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# JOURNAL OF INDIAN EDUCATION

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## CONTENTS

# EDITOR'S NOTE

Protecting, conserving and nurturing our environment is the need of the hour today so as to have a healthy and secure life. Steps and measures have been taken to safeguard it as men have realised the importance of the environment. UN has taken initiative to promote and educate the international communities on the environment they are living in. To kindle the collective consciousness of the international communities, UN in 1972 convened 'United Nations Conference on the Human Environment' in Stockholm, 'to inspire and guide the peoples of the world in the preservation and enhancement of the human environment'. This issue includes a compressive discussion on this theme in the form of Madhav Gadgil's lecture. Madhav Gadgil, a renowned ecologist presented NCERT's Golden Jubilee Lecture on the theme '*Parisara*: A Free, Public Domain Knowledge Resource on Indian Environment Developed in a Collaborative Fashion' which brings home the essence of environment that we live in and reinforces that it is the collective responsibility of the State and its people to enhance and promote the health and well/being of the environment. He emphasises that the education sector has the potential to play a vital role through teachers and students to promote and spread awareness about our environment. Developing sensibility towards environment through school education is really an effort towards fulfilling cherished dream of inclusive and sustainable growth. In this regard, an article contributed by Shashi Singh, Ajay Singh and Kiran Singh 'Working towards Inclusive Growth: Skill Development Mission' rightly pointed out that skills and knowledge are the driving forces of economic growth and social development of any country. However, the major challenges and obstacles have been the fast growth rate and poor skill index of its population. Nevertheless, with the initiative cooperation of states and the Centre and with public-private partnership India can achieve its cherished dream of inclusive and sustainable growth and development.

Another article entitled, 'The UGC: Financing of Higher Education in India', by Janailung Kamei Francis deals with the emerging issues in public financing of higher education. UGC is an apex and statutory body solely responsible for the disbursement of grants to the colleges and universities. The article also highlights the challenges and problems faced by UGC in delivering its responsibilities as the country opens up to the globalising forces. He further points out that higher education in India needs a huge amount of resources not merely to provide good quality education but to transform the nation as a whole.

'ICT Kit in Mathematics' by P.K. Chaurasia suggests teachers to use ICT based tools in regular mathematics teaching, experimenting innovations as well

as comprehensive evaluation devices. Shamim Ahmad in his study explores the perceptions of prospective teachers towards using open educational resources to enhance knowledge base, improve learning and conduct research. The article of Jose C. C., 'A Study of Work Values of Secondary School Teachers in Relation to Organizational Culture', highlights teacher's understanding on the work values and organisational culture as a means to quality and efficient management of the schools, especially in public institutions. 'Teacher Preparation for Inclusive Education: A Major Concern for India in New Times' co-authored by Radhakanta Gartia and Sushama Sharma is basically seeking inclusive education for special care needs students in regular schools. And for this task teachers are required to be prepared to handle likely challenges and problem when put into practice. 'Policies and Programmes on ECCE in India: An Evaluation' by Sujit Kumar Choudhary raises the issues of ECCE (early child care and education) policies and programmes in India, whose main target are the vulnerable and disadvantaged children. Through the study it is found that we are unable to meet the said target of reaching out to the unreached even today as far as ECCE is concerned. B.C. Das in his paper, through the case study of Class IX students found Self-Study Material (SSM) significantly effective than the traditional method of teaching as it gives choice to learn in his or her preferred ways of learning.

'A Study of Awareness of Open Book Examination System' by Mandira Sikdar and Swati Amraotkar highlights the usefulness of the Open Book Examination in the present context and opines that this system of examination will inculcate critical thinking among students. However, its implementation requires necessary preparation on the part of academic institution and learners.

Though corporal punishment is legally banned in our schools, it is being practised by many teachers in the name of discipline. A study jointly conducted by Naba K. Mondal and Sunayna Prasad endorsed that corporal punishment is still favoured by a large number of teachers in Indian schools.

In view of the NCF 2005 recommendations, the NCERT has recently developed a new course namely, 'Human Ecology and Family Sciences' for +2 level. The issue presents a brief report about the curriculum and textbooks prepared for the course by Sushma Jaireth. This issue of JIE starts with environmental concerns and concludes with a book review done by Aparna Pandey which talks about environmental hazards. Taking forward this dialogue in New Year 2012 we wish you a green year ahead.

