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E-mail:vetriorgpondy@gmail.com

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(QUARTERLY JOURNAL)



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# **Vetri Education (Quarterly Journal in Education)**

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# VETRI EDUCATION

Volume 9

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## Editor's Note

Dear Readers,

**Vetri Education** tries its best to provide educational articles to help quality guidance and improvement in human resource development for its readers. Our arduous desire to maintain the quality, format and the timely publication of **Vetri Education** continues undiminished, with your support. You are viewing the Third issue of the 9<sup>th</sup> volume of the Journal before the middle of July, 2014.

The first article in this issue is an invited one titled: *A Saga of Indian Contributions in Science and Technology* by **C. G. Ramachandran Nair**, an eminent teacher, researcher, writer, speaker and administrator with his students occupying high academic and technical positions in India and abroad. This article presents a brief account of a few of the important contributions to Science and Technology by India during the past and present times, for the realization, appreciation and motivation of the youth, especially the students, for further contribution to Science, Technology and Mother India's continued service to World and Humanity.

**G.C. Bhattacharya**, one of the regular contributors of original research articles to *Vetri Education* through his article (second of the issue): *Some Issues concerned with Inclusion in Modern System of Education* describes the innumerable and manifold challenges towards inclusion in education mainly concerned with the rigid outlook and mental set up of the people, settled in low literacy areas and analyzes the real situation of 'Education for All' scheme of government of India, in general and modern system of education, in particular.

The third article: *Importance of Financial Literacy for Women in the 21st Century* by **Ranjana Banerjee** explains different aspects of benefits, women derive by their acquiring financial literacy and thus, enabling them to gain the financial knowledge and skills necessary for them to make their contribution to a holistic national development.

**Asrat Dagneu**, in the fourth article: *Study on the Low Participation of Women in Educational Leadership at Government Primary Schools, Ethiopia*, based on his research findings, reveals that women leaders in primary schools face unique obstacles in their substantive position, school administration and organizational responsibilities. Women's poor self-image and hesitant approach to organisational and cultural challenges appear to be major factors affecting women participation in the educational leadership positions.

The fifth article: *Value Preferences of Prospective Teachers (Teacher-pupils)*, based on a research study and findings by **Ripenjeet Kaur** concludes that overall most preferred values are religious and political and the least preferred one is social – certainly a discouraging or unacceptable situation against the generally desired preferences.

The sixth and the last article: *Role of Social Novelist in Portrayal of Social Changes in the Era of Globalization* is from **Shamala Ratnakar**, based on her presentation at the International conference on: *The Impact of Social Changes on English Language & Literature: An Over view of Past 100 Years*, organized by the Dept. of English, Lingaya's University on 7 & 8 February 2014. The greatness or importance of a social novelist, she asserts, lies not only in the realistic portrayal of life but also in the vision of life which he conveys through it and which we all appreciate and admire to possess.

**Vetri Education** expresses sincere appreciation and thanks for the valuable contributions and encouragement from authors, subscribers and all our well wishers, and for the earnest efforts of Mr. P. R. Anebarassane Rada and Mr. N. R. Prabu for the successful and timely publication of the issues of the Journal.

**Academic Editor,  
Vetri Education**

# **A Saga of Indian Contributions in Science and Technology<sup>#</sup>**

**C. G. Ramachandran Nair\***

Former Dean, Faculty of Science, University of Kerala and  
Chairman, State Committee of Science, Technology & Environment, Government of Kerala,  
Thiruvanthapuram, Kerala State

## **Abstract**

The Indian subcontinent can legitimately be proud of its very ancient civilization, dating back to millennia before the start of the Christian (or *Common*) era. The ancient world's great civilizations include the Egyptian, Babylonian, Sumerian, Assyrian, Indian, Chinese, Mayan, Inca and Aztec civilizations. Among all these, some sort of cultural continuity, from very ancient times down to the present day, can be claimed only by two nations, namely India and China. A brief account of a few of the important contributions to Science and Technology by India during the past and present times is presented for the realization, appreciation and motivation of the youth, especially the students, for further contribution to Science, Technology and Mother India's continued service to World and humanity.

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**Key words: Science, technology, Indian contribution, past and present**

## **Introduction**

Any nation should remember its past. This is necessary to rejuvenate its present and to plan its future. Let us therefore, at the very outset, have a look at India's heritage.

The Indian subcontinent can legitimately be proud of its very ancient civilization, dating back to millennia before the start of the Christian (or *Common*) era. The ancient world's great civilizations include the Egyptian, Babylonian, Sumerian, Assyrian, Indian, Chinese, Mayan, Inca and Aztec civilizations. Among all these, some sort of cultural continuity, from very ancient times down to the present day, can be claimed only by two nations, namely India and China.

It is well known that ancient India excelled in the fields of philosophy and literature. But, what about the sciences and mathematics? Let us have an overview of the contributions of the ancient Indians in these domains.

**# Invited article from Prof. Dr. C. G. Ramachandran Nair after listening to a few of his key note addresses during felicitation for his life time achievement in Science, Technology and Education by scientific and educational institutions**

**\*E-mail: [profgram@gmail.com](mailto:profgram@gmail.com)**

## Discussion

A selected few of the more important contributions by ancient Indians and by modern scientists and technologists, including present timers on India's contribution to Science and Technology in different fields are presented under short headings from ancient to recent through post independent one, in chronological order.

### *The Concept of Zero*

The concept of “zero” has been acclaimed as one of the most brilliant ideas in mathematical thought. It is indeed one of the foundation stones of the entire edifice of mathematics. It was the ancient Indians who “invented” this concept.

It may here be remembered that other ancient arithmetical systems did not have a place for zero. For example, there is no *zero* in Roman numeral system (I, II, III, IV, V, VI, VII, VIII, IX, X, etc.)

### *The decimal System*

This is another great Indian invention. The so-called Arabic numerals we now use (0, 1, 2, 3, 4, 5, 6, 7, 8 and 9) are truly Indian inventions. The Arabs borrowed it from India and the Europeans came to know of it from the Arabs. That is why the system is called the “Arabic numerals” by the westerners.

It is interesting to recall a personal anecdote here. During a discussion in an intellectual group abroad, a friend of mine, an Iraqi professor, turned to me and said: “I do not understand why you Indians call them *Arabic numerals*! We Arabs call them “**raqm-al-hind**”, that is, Indian numerals!”

About this number system, an Arab mathematician who lived in the tenth century exclaims: “*It is mind-boggling to see how the Indians are able to represent any number, however large it be, by just 10 symbols!*”

### *The concept of infinity*

The *Vedas* contain a famous hymn, which runs as follows:

***Om poornam idam, poornam ada:***

***Poornad poornam udachyate***

***Poornasya poornam adaya***

***Poornameva/vashishyate***

Roughly translated, this would be as:

This is infinity; that is Infinity:

Infinity derives from infinity;

If one subtracts Infinity from Infinity,

Only Infinity remains!



Philosophers have opined that “*poornam*” refers to God. But mathematicians would gladly have it as ***infinity!*** In any case, there are several indications that ancient Indians had notions of ‘infinity’, ***“than which no greater number can be conceived”***. This was another brilliant mathematical idea of the ancients.

### *Big numbers*

The ancient Indian texts show that big numbers were familiar to the scholars of the day. In Vedas and other ancient literature we find mention of numbers like *prayuta* ( $10^6$ ), *samudra* ( $10^9$ ), *parardha* ( $10^{12}$ ), and *tallakshana* ( $10^{53}$ ; that is, 1 followed by 53 zeroes!). Let us remember that the biggest number mentioned in Greek literature is only “myriad” which is equal to just ten thousand!

The Indians of yore also had a systematic nomenclature for big numbers. Thus, 60, 699 was read as “*shashtima sahasra navatim nava*”. Fractions were well known too. We find that  $3\frac{3}{8}$  is referred to as *traya trayashtaka*, and  $1/24$  of 5 is described as “*panchasya chaturvimsaka*”

### *Infinite Series*

Number series were also known. The series 6, 12, 24, 48, 96, 192... is called “*swarna manasa shreni*”. The 14th century Kerala mathematician Madhava of Sangamagrama, along with other mathematicians of the Kerala School, studied infinite series, convergence, differentiation, and iterative methods for solution of non-linear equations. Jyestadeva of the Kerala School wrote the first calculus text, the *Yuktibhasha*, which explores methods and ideas of calculus repeated only in 17<sup>th</sup> - century Europe. In *Yuktibhasha*, the author mentions some of the theorems of integral calculus discovered by his teacher Madhava. Madhava (14<sup>th</sup> century) taught:

“*Ekadyekoththara pada sankalitham samam padavargaththinte pakuthi*”. Translated into modern English, this reads “The integral of  $x dx$  is equal to half of  $x$  to the power of 2”. It is now known that it was neither Newton nor Leibniz who invented calculus; it was Madhava!

### *Boudhayana's theorem*

*Boudhayana* had stated, earlier than Pythagoras, that “The Square of the diagonal of a rectangle is equal to the sum of the squares on its sides”. Pythagoras said: “The Square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the other two sides”. Both amount to the same; but isn't *Boudhayana's* theorem the simpler and more elegant of the two?

### *Astronomy*

The study of astronomy had made great progress in ancient India. The earliest concept of a heliocentric model of the solar system, in which the Sun is at the centre of the solar system and the Earth is orbiting it, is found in several Vedic Sanskrit texts written in ancient India. Aryabhata (born AD 476), who was likely to have been a *keralite*, had stated that the earth rotates on its axis. He also said that the earth revolves around the sun and not vice versa. (All this was independently re-discovered by Copernicus in the 15<sup>th</sup> century, about 1000 years after Aryabhata!). Varahamihira, Brahmagupta and others had also made great contributions.

Ancient Indian astronomy books contain poetic expressions like: “*the borrowed light of the moon*” and “the fantastic march of the sun through the *ksheera patha*”. Eclipses, seasonal fluctuations, equinoxes were all calculated accurately. The stars and zodiacal signs were identified and classified and named.

### *Physics, Chemistry and metallurgy*

The 6th century BC Indian philosopher Kanada was the first person who went deep systematically into the structure of matter. He propounded the first Atomic Theory of matter. Kanada said that matter is composed of units called “anus”, which are indivisible. John Dalton arrived at similar conclusions only in the nineteenth century!

An iron pillar believed to be cast in the Gupta period around the 5th century stands by the side of Qutub Minar World heritage site in Delhi. It is 7.32 m tall, with a diameter of 40 cm at the base tapering to 30 cm at the top, and is estimated to weigh 6 tonnes. Standing in the open for last 1500 years, it has withstood wind, heat and water without rusting, except for very minor natural erosion. This kind of rust-proof iron could not have been made unless iron and steel was discovered in India earlier.

Let us also remember the metal mirrors (*Aranmula kannati*) of the Kerala metal smiths too. They still make these metal mirrors, which rival ordinary glass mirrors in quality.

An influential Indian metallurgist and alchemist was Nagarjuna (b. 931). He wrote the treatise *Rasaratnakara* that deals with preparations of many chemical compounds. It gives a survey of the status of metallurgy and alchemy in the land. Extraction of metals such as silver, gold, tin and copper from their ores and their purification were also mentioned in the treatise.

### *Cosmology*

The ancient Indians had developed a cosmology of their own. They conceived of a *brahmanda*, which gave birth to the universe. (How similar is this to the idea of Lemaitre who thought of a “cosmic egg”, and whose ideas led to the Big Bang theory!)

The Indians also considered a “cyclical universe”, with the Day of the Brahma, the Night of the Brahma, and an endless repetition of these. Each cycle was a “*kalpa*”. Professor Carl Sagan says: “The similarity between our modern cosmological theory of the cyclical universe and the ancient Hindu concepts of *kalpa* and *kalachakra* is really astounding!”

### *Ayurveda, chemical technology*

The science of medicine in ancient India is known as “Ayurveda”, literally, “the science of life or longevity” in Sanskrit from “ayur” (age or life) and “veda” (knowledge). Ayurveda constitutes ideas about ailments and diseases, their symptoms, diagnosis and cure, and relies heavily on herbal medicine, including extracts from several plants. Ayurveda, the Indian system of medicine, has stood the test of time and is poised to become popular all over the world. Charaka, Susruta, Vagbhata and others were great medical scientists and physicians and surgeons too. The medicines included *kashayas*, *bhasmas*, *sindooras*, *lehyas*, *asavas*, *arishatas*, *thailas*, etc.

Fermentation techniques were widely practiced. Various types of alcoholic drinks (*soma, sura, madhu, etc.*) were known

We have merely glimpsed randomly here ten of the many achievements of the ancient Indians. Let us remember that these achievements were made at a time, when the ancestors of the present Europeans lived like uncivilized savages.

*Truly we thus, have a great heritage to be proud of, not only in philosophy and literature, but also in the sciences and mathematics.*

### *Post-independence achievements*

It is gratifying to note that after attaining independence from the colonial yoke of Britain, free India has made remarkable progress in science and technology. We have made spectacular achievements in nuclear science, space science, agricultural self-sufficiency (green revolution), milk production (white revolution) telecommunication and so on. We have had great leaders in science such as Dr. J. C. Bose, Professor P. C. Ray, Sir C. V. Raman, Dr. S. N. Bose, Dr. Meghnad Saha and others. Modern India had great leaders of technology like Dr. Homi Bhabha, Dr. Vikram Sarabhai, Dr M. S. Swaminathan, Dr. Varghese Kurien, Dr. Sam Pitroda, Dr. A. P. J. Abdul Kalam and Dr. G. Madhavan Nair.

