they remember the vivid image and the strategically located PETA logo on the lower right corner, they will be more likely to engage in behavior and attitude change than those people who do not. However, the behaviors of these peripheral processors who have favorable attitude toward the message may vary from one individual to the other. According to ELM, although some people who took this route may consider pursuing a vegan lifestyle, their positive attitude might not remain long enough to get to that stage. They may encounter more persuasive ads from food corporations or fashion retailers proclaiming their animal-friendly products or might simply forget the attractive message. ELM also suggests that people who take this route are easily swayed. Meaning if PETA gets involved in a controversy where their claims are proved wrong by an environmentalist group, the latter might grab this audience members' attention instead of PETA.

Though the message primarily relies on peripheral cues for effective persuasion, it has also provided opportunity for those audience members who have both motivation and ability to take a central processing route. Strategically located on the lower right corner of the page is the name of the PETA webpage, "goveg.com" which is

dedicated to promoting vegan lifestyle. Those people who possess the strong motivation and ability to elaborate the message content may access the website to get more information. The website sporting a green and yellow color scheme has a user friendly design and provides sufficient arguments in support of the message. There are colorful buttons on animal cruelty, health and environment issues, fabulous veg recipes, celebrities who support the cause, and easy activism. Upon clicking 'famous vegetarians', one can find a full testimonial from Ms. Silverstone explaining her endorsement. The interactive blog provides information on animal-free products, restaurants and members can interact and share their thoughts and life experiences through posts.

The critical feature of the central route to persuasion is that an attitude change usually tends to be relatively enduring and predictive of behavior. In order for audiences to process centrally, they should be presented with solid arguments supporting the true merits of the issue. However, Perloff (2008) notes that not all central-route processing is rational and free of bias. If the message focuses on a personally relevant outcome, people process arguments rationally, ignoring their personal biases. Meaning, if becoming vegetarian can contribute to a healthy heart, an audience member may rationally process the message conveyed in the PETA ad. Another example can be a young female audience who desires to have a healthy body as well as a cool lifestyle according to her beliefs. However when the issue violates long-held beliefs or core values, individuals may get selective on how they approach the issue. For example, even if an audience member supports animal rights and healthy lifestyle, he or she may find the nude image in the message inappropriate and against his/her personal values. Therefore, if people think favorably of the information being presented to them, attitude and behavior change will occur. If they think negatively about the information they are presented with, than there will not be a behavior or attitude change. Finally, those message receivers who form a negative affect towards the information presented to them, regardless if they took a central or peripheral processing route, will not become a vegetarian or follow a vegan lifestyle.

ELM as a Predictor of Message Effectiveness

As a mass communication theory, ELM offers a comprehensive framework for understanding communication effects in a variety of situations. It answers critical questions like why people

take the processing route that they do, the conditions under which central or peripheral processing is likely, and the effects of such processing on attitude change. It explains why different messages are effective in different circumstances and in different individuals. The model addresses the characteristics of the message set, the receiver and the situational factors that affect the processing of the messages, thus providing a complete framework for predicting attitude changes. Owing to its vast scope, the model can be applied to a variety of settings including school psychology, attitudes about gender roles and advertising (Miller. 2005).

However, the model has its shortcomings. It does not clearly explain the role emotion plays in persuasion. The model also proposes that individuals take either the central or peripheral route to persuasion, but not both routes. However, researchers have argued that people are capable of simultaneously processing both central and peripheral routes. Depending on their level of involvement, people might process various combinations of central and peripheral route (Miller, 2005). For example, if a person takes a central processing route and has a favorable attitude towards most of the subject matter, this still does not mean that the positive behavior will follow, which in this case is turning into a vegetarian. Or in another case, a young individual's decision to become a vegan may be influenced by the peripheral cue that many popular personalities endorse the cause as well as the central cue that vegan living is healthy lifestyle. Nevertheless, the model is effective in explaining a variety of persuasion effects in multiple situations based on the characteristics of the message receivers.

Possible Improvements to the Message Set

The PETA ad featuring Alicia Silverstone is an effective persuasive message in terms of its simple message design and subtle visuals. The celebrity endorsement and tastefully shot visuals with muted green color schemes function as effective peripheral cues. Thus the pleasant association of the communicator with the message conveyed persuades individuals toward accepting the message. Though the nude female form attracts most of the attention, the large fonts proclaiming her vegetarian status do not slip the eye either. The PETA logo and the website name are strategically located on the lower right corner, so highly involved audience may further elaborate on the arguments by visiting the website. However as mentioned earlier, peripheral cues though often successful at attracting

audience's attention, do not guarantee attitude or behavior change. Also, even the high involvement audience sometimes might not engage in elaboration process, if they lack immediate access to the internet. Hence, the ad should contain more information than merely stating the webpage. Moreover, not all audience, though supporters of animal rights might identify with Alicia Silverstone or the concept of artistic nudity. Therefore, the message might benefit from featuring multiple celebrities, who are vegans and who appeal to a wide range of audience without shedding their clothes. Having more information and celebrities might reinforce the message appeal by probably engaging the audience in parallel processing i.e. through both central and peripheral route of persuasion.

Conclusion

The most important goal of an advocacy group and its campaigns is to catch the targeted audiences' attention and drum up media frenzy. With its captivating visuals and simple design, the PETA print ad effectively navigates both central and peripheral processing routes of persuasion by successfully engaging audiences and providing multiple ways for behavioral and attitudinal change. Using ELM, one is able to clearly explain a wide range of information processing situations pertaining to the message and their effects on attitude changes. Nevertheless, PETA's typical communication strategies are always characterized by "in your face" advertising, designed to create maximum publicity by being bold or outrageous. Though this might ensure public attention and some extent of attitude change, it definitely does not guarantee long term behavioral change.

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FORM IV (See Rule 8)

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