Our latest great achievements, namely ***Chandrayaan***, and ***Mangalyaan***, have done all Indians proud. We are the fourth nation (after USA, Russia and Japan) to hoist our national flag on the surface of the moon. It is our *Chandrayaan*, which established the presence of water on the moon.

### *Some other recent achievements*

Indians and persons of Indian origin have become world famous in recent times. Rajeev Gupta became a General Manager of Hewlett Packard Company USA. Vinod Dam played a role in the invention of the Pentium chip. Sabeer Bhatia created Hotmail. The list of successful Indians goes on.

While the India immigrants and their progeny form only 1.5 % of American population, they account for 38 % of doctors in U. S. A. now. About 36 % of Science and Technology personnel employed by NASA are Indians or PIOs (Person of Indian Origin). Indians or PIOs form 12 % of the scientists in USA. They constitute 34% of techies in Microsoft, 28% in IBM, 17 % in INTEL and 15 % in XEROX. The information scenario given above is fast changing and improving too!

### *Way Forward - Some vistas...*

India has seen steady increases in government spending on research and development. It stands at 15 per cent or more each year. This ***rate*** of 15 % is not enough. Let us note that our Research and Development ***spending*** is a poor 1 % (one percent!!!) of our total GDP. Compare us with Asian nations such as China, South Korea and Taiwan where between 1.5 and 3.5 per cent of their GDPs are set apart for Science and Technology.

*Our R and D spending must be increased at least to 2% of the GDP*

India now has a critical mass of science and technology trained personnel. We can be proud of being in the third place if one considers the total number of S and T personnel. Critics may comment (and lament!) that this refers only to quantity and not quality. Still, let us be optimistic and hope that, as per *dialectics*, quantity may in course of time transmute to quality!

Apart from government spending, the private sector is also providing increasing S and T funding. Since 2008, India has been on a fast track for economic growth also. This augurs well for our national plans for S and T development.

## **Conclusion**

The golden era of the past, the significant contribution in the present and some of the worthy techniques and achievements of the recent times by India make one proud of Indian share of development of technology and science to the world.

Finally, ....Yes, we had a great past, we have a vibrant present and we look forward to a glorious future! Jai Hind!

## **Appendix**

(Provided by Vetri Education, with consultation and consent of the author)

There have been reports of significant contributions from Indian youths (research scientists and techies) as well as Indian origin internationals in the field of medicine, molecular biology, nano-devices, energy saving auto mobiles, cyber crime specialists, etc. and even a Nobel winner in 2009.

A few of their fields and the importance of their contributions are briefly presented to act as catalyst / rejuvenator for the hard working and intelligent youth of India pursuing human resource development of the nation. Eleven of them are shown with relevant references to sources.

### *Scientist controls another man's brain via Internet*

Scientists, including one of Indian-origin, have conducted the world's first non-invasive human-to-human brain interface in which one person was able to control the motions of another person via Internet.

Using electrical brain recordings and a form of magnetic stimulation, Rajesh Rao, professor at University of Washington sent a brain signal to his colleague Andrea Stocco, causing Stocco's finger to move on a keyboard (<http://www.deccanherald.com/content/353794/scientist-controls-another-mans-brain.html>).

### *Implanting First 'Wireless' Pacemaker sans Surgery*

An Indian-origin doctor, Vivek Reddy from Mount Sinai Hospital USA, has implanted the first miniature sized, lead-less cardiac pacemaker in the US directly inside a patient's heart without surgery. The leads-free space maker is implanted directly inside the heart during a catheter-guided procedure through the groin via the femoral artery.

The device implanted by Vivek Reddy from the Mount Sinai Hospital, resembles a small metal silver tube, and is only a few cms in length, marking it less than 10% the size of a traditional pacemaker. (New Indian Express, Monday, February 10, 2014, p.1.)

### *New Device to Check Diabetes*

A low-cost testing device which promises to be a boon for diabetic patients by detecting their sugar level in less than a minute with much lesser amount of blood will be available in the next six to twelve months, in India. The Indian Council for Medical-supported research in IIT, Mumbai and Birla Institute of Technology and Science, Pilani, had delivered two devices and testing strips for the estimation of blood glucose (New Indian Express, Monday, February 10, 2014, p. 9).

### *Nano-robots to clean the arteries*

Engineering researchers from Erode (K. Helen Prabha) and Coimbatore (Ilangovan) are developing a series of nano-robots (0.5 – 3.0 microns) that can be sent into the affected arteries to remove calcified plaque deposits. These nano- robots, controlled by external computers can be used to attack or reconstruct desired cells in the body (New Indian Express, October 6, 2007, p.13).

### *Nano-way to cancer cure*

Dr. Mansoor Koyakutty of Cancer Nanomedicine, Amrita Centre for Nanosciences and Molecularmedicines (ACNSMM), Kochi, Kerala is waging a war against cancer. He has come up with a nano-photomedicine (nanophotomed), a photodynamic therapy for treating cancer.

“We have a chemo drug; a nanodrug targeted to specific cancer, which when injected into the body accumulates in the tumour. It will be activated when illuminated and kill the cancer cells”, Mansoor says (New Indian Express, Thursday, February 23, 2012, p.7).

### *Protein from HIV acting as cure*

Studies from Hyderabad University on the effect of Nukubasic of HIV, inhibiting its multiplication (Enzymes - Cre recombinase and modified Tre recombinase - remove the HIV virus from the genome of infected cells after recognition and then recombine with the virus DNA) (New Indian Express, Friday, January 18, 2013, p.11).

### *A Hard Man to Beat: An expert in cyber crime investigation*

Venod Bhattathiripad from Kerala is one of the world's leading experts in the field of cyber piracy in great demand all over India and abroad. (Sunday Express Magazine, October 14, 2012, p.3).

### *Memory Giants*

Two of the world's best remembers (maximum memory power; *Guinness record holders*) are from India. Prijesh from Payyanoor, Kerala (470 words) recently overcame the *existing winner*, Jaisimha Neburla from Hyderabad (200 words) in the very tough process of assessing the memory power. (Vanitha, Malayalam Biweekly, 24(39), February 15-28, 2014, p.12)

### *Nobel in Chemistry for ribosome research*

Three scientists - Venkatraman Ramakrishnan (Chidambaram, Tamil Nadu born American) and two others (Thomas Steitz, American and Ada Yonath, Israeli) being awarded the 2009 Nobel Prize in Chemistry for their fundamental work on ribosomes, indispensable for the understanding of life. (Associated Press, The New Indian Express, Chennai, Thursday, October 8, 2009, p. 12).

### *Eye on Fuel Efficiency*

Students of Manav Rachna International University, T. N. have designed a prototype car that can run 123 Km / litre, as part of a worldwide contest to be held this year in Manila, in the Philippines and the Manav Rachana team plans to run the MRV3 which can cover a distance of 123 Km / litre. It weighs 180 Kg and the body is made of fibre glass - 21Kg in weight. It has a turning radius of four metres. Karanvir and Aman Agha of the team have come up with the idea of putting in an alcohol sensor. The car will not start unless the driver takes a breath-analyser test. Another feature of the car is that the engine is separated from the driver seat by fire-resistant material and also the steering mechanism is thus separated from the driver's compartment (Shubashree Desikan, The Hindu, Education plus, Monday, February 3, 2014, p.2)

### *Indian activist awarded Goldman Environmental Prize*

Indian environment activist, Ramesh Agarwal from Raipur, Chhattisgarh, has won the prestigious Goldman environmental prize for his contribution in controlling unchecked industrial development throughout India. The Golden Prize in its 25th year is the greatest award for grassroots environmental activism given annually by the Goldman Environmental Foundation based in San Francisco. Agarwal, founder of Jan Chetana - a grassroots movement to protect people and the environment from rampant industrialisation - is one of the six global recipients of the award this year and will receive the individual cash prize of \$ 175,000 (The new Indian Express, Chennai, Tuesday, April 29, 2014, p.7 and Editorial, Recognition of growing activism in India, *ibid*, Wednesday, April 30, '14, p. 8.

XXXXXXXX



# Some Issues concerned with Inclusion in Modern System of Education

G. C. Bhattacharya\*

Faculty of Education, Kamachha Campus, Banaras Hindu University, Varanasi - 221 010 (U. P.)

## Abstract

The process of inclusion has now become inevitable in the field of education, in general and teacher education in particular, when right to education has been accepted as fundamental right for each and every learner. Inclusion is required to bring children with special abilities and those out of the reach of schools, in the mainstream of quality education. The World Food Programme (WFP) believes that nutrition and education are essential for breaking the vicious cycle of poverty and hunger especially for the resource less families. For the hungry poor in the remote areas, education bears little significance even in this modern era of information-communication technology in a developing country like India, unless it provides any immediate output. Accordingly, WFP initiated food aid programmes and supported over 17 million beneficiaries concerned with primary education and other training among the rural poor, all over the world in 2001.

Our mid day meal scheme is also designed as a supplement to WFP programme which has become the largest provider of nutritious meals and, like WFP, succeeded in developing take home food based relations for school children in poverty laden regions. WFP programme earned recognition all over the world on account of food and training programmes, running in 47 countries. Though, the underlying message behind is: *investment in people, is investment for a sustainable future*, in our country some issues have arisen instantly concerned with the midday meal based inclusion oriented programmes for those who are out of school yet, as greed has over taken the need in a few people who have taken the system of education as grant for commercial benefit causing eventual deterioration in the quality and function for attainment of the target of such programmes. It is observed and reported that low quality food materials are provided in unhygienic manner with diminishing quantity too.

Challenges towards inclusion in education are innumerable and manifold in nature, mainly concerned with the rigid outlook and mental set up of the people, settled in low literacy areas. A number of socio-cultural factors like caste sensitivity, class consciousness, gender discrimination, religious affinity, negative attitude towards differently challenged or disabled learners, poor psycho-educational background of the family particularly among the first generation learners, rigid nature of curriculum and defective system of evaluation, lower scope of motivation and facilities for education of the excluded, lack of inclusion-mindedness, etc. form the significant ones among others, concerned with commercialization of education and educational support schemes.

A discussion has been initiated here over such perspectives with logical base and with a view to analyzing the real situation of 'Education for All' scheme of government of India, in general and modern system of education, in particular.

**Key words: Inclusion, education, food aid programme, ICT, challenges**

## **Introduction**

The term rural education is viewed as one concerning with a teaching-learning situation in educational institutions, situated away from urban sectors and generally considered as not enriched enough to cater to the needs of learners in terms of their personal, academic and social development, in contrast to urban sectors, on account of either deficiency in certain resources or inefficiently oriented technology. Basically, all educational facilities available in rural areas are taken for granted to place under the purview of rural education, the insufficiency of which may be due to deficit in availability of modern technology based facilities concerned with multi media and other Information Communication Technology (ICT), awareness and consciousness towards attainment of excellence, ever changing scenario in the field of education in general and requirements of learners with special needs, in particular as well as lack of expert teachers and counsellors to deal with such learners. Special-need learner is one affected with some handicapping condition (s) requiring some form of special educational support, treatment and services in order to function with full potential and on par with their normal counter parts having average general mental and other performing abilities.

Here, the term special need learner is used in a broad sense to incorporate disabled of any kind as well as never schooled children. In such situations, inclusion of all such learners with special needs in the main stream of education may not be a possible reality, at ease. The initiation of inclusion has now become more and more essential as well as inevitable at secondary level of education, particularly in the ever neglected rural sector when right to education has been granted as a fundamental one to every child of the country up to the age of 14 years, at elementary level.

This may counteract the process of exclusion of those children who are yet out of reach of school due to some socio-economic or psycho-educational hindrances. Exclusion is observed as occurring on account of either some exceptional school situation and inappropriate school function or programmes, not supporting the pre conditions of learning.

The first element is concerned with a condition which according to Davis (1998) is a concept, developed by Steve Lilly that describes a school setting in which a student's interaction with the teacher has been restricted to such an extent that requires some external intervention to make the teacher deal effectively with the students. In such a situation, it is not assumed that the student alone is totally to be blamed for school failure. Rather, emphasis is placed on assessing and possibly modifying the student's interaction with the total environment (e.g. parents, community and school) in order to develop a more appropriate school programme for the students according to their special needs.

The other one is related with the teaching-learning schedule of the school, activities based on curriculum, techniques and styles of teaching, co and extra curricular activities and school resource based support for the students, not in tune with the conditions and psychology of learning as well as creation of interest in it.

## Discussion

### *The world food programme (WFP): Food support from school*

In remote poverty laden rural areas of developing countries, food security is one of the dominating factors concerned with non-schooling. The World Food Programme (WFP) is an international level attempt in this direction to resolve the issue with a strong belief that nutrition and education both are essential for breaking the vicious cycle of poverty and hunger, especially for the low resource families.

In those families having no bread earner or with very meagre earning, educational need becomes subsidiary to bread and butter. For the hungry poor, settled in remote rural areas leading often nomadic life, ensuring better earning and education draws little attention. The scenario is not so only in our country, but similar situation exists in many other parts of the developing world, even in this era of high scientific advancement and technological development geared with ICT, education not providing any immediate output for them.

WFP initiated food aid-in programmes which supported over 17 million beneficiaries concerned with primary education and other training for the rural poor, in 2001. WFP knows that giving poor people education and other training for making their lives better, is to cause sustainable development at its best and thus the largest WFP programme related to education was initiated as school feeding over the past forty years to provide nutritious meals and take home-rations for school children in poor countries, all over the world.

In 2001, WFP fed more than 15 million children in 57 countries to improve literacy rate and help them to break free the poverty cycle as it was observed that on a full stomach, a student's ability to concentrate and learn is dramatically improved, in comparison to the starving situation. This observation was mentioned in a study conducted by the International Food Policy Research Institute and explored to refer by Morris (2002) in his study on food aid for rural education and women's empowerment. Take home-food is also implemented as an innovative and school support tool to encourage parents to send their children, especially girls, to schools, regularly.

Another WFP study reveals that school feeding programmes improve the over all educational environment which is also reported by Morris (2002). This builds parental and community involvement better, in turn, strengthening the schools to benefit from food aid. 'Food for Training' programme is a well integrated part of WFP programme running in 47 countries, planning to reach over two million beneficiaries. Skill training for income generation activities, life skill and literacy training as well as provision of special initiatives for persons affected by HIV/AIDS are all basic parts of WFP's wide range of food for training programmes which used to show special emphasis on meeting the educational and skill development needs of poor women, as they form about two third of the beneficiaries of such programmes.

WFP food and aid programmes not only just help poor people to read but also to reduce geographical disparities that exist between the rural and urban sectors primarily in developing countries. Further, they reduce student's drop out rate, opening doors for continuation of further basic education and its completion; requiring literacy as the critical prerequisite for achieving the latter. The life-skill based training with technical knowledge empowers the trainees to manage: water resources through rain water harvesting and water conservation, sanitation and agricultural assets created by food aid, use of appropriate seeds, employment of modern storage technology for food preservation, management of natural disasters and attention to prevention and follow up of severe health issues.

As the FAO/UNESCO Flagship Programme on Education for Rural People takes off, it may be presumed that it would be able to initiate new and strong partnerships that utilize what each of us can contribute to meet the educational needs of the hungry poor with the message that investment in people is an investment for a sustainable future.

Our Mid Day Meal School Programme is also a part of such international programmes which has become now the largest provider of nutritious meals and 'take home food' based relationship developer in India for the school children; WFP programmes around the world earned credit and recognition for its food for training programmes running in 47 countries.

In India, the Panchayati Raj System and concerned agencies are playing a critical role trying to manage and sustain our midday meal supported educational programmes initiated for poor and specifically rural children with utmost sincerity and dedication. But some constantly growing challenges have arisen to be noticed and nipped in the bud. They are related with such highly esteemed inclusion oriented programmes, with the need overtaken by the greed of a few people of commercial interest, who dare awfully to consider education as a commodity and all of its related tasks as parts of such profit making business.

This is tending to cause deterioration in the quality of the food supply and its aim for attainment of the target. Food materials and items, lower in quality and quantity, are being supplied and fed to the hungry children causing severe health hazards. Often such food materials are prepared and served in most unhygienic manner as reported by the print and electronic media of India.

Thus, the basic issue becomes ensuring and implementing strict quality control measures in the case of all such programmers in force for rural children, to guarantee attainment of the target within the time limit. Academic achievement based targets are also to be achieved through eradication of child labour, ensuring all children to reach schools to learn up to the age of minimum 14 years, enhancement of literacy rate, decline in the drop out rate at primary school level and also efforts to solve the problems like wastage and stagnation at this level of education. The Panchayati Raj System may share and shoulder all these responsibilities well to serve the poor of the rural sectors as well as the rural children.

### *Some concerns of growing challenges*

There are some other challenges too raising the obstacles on the way of inclusion of all children of school going age in rural sectors in formal educational set up of educational mainstreaming. Some are connected mainly with the rigid outlook and mental set up of the people due to poor literacy and some are concerned with socio-cultural set up of the region like tribal belts.

The former is related with psycho emotional factors associated with superstitious beliefs and taboos, eradication of which is often found very difficult. Prohibition of women education and school going practices are yet found significant within some tribal and aboriginal belt of the country where there is no belief in the slogans like work is right and worship for all and education is the fundamental right to all. It is only education, which may enlighten such people and therefore, adult and continuing education is considered as the most significant tool at the disposal of curtain raising educators for not only eradication of illiteracy through enabling adults to read and write but also the enhancement of their psychological flexibility and logical reasoning abilities to think rationally and analyse critically any situation at present or for future, to take long term decisions for their own betterment as well as for their children.

The latter is concerned with socio-cultural factors like class sensitivity, caste consciousness, cultural lag, gender discrimination, religious affinity and attachment, challenges related with disabilities or non recognition of the abilities of the differently challenged learners, poor psycho-educational background of the parents and decision making family members of the first generation learners, and so on.

The third category of factors are related with the educational programmes and institutions: they are rigid nature of the school system, curriculum in use, ineffective system of evaluation in practice at school and higher levels of education, little scope for making provision of right kind of feed back and motivational inputs to ensure facilitation of learning for the excluded, educational set up without well planned learning schedules, lack of inclusion oriented mentality to the sense of bringing all learners in the light of education on one hand and differently abled learners on the other to the main stream of education through proper socialization of such learners, etc.

Class sensitivity and caste consciousness are yet in dominance in rural India (and even in some urban regions too) though others like gender discrimination, religious affinity and attachment in the name of faith (astha) are becoming less significant day by day. Class and social status are created by wealth and caste by birth and none is concerned with the issues related to ability, morality and value maintenance in life. It is yet believed that all abilities and qualities, values and moralities are imbibed in caste itself and preference is always given in a developing and democratic country like India to the class and caste over other social and personality traits and character development. It is either being done behind the curtain of some governmental policies like caste based reservation facilities or some where at local or even at personal levels which surely ensures low work efficiency in performance and substandard output in consequence. In such condition, development of serious work culture which is essential for cultivation of a learned society remains far away because those who may work are not in a position to do so due to lack of chances and those who are enjoying the opportunity, can not do any work due to lack of abilities, moral soundness and strong value oriented base in their life and living styles.

Non-recognition of inherent abilities of the differently abled learners is another significant factor causing a lot of havoc in rural education where disability of any kind is attributed to grant of a curse of God or due to any misdeed of the person in previous life. The concept of 'pap and punya' as well as of rebirth are doing all hell over spreading the light of education as there is a significantly large number of literate and educated persons in our country who are having enough faith in such beliefs and ideas. 'Ram' or god is the ultimate authority to do (work) and it is He who is providing us with our daily bread and butter to survive because as He has created us (life) and thus it is the basic duty of God to feed us and doing much efforts for it is of no use because everything and all attainments are predetermined and written on our luck which is not changeable.

This type of philosophy is causing enough harm due to negligence of the inherent capabilities of differently abled learners and debarring them from availing mainstreaming facilities in the field of education. Either pity or hatred is the due for such learners and yet prevailing in remote rural areas where none is concerned with motivating such learners to do well and recognizing their interest, abilities and aptitudes as they are not in the tune of their average or normal counter parts in schools.

Lack of resources and facilities along with carelessness is another factor which is adding some points in negation. Ours is the country where even in these days, all public places are not constructed as hindrance free and in disabled-friendly manner, though we are aspiring to talk about inclusion and mainstreaming of such children in the field of education. Even school buildings are not made suitable for disabled learners with ramp etc., in urban areas and then one can easily imagine the conditions of other public places like railway platforms, airports, banks etc. in cities leaving aside the rural sectors where now more and more constructions are getting much impetus with the expansion of metropolitan cities.



Poor psycho-educational background of the decision making family members of the first generation learners is the other strong factor to disappoint and debar them to continue in the field of education for sustenance of learning who instead of providing ample motivation to differently abled learners, used to do injustice with them through demotive acts and comments and this situation will prevail till education is not provided free of cost to such learners at any level, though government is amply trying to provide with much incentives for such learners. Free and compulsory education may help to improve the situation well at all levels, including professional education.

### *Challenges concerned with institutional factors*

There are some institutional factors which are playing determining role against inclusion in rural education. Rigidity of curriculum is the significant one among all. Curriculum in same form is mandatory for all learners with little scope of variation and distraction. So, is the school programme and schedules, time table, attendance and other disciplinary rules and regulations which may not be taken as of much help to foster the ability of free thinking, working in and with nature, studying according to one's own choice, need, interest, capacity, learning speed, styles and requirements.

The existing institutional system used to teach learners to copy and at least to be at par with others to score well. Slowly, it generates tendency to compete with other learners considering them as rivals than to work as friends. Competition in positive sense is good for improvement in career but in extreme sense when it converts to cut-throat-competitiveness, it earns no democratic credit. To shape and size the tender mind of young learners, acute level of competitive tendency develops the sense of better and worse, superior and inferior without giving any attention and credit to we-feelings, sense of cooperation, assistance and tolerance which are considered as very much essential to foster the democratic values among the future citizens of the nation.

Our existing system of evaluation is targeted to assess cognitive abilities and laying some stress over acquisition of psycho-motor skills and techniques but in real sense having little concern with development and evaluation of the abilities related with the affective domain. Rigid information oriented curriculum begets rigid evaluation system without ample scope of motivation for young learners to think, to feel, to do and to live together with all other living beings on the mother earth. At all stages of education, the situation is more or less the same and those who cram and memorize well, they are having more chances for doing well. Innovative idea and ideation through divergent thinking may not have much scope and consequently learning is supposed as meant for forgetting by the next day of examination or evaluation. So, for the excluded, there is little chance of preparing more flexible curriculum and experience based evaluation system with well designed teaching strategies, as the same pattern is granted as good enough for all, though due to individual difference, all learners are possessing an unique and extraordinary set of mind and nature.

Since the rigid institutional system is in function within the purview of non flexible curriculum, facilitation of learning for inculcation of innovative and divergent thinking among learners is hardly possible in real sense and the ineffective system of evaluation is impotent enough to assess the creative abilities too to validate the actual degree of learning. Open learning environment with little restriction is very much required for this purpose but the existing system of education prompts one everywhere to be controlled. So, such system of education may never be suitable for all types of learners. Inclusion needs change and complete overhauling of the present system of education and evaluation indeed.



### *Improvement in the situation*

Situation, as perceived by us is not good enough and suitable for all learners, in real sense. So, we are in need of making some change and invariably to make education suitable for all categories of learners, general and special, traditional or convergent as well as for innovative thinkers.

After analysis of the existing situation in rural education in India, the thousand dollar question raised is how to improve the situation. Some experts and investigators have given some ideas over the issue; a brief summary of which is presented below:

- Balakrishnan (2010) while assessing the educational status of the beneficiaries of a poverty alleviation programme in Kerala known as 'Kudumbshre', launched on 17th May, 1998 observed that secondary education increased the age of marriage in Venganoor village, contributed to increase employment opportunities, resulted improvement in decision making mechanism and empowerment of women as well as it helped to reduce the drop out rate to zero in 2007 with raising of an urge for seeking quality education for own children. The increased freedom among women in decision making process, due to additional income benefit, resulted in spending more on children's education in 2007 in comparison with the year 2002.

It is also reported that Kudumbshre was successful in meeting the norms of gender equality and women empowerment through spreading of education among rural dwellers and below poverty line families of Kerala, as it was the flagship programme of the state ([www.kudumbshre.org](http://www.kudumbshre.org)).

- Morris (2002) found that the WFP programme is leading to support rural poor beneficiaries and to enhance favour towards education. He presented example of WFP country programme in Mozambique where it extended support to poor rural households through education added with training in management skills to the rural poor who are most affected by droughts and other natural disasters. WFP has shown that food aid can make a central contribution to advance the common objective related with security and protective measures.
- Valadao (2002) who is concerned with the Brazilian Ministry of Health as a minister, in his article 'Education, AIDS and Sustainability', noticed the significance of information communication technology and mass media campaigns in order to live and learn through long term educational process. So, use of this technology may extend much support to improve the situation undoubtedly,
- Romero and Marin (2010) considered Information Communication Technology as an essential tool in student's academic development in general, and for ensuring constant progress in particular. The results of their study indicated that the participants seem to make use of ICT tools usually for their academic purposes in a variety of types, although some training may be necessary for acquaintance with the technology. They also reported the use of ICT as beneficial for the learners of all categories, even in rural areas, if they are provided with the technological facilities and tool based school support.

### **Conclusion**

With the above empirical observation, it is evident that food and education-cum-training programme becomes the one alternative solution; the other as the proper and optimum use of ICT to improve the existing situation and get rid of numerous hindrances in the efforts for inclusion in modern system of education.

It could thus, safely be concluded that on the basis of such findings some growing challenges concerned with the issue of inclusion in rural education, in the sense of both incorporating all learners in the arena of education up to the age of 14 years having varied nature and learning styles, and in including learners with special needs into the main stream of education, may be conquered with strong will power and vision; but over coming such issues are not impossible. Provision of quality education supported by food aid and other technical and technological supportive programmes at state and central government levels may reap the reward when implemented with utmost care and moral sensitivity as well as with consciousness towards the eternal values of life.

The basic crisis we are facing is of development of ethics and sound moral character among future generation with arousal of strong value consciousness. This endeavour may be possible and successful through proper inclusive educational plans and programmes initiated and conducted by right kind of persons. Those who are lacking in moral sense in themselves cannot succeed to inculcate it among the learners through mere telling and propagation, because values, sense of morality and strength of character etc., could not be taught but are caught by the learners, according to a well known proverb.

Let us hope that we are going to be in a position to face the challenges causing hindrances for inclusion in education in general, and rural education in particular, in our near future to get rid of all such problems through continuous assessment and improvement and be able to serve the nation better, above self.

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# **Importance of Financial Literacy for Women in the 21<sup>st</sup> Century**

**Ranjana Banerjee\***

Department of Education, Loreto College, Kolkata – 700 026

## **Abstract**

Financial literacy will help women to be knowledgeable in financial transactions and help find employment to sustain their needs and demands realistically. Educating women and girls with a preliminary knowledge of finances from the early years of schooling and proceeding with the knowledge to organize them for income generating activities is the role of the education system. Knowledge of ‘Domestic Arithmetic’ which is inclusive of housekeeping expenses, planning budget, minimum monthly saving for illness, banking, interest, fixed deposits and investing in gold as an asset is important. Even with the knowledge of finances in areas like banking and accountancy, they may not have grip over the different areas that make up financial literacy. In spite of the growth of financial institutions like cooperative societies in urban areas and saving credit groups in rural areas, the poor and underprivileged women folk remain outside this development as they lack the resources to participate. Financial literacy must have a practical exposure in a continued manner. Parents, teachers and the education system should feel responsibility in the preparation of financially literate women. The aim of financial literacy should be to devise a strategy of learning to allow women to become financially competent. Skills of managing income and expenditures, investments and investment strategies, understanding the terms and conditions of loans and their mode of repayment and the purchase, sale and transfer of shares are important. The government needs to play a major role with the allocation of funds to women to help them take up entrepreneurial tasks for the survival of themselves, their families and their children.

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**Key words: Financial literacy, role of education, knowledge and skill development, sustainability**

## **Introduction**

Literacy is defined as a basic understanding or ability in a specified discipline. The understanding of finance and its impact on society (financial literacy) is essential for the economic and social security of women and their families. The present century recognizes financial literacy as an essential life-skill that is every human being’s basic right.

Women’s lack of knowledge and ignorance in financial dealings are matters of serious concern and the global society needs to take financial literacy as an urgent action across the world. It is an accepted phenomenon that women play a vital role in family and community life; yet their access to financial education has often been limited owing to various social, cultural, and economic factors. We need to realize that effective community and national development cannot be achieved without women’s full participation as members of a society. Local, regional and national strategies are required to enable women to gain the financial knowledge and skills necessary for them to make their contribution to a holistic national development.

**\*E-mail: [tolika\\_b@yahoo.co.in](mailto:tolika_b@yahoo.co.in)**

## Discussion

The main objective of a financial literacy strategy is to spread relevant information on financial management amongst women by building their financial awareness, knowledge and skills. This will enable them to develop the expertise to use their own finances wisely and make them financially self-reliant for a better and more secure future. Women who achieve economic prosperity will release themselves and their families from a future of poverty.

The recent worldwide economic downturn and financial crisis highlighted the importance and the need for financial education. Angel Gurria, the Secretary General, Organization for Economic Co-operation and Development OECD (2012) said: ‘the low level of financial literacy observed in most countries has been, if not a direct cause of the crisis, at least one of the aggravating factors’. The OECD (Monticone and Messy, 2012) defines financial education as ‘the process by which financial consumers / investors improve their understanding of financial products and concepts and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being.’

Thus, financial literacy has three key components:

- financial knowledge and understanding,
- financial skills and competence, and
- financial responsibility

### *Financial knowledge and understanding*

In the past few decades there have been many changes in the global financial environment. The changing nature and functions of banks, building societies, finance and insurance companies have resulted in the development of highly complex and interrelated national and global financial institutions. Access to money and the widespread use of credit and debit cards has conceptualised transactions and made financial activity less concrete in nature compared to the primarily cash based society of the past. Credit and loans have now become widespread and are much more socially acceptable. For women to make sound financial decisions either for themselves or on behalf of their households, it is vital that they have sufficient knowledge and understanding of the core financial principles involved. Deregulation of the financial services industry has increased the number and range of financial products, providing increased choice. To make informed choices, today’s consumers require greater levels of financial capability than those of three decades ago.

Some of the changes resulting in the 21st century financial environment are:

- Many people now make their own decisions about how to plan for retirement rather than relying solely on government or company provided pension schemes
- The rapid uptake of financial technologies such as ATMs, EFTPOS, Internet and Telephone banking
- A prematurely affluent teenage population having money available for short term aspirations without having to fund their longer term needs and essentials

- A rapid increase in debt, with student loans the norm, and hire purchase and credit cards part of normal consumerism in society
- Goal setting and influence of goals on spending activities
- Household and individual budgeting
- The need for income and various sources of income
- Spending and payment activities and methods
- How and why income is related to time and value of effort
- The tools used to manage money and credit
- Protection and insurance of the family and its assets
- The influence of life stages on financial decisions
- Planning for retirement
- The understanding tax and welfare benefits
- The impact of debt on individuals and households
- The importance of good financial record keeping
- Investment as a tool for future security

### *Financial skills and competence*

Financial literacy helps to protect women from unexpected events, such as fraud and scams, and enables them to have an informed voice as consumers and citizens. Personal financial well-being contributes to the efficiency and prosperity of the national economy. Financial decisions impact on three areas – a) they impact on the income earned as decisions about career choices and work options, often influencing the level of income likely to be earned b) financial decisions about saving and spending, making impact on the level of wealth accumulated and c) financial decisions made regarding income and wealth, influencing the potential level of personal well being experienced. The extent to which one can save and accumulate money determines the extent to which a family can comfortably take on their financial liabilities. Decisions are not made in isolation, personal decisions impact on the individual and in one's family and community

All financial decisions have consequences. Some of these are immediate or short term and are easy to relate. Other decisions have consequences, which are some way in the future, and these may be outside one's personal time vision and be extremely difficult to envisage. Financial decisions should always be made foreseeing and analysing their short and long term consequences. Given the current financial environment it is vital that financial literacy is taught at the earliest possible age so that future generations are well equipped with the knowledge and understanding; more importantly to acquire the necessary skills and competence to operate in the complex financial environment. This will require strategic planning, national approach and sustained effort and commitment of all decision makers. Well-planned, well-resourced high quality programmes can play an important role in developing future generation's financial skills and competence while demystifying the financial language.

Improved financial knowledge and skill will empower women to take control of their future and enable them to make valuable contributions to their local and national communities. Important topics to include in financial literacy programmes are:



- The understanding of balance sheets and financial accounts
- Comparison of annual income and expenditure
- The valuation of assets and their relationship to the balance sheet
- The depreciation of assets
- Useful financial ratios to measure financial performance
- Developing realistic business plans
- Monitoring income and expenditure
- Financial delegations and authority
- Terms and conditions of loan and the mode of repayment
- Knowledge of gift and wealth tax
- Investments in domestic / public and private Mutual Funds
- Asset and liability management
- Sale and transfer of shares
- Knowledge of Income tax and the method of tax remittance

### *Financial responsibility*

Financial literacy has now been broadly accepted as a core ‘life skill’ rather than an extra one ‘nice to have’. Financial literacy programmes empower individuals and families to make sound financial decisions and are important tools for achieving financial responsibility in the wider national and global context.

The need for financially responsible behaviour has never been greater than today. The recent worldwide economic downturn and finance company collapses have further highlighted the importance and the need for financial literacy that can lead to financially responsible behaviour. The contribution of the low level of financial literacy in aggravating the international financial recession is relevant from the statement of the OECD Secretary General (2009, *loc cit.*): ‘*the low level of financial literacy observed in most countries has been, if not a direct cause of the crisis, at least one of the aggravating factors*’.

More and more countries are developing tailored financial education strategies and programmes and are introducing financial education into school curricula to improve financial literacy. It is hoped that introducing financial education at an early age will influence people’s financial behaviour at different stages of their lives and encourage them to investigate their own attitudes and practices towards money. While the recent recession has resulted in reduced use of credit cards, and there are indications of some households repaying debt; it has also led to significant loss of value in financial assets and property, affecting the net worth and retirement incomes of many who are approaching superannuation. The economic outlook remains uncertain.

Against this backdrop, in planning the finances people need to be reminded that their actions have consequences and every financial decision they make needs to be viewed in the context of its risks and benefits. Risk is an inherent part of financial planning and needs to be understood and managed appropriately. Financial risk and reward are usually inversely related and risk is not necessarily bad in every situation. However, an individual making decisions will need to have sufficient financial knowledge, understanding and skills to be capable of analysing the extent of the risk relating to their decision. It is this ability to analyse, consider the risk elements involved and be aware of possible alternatives that facilitates a process of financially responsible decision making.



Other key contributing factors to responsible financial behaviour include:

- The changes in pension schemes, with a shifting of risk from governments to individuals, and from Defined Benefit to Defined Contribution schemes, in some countries
- An increase in life expectancy with people's savings having to support them for longer than ever before
- The complexity and proliferation in the number of financial products available
- The low levels of financial literacy and numeric of many people
- The erosion of trust/confidence in the financial services industry
- An increasing level of consumer debt and failure to see the need to reduce personal and household debt
- The availability of easily accessible credit products to an increasing proportion of the population
- Controlling of future uncertainties by constructing less complicated pension plans

### *The role of education in the cultivation of financial literacy*

Educating girls and women from the secondary stages and building up their skills in theory and practice is the need of the hour. Regarding the status of financial literacy, it is evident that in spite of the growth of financial institutions like cooperative societies in urban areas and saving credit groups in rural areas, the marginalized women remain outside this development, as they do not have the resources to participate. Some NGO's have taken partial responsibility to provide training courses in preliminary accounting and finance. Accountancy is an alternative subject in high schools however the management streams include accountancy; banking and finance. Post Masters Degree students participate in internship in various financial organizations. Financial literacy should be part of life long learning for women to help them take up entrepreneurial tasks for the survival of themselves and their children. Financial literacy must have a practical exposure in a continued manner. Budgeting and ways to balance a cheque book should also be included as learning subjects. Parents, teachers and the education systems should comprehensively assume responsibility in the preparation of financially literate women. The aim of financial literacy should be to devise a strategy of learning that will allow both sexes to become financially competent. Adequate learning material on finances should reach students through the process of socialization where teachers must facilitate and disseminate workable knowledge of financial modalities. It is an accepted fact as observed in social behaviour that:

- a) Women who receive higher education are expected to be more knowledgeable in the understanding and execution of financial matters
- b) School curriculum from primary to higher classes does not have any structured content to disseminate simple to complex knowledge about financial nuances
- c) All schools do not have adequate basic and advanced courses in their curriculum for the improvement of knowledge in financial matters either in theory or in practice to help gain an understanding of financial modalities
- d) Commerce being one of the main subjects that primarily caters to knowledge of financial literacy must be incorporated as an integral part of the curriculum for students in the age range of 14-17 years. In advanced level classes entrepreneurship and economics with econometrics are to be included
- e) Schools must help with consumer education courses and components in maths, commerce and home economics courses especially in high school

## Conclusion

Financial literacy skills help women to be employed and sustain their needs. In the present century, with a control over financial matters, women are well prepared to take decisions about their lives and those of their children. It has protected them against financial exploitation by the stronger sex and has enabled them to set up their own lives in the event of any family disruption. Financial disciplines have enabled women to break the glass ceiling and find employment in the male dominated sector. They have attained command over property management along with personal and professional financial management. Women have developed an independent mind with increased buying capacity taking them almost at par with their male counterparts. However, society and the education system still need to introduce economics oriented concrete knowledge for women coming from all strata of society to help them live with financial liquidity and control over their resources.

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# **Study on the Low Participation of Women in Educational Leadership at Government Primary Schools, Ethiopia**

**Asrat Dagne\***

Department of Teacher Education and Curriculum Studies, Bahir Dar University, Ethiopia

## **Abstract**

The present study investigated the challenges affecting women's participation in educational leadership in Gondar town. It was carried out using descriptive survey research design employing both quantitative and qualitative data collection methods. Data were collected from 12 government primary schools using questionnaire and interview guides. The participants included 106 teachers, 24 school leaders, one district education officer and core processes leaders. The respondents were selected using stratified random sampling, purposive sampling and comprehensive sampling methods. Structured questionnaire was used to collect quantitative data from 130 participants. Interview was used to obtain in-depth qualitative information on a number of selected issues. The quantitative data were analyzed using a relevant statistical package. The findings of the study revealed the impressive perception of school leaders and teachers towards women leaders' ability, skill and leadership competence. Despite their ability and competence women are still largely under-represented in the leadership of primary schools in Gondar town. There are several challenges at the self-image, organizational and societal levels preventing qualified women ascending from junior positions in primary schools. At the self image level are such challenges as women still acknowledging the world as masculine, women's fear of balancing professional work and family responsibility, fear of success in achievement, lack of mentor and role models, reluctance of women to hold position of power, lack of awareness and knowledge of organizational culture, dissuading women from taking leadership positions. At the organizational level, insufficient support and motivation from stakeholders, the rules, regulations and norms of the organization, lack of role model, disrespect from male, and women's failure to manifest quality leadership skill in the primary school leadership. In addition, cultural challenges such as cultural and religious sentiment with notions like women inferior to men, male prejudice revealing women as less acceptable than men in the society, misconception of society on women's roles, girls and boys socializing different roles and unfavourable opinion of the society contribute to hindrance to women' participation in educational leadership in the area of study and service.

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**Key words: Educational leadership, primary school, women's participation, challenges**

**\*E-mail: [asratboza@yahoo.com](mailto:asratboza@yahoo.com)**

## Introduction

Education is a pillar for the development of a nation and other changes to bring about better understanding and communication as well as interaction among people. Different research findings support this idea. Emebet (2003) pointed out that education is the basic indicator showing the status of a society, the rate of enrolment and success to determine the income level, influence rate of mobility and confidence. In addition to the personal gains, education is considered to be the driving force behind economic, social and cultural development of a country.

In educational institutions, women are given the same opportunity as men to promote leadership, but females do not become leaders due to the barriers resulting from societal structure, wrong perceptions from family and women's point of view towards leadership, the problem of working hours and career obstacles resulting from educational organization and environment (Shakeshaft, 1989).

Women must occupy leadership positions in educational systems worldwide to provide a gender perspective in educational change and development, and guarantee social justice through gender equity at leadership and decision making levels. The 4<sup>th</sup> world conference of women (1995) called for government's worldwide role to "create a gender sensitive education system in order to ensure full and equal participation of women in educational administration and policy and decision making". The presence of women in leadership role at school level contributes to sensitivity within schools for the well being of adolescent, and provides girls opportunity to consider career choices with role models of women decision makers and leaders. It is also imperative that women be actively involved in leading educational change and given the vital role that the education system of a country plays in both national development and the development of a society with gender equality. For women to be active participants in change and development processes they must be encouraged and provided with the necessary skills and understanding, needed to participate effectively in educational leadership and policy making at both school and national levels.

In the case of Ethiopia right from the outset, the system of education had never been encouraging for women. Policies of education were highly affected by the religious, cultural and other values which consider the education of girls' as low priority item and women are considered to be wives and mothers to assist the master (husband) and engage in household management. The type of lesson given to males and females were different, limiting women's education to reading only and not writing (Amanuel and Mulugeta, 1999).

The logic behind this is needlessness for women to acquire the skill of writing, as the art of writing was meant to be used in the management of administrative affairs of the state and ecclesiastical duties, an area which was not viewed as the proper place for women to indulge. Therefore, it either excluded or minimized the participation of the females in the field of education, there by excluding women from public activities and relegating them to subordinate positions. This practice shows that the traditional system played an active role on the socialization process of gender stratification in Ethiopia (Tafano, 2009).

Women's education attainment paves the way for acquiring administrative positions and also for their participation and decision making roles, necessary to create and retain women's interest to help in their progress (Gelila, 2007). One of the major areas where women could contribute a lot but not yet seen widely, because of different barriers in school administration. The barriers today are not much different from those in the past keeping women away from becoming educational leaders. But it is clearly observed that women have been consigned to teaching and men are clustered in administration. Researchers have used different models and framework to identify the origin of these barriers; some classified them as external and internal explaining as overcome by individual change (Shaeshaft, *loc cit.*).

There is a deep rooted belief that women are not competent to lead, because of the prejudiced idea among people regarding the qualities associated with muscularity with decisiveness, aggressiveness and competence. There is much overlap between leadership qualities and those we associate with females, with an inclination toward consensus building, to be commanding, expressive and nurturing (Hughes, *et al.*, 2007). Much of the characteristic trait of leadership is strongly linked with the current dominating nature of masculinity - tough, competitive, confident, logical, rational and decisive - with the emphasis on control rather than negotiation and collaboration.

The Ethiopian women are subject to gender discrimination in every aspect - economic, social, cultural and legal - of their lives, like their counterparts in other parts of the world.

Gender discrimination affects not only women but also the overall growth of the country. They do have less access to leadership and employment. This significantly hampers women in pursuing their life and reaching the desired destination (Frezer, 2009). Berouk (2004) remarks that in many parts of the world, women are either excluded or marginalized from high level political, social, economic and cultural occupations; indeed the proportion of men elected and appointed as leaders and decision makers, compared to women in similar status is highly skewed with men overwhelmingly dominating the political field across the board. Earlier researchers suggest that the situation in Ethiopia is not different. Women are undoubtedly under represented within different organizations and institutions despite the continuing effort of the government of Ethiopia to increase the participation of women in different decision making positions. Educational management is an area which has been given much attention. However, there are gaps between educational policy and its implementation as far as women's participation in educational leadership is concerned.

According to Bolam and Wieringen (1999), only scarce gender comparative research was undertaken on the role of principals. He attributes the main reason for this deficiency to the very low percentages of women school principals in most countries. Even though the majority of teachers in schools in many countries are women (about 70%), only a small percentage of them are school principals for primary education in the U. S. (The digest of education statistics records only 12% women among secondary education principals). In recent years in European secondary education, the general percentage is about 20, while in Netherlands it is even less around 7% (Bolam and Wieringen, *loc cit.*). This lower percentage of women principals could be called "quantitative gender inequality" which is explainable by the fact that principals, teachers and students do not work in a gender neutral environment. The social debate about the under-representation of women in school management positions revolves round the conflicting rules of heads; but it lacks research based knowledge about specific qualities of women and men in school management positions.

## Discussion

### *Basic research questions:*

1. To what extent organizational challenges affect the participation of women in educational leadership?
2. To what extent the influence of women's self imaging affect them in their participation in educational leadership?
3. To what extent cultural challenges affect women's participation in educational leadership?



## *Research Design*

### *Subject and sample*

The researcher has employed a quantitative descriptive survey method for this study. The quantitative method focuses on gathering, organizing, analyzing and interpreting the numerical data with specific survey method. The survey design is the preferred type of data collection procedure for the study as it is advantageous in terms of the economy of the design and the rapid turnaround in data collection. It is also the preferred type of data collection procedure because it uses formal instrument to study trends, attitudes or practices of a sample. It describes with emphasis what actually exists such as current condition, practice, situation or any other phenomenon. Since the current study is aimed at examining women's participation in educational leadership and challenges, the survey method is appropriate for the study.

The determination of the population and sample schools were based on the 2012 annual statistical report of the education office. According to this report there were 34 full cycle primary schools (all are government schools). In 34 full cycle primary schools there are 34 principals, 34 vice principals (total 68 school leaders) and 746 teachers. In the district education office there are 5 core process leaders and 1 head of office (total 6) are included. It is easy and convenient to obtain detailed and substantial information through interviewing, on matters not covered through questionnaire. These groups of people found in all full cycle primary schools of the district form the target population of the study.

In order to make the sample size more manageable 12 (35.3%) full cycle primary schools were selected. Among these, 3 schools with women principals were selected using purposive sampling techniques to collect data from the female principals more conveniently. Other 9 primary schools with male principals were randomly selected, using lottery method, on the belief that they share similar characteristics with rest of the population of schools with men principals. Regarding other members, there were 343 primary teachers (189 men, 154 women); 12 vice principals (11 men, 1 woman); 5 core process leaders (all men) and 1 head of office in the sample schools. Among them 120 teachers (66 men and 54 women) were selected (sex based proportionate stratified random sampling) making a reasonably representative population, accounting 35% of the total). Besides, 9 men and 3 women principals, 11 men and 1 woman vice principals (total 24 school leaders) were included.

### *Data gathering instruments*

The tools used were questionnaire consisting of closed and open ended questions and interview.

### *Data analysis techniques*

These data were tabulated and expressed in simple descriptive statistical tools. Mean score was used to describe what portion of subjects agree or disagree on the given item. Independent t-test was used to detect whether there was statistically significant mean difference between the views of the two independent groups of the respondents on the given item. One sample t-test was also used to check which inhibiting challenge is significantly affecting women's participation in educational leadership in the study area. The researcher used SPSS (Statistical Package for Social Science -Version 16) to do the analysis.



The discussion is to focus on the extent of challenges affecting women participation in educational leadership in the targeted area of the study by exploring perceptions of the respondents. As a result, some of the challenges were listed for responding whether these challenges affected their respective full cycle primary schools in the last decade, since the participation of women in educational leadership in the district under study. To analyze the data, the five point likert scale was used. The data were interpreted using mean scores obtained as follows: 0.5 - 4.9 strongly disagreed, 1.5 - 2.49 disagreed, 2.5 - 3.49 partially agreed, 3.5 - 4.49 agreed, 4.5 - 5.00 strongly agreed. These classifications were applied for tables 1-5 and in all discussions followed. Besides, independent t-test was also computed to see the existence of significant difference in the mean of the respondents among the two groups. The formulated data are presented in Tables 1- 5, along with short discussion under each.

**Table 1: Perception of teachers and school leaders towards women principals**

S. N.	Items	Respondents				t'value	Df	Sig (2-tailed)
		Teachers N=106		School leaders N=24				
		Mean	S. D.	Mean	S.D.			
1	Women's by nature possess skills for managing and leading their subordinates	3.85	.935	3.56	.712	-1.425	66	.156
2	Women have capacity to plan and coordinate desired activities	3.95	.959	3.71	.851	-1.239	57	.217
3	Women can implement rules and regulations	3.99	.961	3.90	.856	.446	57	.657
4	Women have promoted optimum use of resources	3.76	1.056	3.87	.975	.529	55	.597

The significance level at  $p < 0.05$  has been used in the whole discussion

School leaders: School principals and vice principals in table 1-5.

S.D.: Standard Deviation in tables 1-5.

Df: Degree of Freedom in tables 1-5.

As shown in table 1, for item 1, the mean scores of teachers and school leaders were 3.85 and 3.56 respectively, which indicated that the respondents agreed that by nature women possess skills for leading and managing their subordinates. Independent t-test was computed and there was statistically mean difference among the two groups of respondents. Porat (1991) states that female leaders' attributes of nurturing sensitivity, empathy, cooperation and accommodation are increasingly associated with effective administration. While these characteristics are innate and valuable, women possessing the qualities of good leadership still face higher attrition and slower career mobility.

As illustrated by item 2, in table 1 (women have capacity to plan and coordinate the desired activities), it was rated high in their agreement as indicated by the mean scores of teachers and school leaders which were 3.95 and 3.71 respectively. The respondents agreed that women have capacity to plan and coordinate the desired activities. Independent t-test indicated significant mean difference among the two groups. According to the interview answers of educational heads and core process leaders, women were very much competent with respect to adhering strictly to the desired activities of the schools and maintaining definite standards of performance in order to accomplish the organizational goals.

Item 3, of able 1, indicates that the grand mean score of the respondents in both groups lies between 3.99 and 3.90 which marked high agreement of respondents in their opinion on women in implementing rules and regulations of the schools. To see the significant difference among the two groups of respondents, independent t- test was computed and there was no mean significant difference in the two groups.

Similarly, in item 4, the mean scores of teachers and principals were 3.76 and 3.87 respectively, suggesting that women could promote optimum use of school resources. To see the significant difference among the respondent groups independent-test was computed and no statistically significant mean difference was observed among the respondents, further revealing that, women use administrative abilities for coordinating various utilization of allotted resources and extracting work from subordinates.

**Table 2: Organizational challenges hinder women to rise to educational leadership**

S. N.	Items	Respondents				t' value	Df	Sig (2-tailed)
		Teachers N=106		School leaders N=24				
		Mean	S. D.	Mean	S.D.			
1	The rules, regulations and norms of the organizations do not encourage women to rise to leadership positions.	3.66	1.249	3.28	1.373	1.470	48	.144
2	Organizations have occupational segregation in the work place.	3.37	1.369	3.09	1.173	1.151	58	.255

3	Lack of role model woman in the area.	3.50	1.311	3.28	1.275	.868	52	.387
4	Insufficiency of support and motivation from stakeholders and colleagues in women's organizations	3.57	1.265	3.96	.694	2.318	80	.023
5	Women do not manifest quality leadership skill as men	3.57	1.286	3.43	1.162	.543	56	.588

*1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree*

As seen from table 2, item1, the mean score of teachers and school leaders were 3.66 and 3.28 respectively, indicating agreement and partial agreement of respondents in: rules, regulations and norms of the organizations do not encourage women to rise to leadership positions. To see the significance in mean difference among the groups, independent t-test was computed; it revealed significance in mean difference.

As shown in the table for item 2: *organizations have occupational segregation in the work place*, the mean scores of teachers and principals were 3.37 and 3.09, which indicated partial agreement. The independent t-test applied to test significance in mean difference among the two groups on this, positive inference was observed. Institutional challenges affecting women negatively are pointed out by Bond (1996) as: discriminatory appointment and promotion practice, male resistance to women in management positions, absence of policies and legislations to ensure participation of women and limited opportunities for leadership training and for demonstrating competence as a result of power structure in the work place.

Regarding response to item 3, in the table, the mean scores of teachers and principals were 3.50 and 3.28, which indicated agreed and partially agreed on: *lack of role model woman on the area* affects women's participation. Significance in the mean difference was observed by computation of t-test. Thus, one can conclude that absence of role model woman in the educational leadership organization has anti-promotional effect on women's participation in leadership.

Data in the table for item 4: insufficiency of support and motivation from stakeholders and colleagues in women's institution, the mean scores of teachers and principals were 3.57 and 3.96, which indicated agreement of the respondents on the issue raised. To see the significance in mean difference, t-test was computed and significance was observed. This leads one to conclude that the stakeholders and colleagues did not contribute significantly in supporting and motivating female teachers in the participation of leadership.

For item 5, of the table: *women do not manifest quality skill as men*, the mean score of the respondents lie between 3.5 and 4.5, revealing agreement of the respondents. skill as men. No significant mean difference was observed by computation of independent t- test.

**Table 3: Women's poor self image challenges hinder them to gain educational leadership**

S. N.	Items	Respondents				t' value	Df	Sig (2-tailed)
		Teachers N=106		School leaders N=24				
		Mean	S. D.	Mean	S.D.			
1	Women still acknowledge/rec- ognize the world as 'masculine'	3.64	1.243	3.96	.739	-1.838	87	.069
2	Women perceive themselves as less skilful in leader- ship	3.36	1.354	3.75	1.077	-1.650	63	.104
3	Women entertain less aspiration to become school principals	3.61	1.151	3.78	.974	-.748	59	.456
4	Women lack awareness and knowledge of organizational cul- tural and political aspects	3.45	1.139	4.03	.782	-3.266	74	.002
5	Women's fear of success in achieve- ment leads to negative attitudes towards colleagues	3.92	1.084	4.00	.622	-.496	91	.64

*1: strongly disagree, 2: disagree, 3: undecided, 4: agree, 5: strongly agree*

Response on item 1, in table 3: *women's fear of success in achievement leads to negative attitudes towards colleagues* was showing strong agreement as indicated by the mean scores of teachers and school leaders as 3.64 and 3.96. This contributes major challenge in participation of women in educational leadership positions at school level. Significant mean difference was observed across the two groups by independent t- test.

Item 2, of the table: *women perceive themselves as less skilful in leadership*, had the mean scores of teachers and school leaders as 3.36 and 3.75 respectively indicating teachers' partial and school leaders' higher agreement on the issue. Independent t-test showed significance in mean difference among these two groups on the issue.

The mean scores for teachers and school leaders on item 3, of the table were 3.61 and 3.71, which indicated agreement on: *women are having less aspiration to become school principals in their primary schools*. Independent t- test, suggesting significance in the mean difference among the two independent groups is in further support. This finding is similar to Asefa's (1994) generalisation that women showed less aspiration for position in educational leadership.

Concerning item 4 of the table: *women lack awareness and knowledge of organizational, cultural and political aspects*, the mean scores of teachers and school leaders were 3.45 and 4.03 showing teachers' partial agreement and school leaders' agreement on this issue. Respondents believe that the given inhibiting challenge affects women's participation in leadership. Independent t-test showed significant mean difference.

On the item 5 of the table: *women's fear of success in achievement leads to negative attitude towards colleagues*, the mean scores of teachers and school leaders were 3.92 and 4.00 indicating strong agreement. Independent t-test showed significance in mean difference among the independent two groups of respondents. The inference the respondents give is inhibiting challenges had negative impact on women in the participation of educational leadership. Shakesht (*loc cit.*) points out that women fear that success in competitive achievement situation will lead to negative consequences such as loss of femininity and gain in unpopularity. This failure or success dilemma is the self image, women entertain and has to be recognised and corrected by male and/or female peers, superiors and subordinates.

These findings lead one to understand that domestic issues are challenges that are originated from home. Women manifest them in the family (home) environment and situations. Apart from school managers, women are part of a family. They play a central role in their family development. Both men and women contribute to the family welfare, but women play a pivotal role in running the family. The double role played by women as managers and as home keepers, places enormous stress on them. These create roles' conflict on trying to maintain a balance between family responsibility and administrative duties.

**Table 4: Cultural challenges that hinder women to rise to educational leadership**

S. N.	Items	Respondents				‘t’value	Df	Sig (2-tailed)
		Teachers N=106		School leaders N=24				
		Mean	S. D.	Mean	S.D.			
1	Women are no risk takers when compared to men	3.89	.914	3.41	1.073	2.339	45	.024



2	Women have less acceptance than men in society	3.74	1.098	3.50	1.077	1.069	51	.287
3	Nature favours male to be leader than females	3.69	1.081	3.34	1.066	1.587	51	.115
4	The cultural and religious sentiments of women are inferior to those of men	4.08	.937	3.63	1.039	2.371	47	.019

1: strongly disagree, 2: disagree, 3 undecided, 4: agree, 5: strongly agree

In table 4, item 1, respondents were asked to analyze: *women are no risk takers when compared to men*. Mean score values of teachers and school leaders were 3.89 and 3.41 respectively indicating agreement. This inhibiting challenge discourages women's participation in educational leadership. Independent t-test was computed and found significant mean difference among the two groups of respondents.

The responses to item 2 of the table: *women have less acceptance than men in society*, gave mean scores of teachers (3.74) and school leaders (3.50) which indicated agreement as an attribute to their negative challenge to their leadership. Independent t-test exhibited significance in mean difference across the groups. It is thus leading one to infer that even when women are well qualified and experienced, the dominance of males in management has produced a culture inducing male behaviour patterns as the perceived norm and women often finding it difficult to impress society to accept them as equal to man.

Item 3 in the table: *nature favours male to be leader than females* produced responses from respondents whose mean scores were 3.69 (teachers) and 3.34 (principals), indicating that the respondents agreed it as inhibiting challenge affecting women teachers in their participation in educational leadership. Independent t-test revealed significance in mean difference among the two independent groups.

For item 4: *the cultural and religious sentiments of women are inferior to those of men*, teachers' and school leaders' mean score values were 4.08 and 3.63 respectively; this indicated agreement of the statement pointing women's inferiority to men as the most serious socio-cultural barrier of women teachers to rise to educational leadership. Independent t-test showed significant difference. This finding supported the ideas and some cultural believes that women are inferior to men and thus cannot be leaders over men. Because of their womanhood, they are thus considered to be weak and not fit for leadership positions. Gillard (2001) argued that the problems female faces were partially rooted in "the pattern of gender socialization and belief system". This author's opinion, based on the present study, is that apart from the prejudice and discrimination against women from others, women themselves develop lower self-esteem suppressing their achievement desires. In general, cultural challenges discussed above, have negative impact on women leaders.

**Table 4: Cultural challenges that hinder women to rise to educational leadership**

One sample t-test was used to detect which inhibiting challenge is significantly affecting women's participation in educational leadership in the study area ( $t=3$ )

Challenges	Respondents	Mean	S.D	t-value	Df	Sig (2-tailed)
Organizational	130	3.4330	0.70293	-1.120	129	-0.06703
Cultural	130	3.6313	0.74746	2.064	129	0.13134
Women's self image	130	3.5951	0.74597	1.498	129	0.09511

*1: strongly disagree, 2: disagree, 3: undecided, 4: agree, 5: strongly agree;  $p<0.05$*

Table 5 reports the mean, standard deviation, t-value and two tailed significance test of each challenge in the study. The mean values of all challenges were found to be greater than the expected mean or the scale mean ( $M=3.00$ ), which used to measure the extent of significance of challenges affecting women's participation.

Table 5 further shows that the mean of each challenge obtained from respondents confirmed that the cultural challenge is the most dominant factor hindering women from becoming educational leader of schools in the sample region. Lodiaga and Mbevi (1995) revealed that there were cultural causes for under-representation of women in positions of authority and responsibility. These were deep rooted traditional/cultural concepts that influence women's participation in educational leadership. These socio cultural beliefs and stereotypical views promoted the notion of women's unsuitability for positions of power and responsibility. As a result of these attitudes grew significant gender based difference and conflict at both family and workplace. Nozmo (1995) also contends that the socio cultural myths and believes about the role of women in society are major determinants of women's failure to reach top management levels in public sector.

These facts point one to understand that even when women are well qualified and experienced, the dominance of males in management has resulted in a cultural trait where male behaviour patterns are perceived to be the norm and thus, women often find it difficult to be acceptable as equal to men by society.

## Conclusion

The findings of the present study can lead one to conclude that the perception of school leaders and teachers were high towards women's ability, skill and leadership competencies, recognizing and accepting their ability. Women possess the necessary ability, skill and competence to accomplish the respective responsibilities in the primary schools. Despite their ability and competence women are still largely under-represented in primary school leadership in the studied area in Ethiopia. The finding revealed that women leaders in primary schools face unique obstacles in their substantive position, school administration and organizational responsibilities. Women's poor self-image and hesitant approach to organisational and cultural challenges appear to be major factors affecting women participation in the educational leadership positions.

## Recommendations

1. Female teachers possess the necessary ability, skill and competency to accomplish the respective responsibilities in the primary schools. They should be competent and committed for every duty and responsibility in the schools to break the traditional belief of society that only men can take leading role.
2. Women should involve themselves in managerial work to gain experience and authority from 'in and out' sources including net services.
3. There should be social recognition of participation of women in leadership positions at school level and this requires attitudinal change and encouragement of all stake holders.
4. Women should be empowered through training to acquire skills on leadership; they should be encouraged to take up positions and responsibilities when required. There is also need to educate the community on the potential of women in leadership; this will improve not only the status of working women but also the entire society set up, removing wrong perceptions, outdated cultural beliefs and misleading myths. The study also recommends that men, in leadership positions, should encourage, support and appreciate good work and behaviour of their women counterparts and treat them as equal partners in life, education and profession.

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## **CURIOUS FACTS, MATERIALS, PROCESSES AND BIO ACTIVITIES**

### **Beating the superbugs (Notre Dame Chemists discover new class of antibiotics)**

Mayland Chang and Shahriar Mobashery of the University of Notre Dame, Indiana, USA have discovered a new class of antibiotics to fight bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) and other drug-resistant bacteria. Screening in silico of 1.2 million compounds revealed that oxadiazoles would inhibit a penicillin-binding protein, PBP2a, and the biosynthesis of the cell wall that enables MRSA to resist other antibiotics. The oxadiazoles have demonstrated oral efficacy against MRSA and given that there is only one such antibiotic on the market this could prove a very useful find in the battle against a microbe that kills tens of thousands of people every year.

### **Snore Activated Nudging Pillow – A potentially revolutionary new sleep aid**

Scientists in New York have now come out with a “Snore Activated Nudging Pillow” – a potential revolutionary new sleep aid that could transform a fair number of lives. The pillow's integrated microphone picks up the sonic vibrations of snoring, automatically inflating an internal air bladder that increases the pillow's depth by 3“- just enough movement to rouse a sleeper into moving head or body position. With a 30 minute delay setting that allows one to fall asleep without triggering inflation, the microphone's sensitivity can be adjusted for light or heavy snoring and the bladder can be manually inflated. What is curious is why the sound doesn't wake up a snorer through such high-decibel noise will make him or her wonder about an intruder

### **Carbon dioxide to acrylate (CO<sub>2</sub> could produce valuable chemical cheaply)**

A cheaper and more sustainable way to make the commodity acrylate from carbon dioxide rather than oil has been developed by researchers in the US. Wesley Bernskoetter of Brown University and colleagues there and at Yale University have shown how they can break open five-membered rings formed between carbon dioxide, ethylene from biomass and a nickel catalyst using Lewis acids. This facilitates an elimination and formation of acrylate. “We thought that if we could find a way to cut the ring chemically, then we would be able to eliminate very quickly and form acrylate”, explains Bernskoetter. “And that turns out to be true.”

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# Value Preferences of Prospective Teachers

**Ripenjeet Kaur\***

Surjeet Memorial College of Education, Malwal village, Ferozepur – 142 052, Punjab

## Abstract

The current decade has witnessed rapid scientific and technological changes and advancements which have benefitted mankind immensely. Mad race for materialism has led to degeneration of moral and social values like honesty, loyalty, courtesy and respect for elders. The present study is an effort to evaluate the value preferences of would be teachers (teacher-pupils) who are known as builders of society. To inculcate true education it is essential to get the knowledge of present situation of prospective teachers and to find any lack of values, and devise means to correct / improve the situation. Results of the present study reveal that there is no significant difference of value preferences among prospective teachers in relation to sex, teaching subjects and location of the college where they are undergoing training. Also, their order of preference for values is not conducive to provide value education to the students.

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**Key words: Teacher education, prospective teachers, values, preferences**

## Introduction

Education is essential for the growth and development of an individual as well as of society through the inculcation of desirable values. In education this crucial and all pervasive role is played by the teachers. Teachers are an amazing group of people in shaping the destiny of children in the classrooms. Good human values help the teachers to motivate, inspire and inculcate the desirable human values among the future generation. This is only possible if these values are first to be cultivated and consistently practised by teachers. Value attainment among prospective teachers is significant in the sense that they are both students as well the future teachers responsible for value development of the upcoming generation. Values play an important role in the life of an individual as it is the important one that satisfies human desire. The importance of values and their realization through education can be gauged in the words of Dr. S. Radhakrishnan (MHRD, 1966): "Education is not limited to imparting of information or training in skills. It has to give the educated a proper sense of values" Values are part of inner life of human beings and are expressed through behaviour. They occupy the central position in accounting for difference in their life styles. In general, we can say that values become the key choice, shaping the type of life, one builds for oneself; kind of person one becomes and reflects one's basic behaviour in private and public life. Value is an intrinsic truth and essential norm for human existence (Taneja, 2006). Value is a measure of all good things in life. But this meaning of value has been changing from time to time with the emergence of new concepts, but fundamental approach is the same throughout.

**\*E- mail: noorbrar29@yahoo.com**



Broudy (1965) viewed that the term value is a general one for worthiness to be chosen. Whatever we choose to perform and act, we do, because we have decided that it is the right thing to do, it is what we ought to do, and it is a claim which we acknowledge as purposely chosen, because among all available alternatives, it is the best thing to lead to more satisfying consequences. Brubacher (1969) opined that values may be defined as a simple or immediate liking, prizing or desiring. They satisfy a unique craving or work which cannot be satisfied by any other thing. Sharma (2005) says that there are always before a man a number of alternative choices and the choices are made according to one's personal satisfaction. The process of choosing from the alternatives is essentially a value process.

Values can be defined operationally to include norms of right conduct and good intellectual and moral habits. Thus, six core moral values could be: *love for truth, love for God, respect for life, respect for authority, reverence for sex and respect for property* (Good, 1969; Oxford Dictionary, 1990)

Abdul Kalam (1999) emphasises: "Value pattern of a teacher as a person is very important as chances of a teacher's being maximum beneficial to the development of values of pupils are small unless the teacher maintains his value pattern at a high level". Das (2004) felt: "Values grow from a person's experiences. It is expected that different experiences would give rise to different values and any person's values would be modified as the experiences accumulate and change. Values may not be static as one's relations to one's world are not static. As guides to behaviour, values evolve and mature as experiences evolve and mature".

## Discussion

### *Emergence of the problem*

Science and technology with its tremendous development has revolutionized the social and economic structure of the society. Spiritualism has given way to materialistic outlook. In recent years there seems to be a crisis of values (Kapani, 1996). The fabric of society is being torn and age-old ties are breaking up. Respect is a thing of the past; honesty belongs to the ancient world (Sunwani, 2003). Today, mankind obviously faces a difficult situation. The difficulties have been created because of the erosion of values. This has given rise to immorality, which is a worldwide phenomenon. It is a matter of universal anxiety and has initiated the role of education for the society in general and educational institutions in particular for the holistic development of the child. The time has come for everyone to bring about a drastic change in personal philosophy, to reject the philosophy of overgrowth and over consumption and accept the philosophy of restraint and control in daily living. This would be possible only when the public institutions educate the future citizens in regard to new emerging ethics. It can be made possible with the intensive and extensive association of experienced teachers with pupils. The teachers have a decisive influence in shaping the personality of their pupils.

The teacher education programme plays an important role in shaping and moulding the habits, manners and above all character of teacher-pupils to become effective teachers. Erosion of values among our students community is very evident and it would be disastrous if our education system is not equipping the prospective teachers to be aware of this grave situation and evolving suitably. As a preliminary step, everyone must be conscious of the existing value preference pattern among students, so as to develop and implement the relevant measures for value attainment, which is essential to promote values in young children and develop in them the power of conviction. Analysis of the context of value attainment among teacher-pupils or prospective teachers is significant in the sense that they are both students and future teachers responsible for value development of the upcoming generation.

Many studies have been conducted in the area of value orientation of teachers (Best, 1999) and a careful analysis of them gave the investigator an idea to analyse the existing value system among our teacher-pupils, which may throw light on the need for value education in a serious manner.

The study of related literature reveals that views of different investigators with regard to values are multidimensional and diversified and there is lack of studies in value preference pattern of teacher- pupils. In view of this and as the first part, a study of the value preferences of a selected sample of teachers was desired and the outcome is the present article describing the findings to help make future plans.

### *Objectives of the study*

1. To study the value preferences of prospective teachers.
2. To find out any difference between male and female teacher-pupils in value preferences.
3. To find out any difference between prospective teachers of science and humanities subjects in their value preferences.
4. To find out any difference between prospective teachers in their value preferences influenced by rural and urban location of their institutions of training.

### *Hypotheses of the study (Null hypotheses)*

There is no significance difference in value preferences among the teacher-pupils:

1. With respect to gender (male / female)
2. With respect to subjects of their study (science / humanities) .
3. With respect to area (locality) of the institutions of their training (rural / urban)

### *Tools used to conduct the study*

1. Personal Data Sheet prepared by the investigator
2. Teacher Values Inventory (TVI) (Singh and Ahluwalia, 1994)

### *Design of the study*

It is necessary to adopt a systematic procedure to collect the necessary data, to help to achieve the objectives and to test the hypotheses of the study. The present study was designed to investigate the value preferences of prospective teachers based on gender, teaching subjects they opted during their B.Ed. course and location of their college. Descriptive and exploratory survey method was used for investigation (Aggrawal, 1996; Kothari, 2004).

### *Sampling*

The sample comprised 200 prospective teachers (teacher-pupils), studying in B. Ed. Colleges of Education of Ferozepur and Muktsar District in Punjab. The sample subjects were selected on the basis of cluster random sampling method (Aggrawal, *loc cit.*; Kothari, *loc cit.*). There were 133 females and 67 males; 168 from humanities and 32 from science; 95 from institutions situated in rural and the rest from those in urban areas.

### *Delimitations of the study*

The present study deals with the study of value preferences of prospective teachers, which is a vast area with varying fields of research. Hence certain delimitations to allow optimum utilization of resources and time has been made in terms of sample, area and the measuring tools. Thus, only 200 teacher-pupils from two colleges of education of two districts (Ferozepur and Muktsar) of Punjab have been taken. The study has been limited to the following six values only - Theoretical value, Economic value, Aesthetic value, Social value, Political value and Religious value.

### *Statistical techniques used*

1. Descriptive statistics such as mean, median, standard deviation, Skewness and Kurtosis were worked out to study the nature of distribution of scores on values (Garret, 1971; Kothari, *loc cit.*).
2. To determine the significant difference between the means among different groups of the sample, 't' test was applied. On the basis of analysis, conclusions were drawn (Garret, *loc cit.*; Kothari, *loc cit.*)

### *Results*

The data collected from the data sheets administered, after proper introduction and explanation have been presented in table form and subjected to statistical analysis and shown under respective sections (Tables 1- 4).

To describe conveniently the nature of distribution of scores for various measures of values and results, the analysis was divided into two sections:

- Descriptive analysis
- Differential analysis

### *Descriptive analysis*

The descriptive statistics ascertained that score distributions for all the variables of values tended to be normal or near normal in most of the cases (Table 1).

**Table 1: A descriptive data analytic picture of total sample (N=200) on the variable of values**

Values	Mean	Median	S. D.	SK (Skewness)	Ku. (Kurtosis)	Ranks
Theoretical	88.03	88.00	10.35	-.055	-0.462	3
Economic	86.42	87.00	10.63	-.114	0.869	5
Aesthetic	86.44	86.00	8.82	.00	-0.502	4
Social	85.20	85.50	11.76	-.525	0.708	6
Political	88.95	90.00	11.72	-.954	4.06	2
Religious	89.13	89.00	9.52	.288	0.721	1

Values have also been ranked on the basis of their mean scores as shown in Table1 in descending order of preference (highest to lowest preference).

Table1 shows that teacher-pupils scored first rank in respect of religious value ( $M=89.13$ ). It means that they show more inclination towards religious activities; it may be attributed to the social conditions prevailing among the people of Punjab and India, with high religious sentiments and traditions. Sample's second score went for political value ( $M= 88.95$ ). It is undesirable value for a future teacher, expected to show and inculcate values and ethics of educational institutions. Third place was for theoretical value ( $M=88.03$ ); might be due to the fact that prospective teachers are engaged in multifarious duties in the colleges of education and thus can enhance / expand their knowledge / cognitive domain. Fourth preferred place was taken by aesthetic value ( $M= 86.44$ ). It may be attributed to general increased aesthetic sense seen around, reinforced by decoration of their class rooms, preparing teaching aids and developing skills for participation in multifarious competitions during their B. Ed. training. Fifth preference went to economic value ( $M= 86.42$ ). It is also a desirable trend among prospective teachers as they are not having materialistic attitude in the field of education because teaching profession is still dominated by service and missionary spirit of a noble profession and economic gains, though important, do not rank high in the hierarchy of values. The lowest preferred is social value ( $M= 85.20$ ) which is highly undesirable and unhealthy for the prospective teachers. This indicates that teachers fail to desire or maintain the ideal relationship with students, their parents and the public which is indispensable for the noble professional ethics.

#### *Discussion based on skewness (Sk) and kurtosis (Ku)*

Results of Table1 show that value of skewness for the sub measures of values i.e. theoretical= $-0.05$ , economic= $-0.11$ , aesthetic =  $0.00$ , social =  $-0.52$ , political –  $0.95$  and religious =  $0.28$  respectively. The range of values varies from  $-0.05$  to  $0.28$ . Values of skewness for aesthetic and religious values are positively skewed whereas values for theoretical, economic, social and political are negatively skewed. These are within the acceptable limits of normality+.

Values of Kurtosis in Table 1 for theoretical, economic, aesthetic, social, political and religious values are  $0.46$ ,  $0.86$ ,  $0.50$ ,  $0.70$ ,  $4.06$  and  $0.72$  respectively. The range of Kurtosis falls between  $0.46$  and  $4.06$ . All the values' trend is somewhat towards leptokurtic. It is due to the fact that people in India, in general, are more materialistic, social, power hungry and religious minded.

From the above results, it may be inferred that score distribution of measures of values shows slight approximation to leptokurtic tendency. Overall, the distribution has been assumed to be near to normal.

#### *Differential analysis*

This section deals with rank order, in order to know value preferences of the sample (teacher-pupils). Differential analysis has been done in order to compare the differences with respect to sex, teaching subjects, and college location of the sample in relation to values.

#### *Value preferences and t-ratios of prospective teachers on the basis of sex*

Comparison based on means, ranks and 't'-ratios of male as well as female teacher- pupils with respect to dimensions of values are given below:

Table 2 shows that on the basis of mean scores male teacher-pupils assigned first rank to political value, second to religious value, third to theoretical value, fourth to social value, fifth to economic value and sixth (last) rank to aesthetic value; while female teachers assigned first rank to religious value, second to political value, third to theoretical value, fourth to aesthetic value, fifth to economic value and six (last) rank to social value. Table 2 further projects that non significant mean differences exist between male and female teacher-pupils in respect of all the six values. The t-ratio obtained between male and female teachers in respect of these values are not significant at any level of confidence. This indicates that male and female members of the sample do not show much of difference in respect of values.

On the basis of these results hypothesis 1: “There is no significant difference in value preferences of male and female prospective teachers”, is fully accepted.

**Table 2: Mean scores, ranks and t-ratios of male and female prospective teachers on TVI**

	Male prospective teachers (N=91)			Female prospective teachers (N=109)			
Values	Mean	S.D.	Ranks	Mean	S.D.	Ranks	t-ratios
Theoretical	87.95	9.40	3	88.10	11.12	3	0.106
Economic	86.30	10.88	5	86.51	10.47	5	0.143
Aesthetic	85.41	8.72	6	87.30	8.84	4	1.519
Social	86.90	9.96	4	83.77	12.94	6	1.887
Political	89.32	10.45	1	88.64	12.72	2	0.405
Religious	88.77	9.38	2	89.42	9.67	1	0.482

\*Significant at 0.05 level of confidence

\*\*Significant at 0.01 level of confidence

#### *Value preferences and t-ratios of prospective teachers on the basis of teaching subjects*

Teachers were classified into two groups on the basis of subjects taught by them in schools.

- Teacher-pupils to teach science subjects
- Teacher-pupils to teach teaching humanities subjects



**Table 3: Means, ranks and t-ratios of science and humanities prospective teachers as TVI**

	Prospective teachers Science (N = 61)			Prospective teachers Humanities (N= 139)			
Values	Mean	S.D.	Ranks	Mean	S.D.	Ranks	t-ratios
Theoretical	87.92	9.91	3	88.08	10.57	3	0.101
Economic	85.80	9.81	5	86.68	10.96	4	0.538
Aesthetic	87.54	8.35	4	85.96	9.00	5	1.171
Social	83.67	11.38	6	85.86	11.90	6	1.215
Political	89.98	11.06	1	88.50	12.017	2	0.825
Religious	89.54	9.38	2	89.94	9.61	1	0.408

Table 3 reveals that teacher-pupils who have chosen science subjects in schools assigned first rank to political value, second to religious value, third to theoretical value, fourth to aesthetic value, fifth to economic value and sixth (last), rank to social value, on the basis mean scores which are 89.98, 89.54, 87.92, 87.54, 85.80 and 83.67 respectively. Teacher-pupils who chose humanities subjects assigned first rank to religious value, second to political value, third to theoretical value, fourth to economic value, fifth to aesthetic value and sixth (last) rank to social value. Value hierarchy for prospective science and humanities teachers is similar in respect of theoretical and aesthetic value only and show dissimilarity in respect of ranking of economic, social, political and religious values.

Non-significant mean differences are observed between science and humanities pupil-teachers in respect of all the six values. This indicates that science and humanities prospective teachers do not differ with regard to values.

Hence, hypothesis 2: “There is no significant difference in value preferences of prospective science and humanities teachers”, stands fully accepted.

#### *Value preferences and t-ratios of prospective teachers on the basis of location of college of education-where they studied*

Teacher-pupils were divided into two groups on the basis of location (area of occupation) of college of education where they received teacher education training.

- Teachers studied at institution in urban area
- Teachers studied at institution in rural area

**Table 4: Means, ranks and t-ratios of teacher-pupils studied in urban and rural area on TVI**

	Teachers studied in urban institution (N= 105)			Teachers studied in rural institution (N= 95)			
Values	Mean	S.D.	Ranks	Mean	S.D.	Ranks	t-ratios
<b>Theoretical</b>	88.18	10.39	3	87.86	10.35	3	0.216
<b>Economic</b>	85.51	9.68	6	87.41	11.57	4	1.261
<b>Aesthetic</b>	86.29	9.00	4	86.61	8.65	5	0.259
<b>Social</b>	85.97	12.32	5	84.34	11.10	6	0.981
<b>Political</b>	89.15	12.11	1	89.61	11.33	1	0.721
<b>Religious</b>	88.69	10.30	2	88.73	8.61	2	0.685

Table 4 indicates that teacher-pupils, studying in urban and rural institutions have similar value preferences, with both groups assigning first, second and third rank to political (M= 89.15, 89.61), religious (M= 88.69, 88.73) and theoretical values (M= 88.18, 87.86); and assigned dissimilar value ranking in respect of aesthetic value (M= 86.29, 86.61), social value (M= 85.97, 84.34) and economic value (M = 85.51, 87.41) which are assigned ranking 4 and 5; 5 and 6; and 6 and 4 respectively by urban and rural groups of the sample.

No significant mean difference in any of the six values - theoretical, economic, aesthetic, social, political and religious - is observed among the two categories of the sample. Thus, hypothesis 3: “No significant difference exists between teacher-pupils studied at urban and rural area based institutions with respect to value preferences”, is fully acceptable.

#### *Emerging trend in value preference pattern of different groups of prospective teachers*

Emerged value preference pattern of prospective school teachers in descending order of preference is as: religious, political, theoretical, aesthetic, economic and social. Overall most preferred values are religious and political, and the least preferred value is social among them, which is highly undesirable. Results of the study show that the sampled teacher-pupils do not exhibit the desirable value preference pattern.

#### *Educational implications of the study*

- Proper value preferences of teacher-pupils would assist their task in human resource development of their pupils, besides maintaining a healthy, happy and peaceful atmosphere in the institution.
- Admission to B. Ed. colleges has to be selective after testing the proficiency along with aptitude and pattern of value preferences assessment.
- The negative finding of the study needs to be analyzed and remedial efforts to be made by all stake holders of teacher education to change it for the better and more desirable to the teachers and taught in providing quality education.

### *Suggestions for further research*

- This study could be extended with a larger sample, drawn from a wider area of population from different regions of state, and even further with other states of India to evolve strategies for providing ideal personnel and atmosphere for human resource development.
- A comparative study can be planned to assess any difference in the pattern of value preferences of the teacher-pupils undergoing training as regular students and distance education learners

## **Conclusion**

The present investigation led to the finding that the preferred pattern of values of prospective teachers (teacher pupils) is religious, political, theoretical, aesthetic, economic and social in that order. Overall most preferred values are religious and political and the least preferred value is social – certainly a discouraging or unacceptable situation against the generally desired preferences. No significant difference is exhibited by the different pairs of prospective teachers differing in gender (male / female), subjects of study (science / humanities) and location of the institution of training (rural / urban). Though the present time feels the maximum need of systematic value education to students at school and college level, the wrong value preferences of the prospective teachers is a wrong indicator in their ability to impart and impress value education to school students.

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### **Carcinogens and DNA - the missing link found (Seeking Carcinogen-Linked DNA in Tissue Samples)**

Robert Turesky of the Wadsworth Centre at the New York State Department of Public Health and colleagues have developed a mass spectrometry technique that identifies and quantifies chemical signatures of carcinogen exposure in preserved biopsy and tissue samples from cancer patients. The research could allow toxicologists to preserve samples from the last few decades to determine whether or not exposure to certain toxic chemicals might be linked to specific forms of the disease. Snippets of medical samples are usually preserved with formaldehyde and paraffin wax, which had precluded subsequent chemical analysis until now. He has now shown that a banned compound from some herbal medicines, aristolochic acid, known to react with adenosine nucleotides to form DNA adducts can be identified and quantified at the same time in a preserved tissue sample.

### **Shedding light on drug delivery**

#### **(Good Vibrations: Using Light-Heated Water to Deliver Drugs)**

A Scientists from the University of Warwick, UK and the University of Sydney, Australia, have created “Janus” protein nanotubes – nanotubes with two distinct faces. The Janus nanotubes have a tubular structure formed by the stacking of cyclic peptides resulting in a molecular channel with an internal diameter of 1 nanometer, big enough to allow ions and small molecules to pass through. Each cyclic peptide has two distinct polymer attachments that give rise to a two-faced shell for the nanotubes. In the solid state, these materials could act as molecular sieves for separating mixtures of fluids.

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# **Role of Social Novelist in Portrayal of Social Changes in the Era of Globalization<sup>#</sup>**

**Shamala Ratnakar\***

Department of English, Karnatak University, Dharwad - 580 003, Karnataka

## **Abstract**

Today we live in a globalized situation, the differences are vanishing and world citizen concept is emerging, literature mirroring Life. It takes its birth in human society, hence it breathes their aspirations, traditions, culture and tenets of customs, lifestyle. It is often conditioned by these parameters. Social novelist is one who voices the aspirations of people whose life is conditioned by societal values, expected and encircled by social obligations and speaks authoritatively and authentically on the issues related to their social life. An individual cannot be found and studied in isolation. The role of a social novelist is that of a committed writer, who aims at bringing awareness of the social issues and problems. The social, political and economic changes that find place as literary representation in the novels of Indian- English literature need to be revisited and studied from the point of view of reassessment. The seminar on this thrust area chosen is an apt academic endeavour in this regard. This paper aims at knowing the need of literary representation of social, political and economic changes in the novels of 1980 – 2000; a reassessment and tracing out the role of the novelist in the era of globalization.

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**Key words: Globalization, parameter, authenticity, reassessment, aspirations**

## **Introduction**

At present we live in a globalized situation. Literature mirrors life, it takes its birth in human society. Hence it breathes the aspirations of its people, tradition, culture and tenets of customs, life style and aims at portraying that aspect of life/social life which is conditioned by these parameters.

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**\*E- mail: shamalaratnakar@gmail.com**



Social novelist is one, who voices the aspirations of people, whose life is conditioned by societal values, encircled by social obligations and speaks authentically and authoritatively on the issues related to their social life. An individual cannot be found and studied in isolation. The role of a social novelist is that of a committed one, who aims at bringing awareness about the social issues and problems.

This article is in the form of an idea paper which discusses and reworks on this theme. Individual reference to any writer or work is not mentioned in this; references are general in nature.

In the era of globalization English has become an indispensable part of our life. Today, we have grown to look at the large world as part of us. The tempo of Indian life has been infused into our English expression. English has revealed that if a language has flexibility, any experience can be communicated through it. Wherever the creative writer wields the language with honesty and in the free certainty of his own vision, not only does the language become his, but he remakes the language.

Whatever merit the Indian languages can claim for expressing the life of the Indian people and the distinctiveness of the values of Indian life is possessed by English too! In fact it is a world language.

First of all, a writer writes for his society; as a novelist, he has a vision and this will be a vision of life around him. The function of the novelist is to give an original interpretation of life, which is also an image the generation needs. Now speaking about the Indian context, India, in spite of her variety and complexity, is a cultural unit. She has an image of her own culture. If culture can be defined as the sum total of all that is reflected in the mode of life of people – their thought processes and outlook on life and their needs, aims and aspirations - are all best expressed through the literature.

## **Discussion**

There is no better yardstick to measure the culture of a nation than her literature, which is an expression of society. The social novelist, when writing in English or in one of the regional languages, is so much a part of his own cultural as social pattern that he cannot but reflect her image. To project the image of a society is not only a means to transmit a particular society's own socio-cultural identity but also to create an awareness of the social image and social problems in the minds of her own people and the rest of the world. It is at this point, a process in time becomes an individual's sense of belonging to a society. The dynamics of contemporary evaluation, its traditions, socio-cultural pattern and the realities of modern life are naturally reflected in the novels written in the modern period; i. e. in the era of globalization. Especially the Indian novelist faces the problem of giving artistic expression to the effect of economic changes and industrialization on the community, the class caste structure, oppressions, strains and conflicts, family ties and changing social pattern.

The social novelist aims at focusing on the socio, political and economic changes in the era of globalization. Thus, Indian novelist in English surely makes an attempt to deal with the socio cultural problems of a modern Indian. The awareness of Indian as a nation is at the back of his mind especially because he is writing for an audience both inside and outside India. The stock thematic preoccupations of a social novelist are portrayal of poverty, hunger, disease, defective societal taboos. Portrayal of widespread social evils, exploration of the hybrid culture of the educated Indian middle class, analysis of the innumerable dislocations and conflicts in a tradition ridden society under the impact of an incipient, impact of industrialization, themes such as racial relations, global warming, ecological imbalance, socio cultural vortex of the world, impending dangers like terrorism, need for world peace, emphasis on universal brotherhood, egalitarian outlook at the global level, etc., needs to be addressed.

The canvas of social novelist needs to be long stretching and far reaching. He must not cling only to the stock themes. He must rise above, to select newer theme patterns and focus on them, and has to search for new frontiers. This search for new frontiers is the adventure that invites the Indian novelist in English today. Let him draw the inspiration from his local culture, transmute it into process and transform it into the level of global reach with newer approach and novel perspective and strive hard to create an emotional see-saw across continents and cultures, thereby opening up unlimited horizons and enhancing the scope of social novel.

The concerns of today which are universal in nature are individual human worth and dignity, social sanctity, freedom and national aspiration and the need for reconciliation of differences and achievement of equilibrium among differing views and ways of life at the global scenario, confirming thus our human commonality. This is necessary on the broader world scale, because in a globalised world, solidarities exist beyond territorial/cultural social obligations. Globalization involves/demands, increasing communications and network linkages. Today's globe is in increasingly one social space.

Social novelist's canvas is strongly marked by a consciousness of the period in which it is set. The penetrating mind of the social novelist works and it is he who can hold and present before us a social panorama. Of all the literary forms, fiction must be in corresponding contact with the pulse beats of the period, place and life. No writer can be judged without his social background and the period in which he lived. They are inseparable. Hence, social novelist in the era of globalization cannot be found in isolation because he is the product of his age. So, he should be judged as an inseparable product of the contemporary ambiance of the world, the social setting in which he lived and the depiction which he has portrayed in his works.

Every social novelist is a custodian of his national identities like culture, tradition and customs. Globalization has brought in many changes in our lives. It has added new socio economic developmental prestige and status to the world scenario.

Social novelist should rise above mere depiction of social scenario and additionally aim at humanism, the common experience of people, universal brotherhood, and also plan for bringing about drastic social change. Focus on literary projection of socio political and economic changes has to be seen in his creative literary works. Each generation has its own problems of life which are often dictated by the social milieu. Literature is basically a response to contemporary life.

Social novelist has the responsibility of portraying the tenets of social issues and depicting social forces, their influences over the lives of individuals and the process of change, taking place in the society. He must also depict the dynamic relationship between the individual and society. In the era of globalization the canvas of social novelist is expected to be broadened / widened so as to cover the whole world scenario. As Mulk Raj Anand once said: "Social novelist should not live in an ivory tower but indulge and breathe the contemporary ambiance and project it in its sincerity"

## **Conclusion**

It is expected in the era of globalization that a social novelist acts as an activist, conscious of the role he has to play in effecting changes in the social consciousness. The focus of social novelist is in establishing a perfect world society, ideal society, a society which has the hallmark of a healthy society in which no differences exist among people of different race, caste, creed, group and class and is free from oppression.

He should be a catalyst in the realisation of a more free human society, wherein everyone enjoys all types of freedom, mutual respect and lives in harmony with one another on an egalitarian social concept.

The greatness of such social novelist lies not only in the realistic portrayal of life but also in the vision of life which he conveys through it and which we all appreciate and admire to possess.

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### **Polymer runs cold (Heat-Conducting Polymer Cools Hot Electronic Devices at 200 Degrees C)**

Polymers are usually good insulators. However, by harnessing an electropolymerization process to produce aligned arrays of polymer nanofibers, researchers at Georgia Institute of Technology have developed a thermal interface material that can conduct heat twenty times more effectively than the original polymer. The modified material can reliably operate at temperatures of up to 200 degrees Celsius and could have applications as a component of electronic “heat sinks” for cooling computer chips, high-brightness LEDs and the internal circuitry of mobile devices.

(Indebted to: Nature, Science, New Scientist, Online Daily Mail, Alchemist News Letter, The Science and Advanced Materials Journal, British J. Nutrition, Discover Newsletter, Agence France-Presse, Journal of Science transactional Medicine The daily telegraph, New Indian Express, Google and BBC)

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