*Academic Editor*
JIE

# *Parisara:* A Free, Public Domain Knowledge Resource on Indian Environment Developed in a Collaborative Fashion *

Madhav Gadgil**

**Abstract**

*To address the important challenge of taking good care of India's environment, we clearly need substantial, good quality information. Unfortunately, pertinent information is in very short supply. Most of it is collected through the state machinery, and is of poor quality and highly incomplete. This is because the official machinery violates the spirit of science by discouraging scrutiny. Modern science has abundantly demonstrated that good information flows from an open, transparent process that welcomes participation from all interested parties. We obviously need to put in place such a broad/based, open, participatory process to develop a sound, comprehensive base of information on India's environment. All over the world, citizens are a great repository of detailed information on many facets of their local environment. Our citizens, especially students and teachers, ought therefore to play an important role in this process of building up a good information resource on India's environment. The rapidly advancing tools of ICT hold much promise in facilitating such a participatory process of knowledge generation. An outstanding example of such an application is Wikipedia, the free encyclopedia that anyone can edit. Wikipedia articles are expected to be encyclopedic, i.e. based on published, authenticated information, and not on primary observations. Thus, a review of published information on birds of Ratnagiri/Sindhudurg district can, while a checklist of birds of a particular college campus based on personal observations cannot, qualify for an article in Wikipedia. However, the Wiki software is freely available for other users to create their own websites. Therefore, such a checklist could be-hosted on a wiki site set up on the website of a school/college, or some other appropriate*

* This lecture was delivered for the Golden Jubilee Lecture Series at Chacha Nehru Bhawan CIET, NCERT, New Delhi on 27 July 2011, by Professor Madhav Gadgil and Published by NCERT, New Delhi.
** *Professor,* Former Chairman Centre for Ecological Sciences, Indian Institute of Science, Bangalore.

*agency. Taking advantage of the wiki facility, other students or interested citizens, observing additional species may then quickly add to the checklist. They may also add images of these bird species in Wikimedia Commons, their Marathi names in the Marathi Wiktionary, classification details in Wikispecies, and show the location of the college campus on Google Earth image. Another application of interest is a shared spreadsheet that is made available to all or selected users for concurrent data entry or modification, usually on a private or public network. One may visualise students from different colleges collecting information on BOD levels and other water quality parameters, in different water bodies, as a part of their Environmental Education projects. They may all be authorised to access a shared spreadsheet on which information from a number of different investigations can be uploaded, validated by a moderator, integrated, analysed and eventually shared with the public. We propose to begin this collaborative process of developing publicly accessible information on India's environment, with a pilot project in Ratnagiri/ Sindhudurg district. The programme may involve the many interested citizens of the district working with a consortium of junior and undergraduate colleges representing both urban and rural localities. It would take advantage of the fact that it is now mandatory for students of Class XI and XII standards as well as for the second year undergraduates in all branches to undertake a major project on environment. It could also build upon the provisions of the Biological Diversity Act 2002 that mandates all local bodies—Panchayats and Nagarpalikas—throughout the country to undertake documentation of local biodiversity resources and associated knowledge in the form of 'People's Biodiversity Registers.'To succeed, such an endeavour clearly needs vigorous scientific support. It is proposed to provide this with the help of a Technical Support Consortium (TCS), primarily of Ratnagiri/ Sindhudurg district/ based scientists. This group will have to develop manuals detailing study methodologies, formats in which quantitative data may be collected to support these studies, as also other resource material such as field guides for identification of bioindicators of water quality. Most importantly, the TCS may help through assessing the quality of the primary data posted by students or other interested citizens on various wiki sites that may be networked to constitute a non-peer-reviewed publication called 'Ratnagiri/ Sindhudurg Parisara Sthiti'. TCS may help in selecting material of good quality from this information resource, help in its interpretation in light of available scientific knowledge and in its publication in an appropriate peer-reviewed medium. Since much of such information, although of good quality, is likely to be of very locality-specific interest, it might be worthwhile organising a locality specific online publication called 'Ratnagiri/ Sindhudurg Parisara Prakashana' to host it. Once properly peer reviewed and published, this information may be used to write Wikipedia articles. This should set up a positive feedback system, because the more knowledge there is, the more readily can its quality be assessed,*

*and the more readily can it be added to. With students, and other interested citizens generating knowledge about environment, the quality of environmental education will improve. The built-in transparency of the process would promote honest submissions, as well as grading. It would be a self-correcting system with a built-in forum for all citizens, including experts to assess, point out possible deficiencies, and incorporate improvements. In the long run, this process should create a totally transparent, publicly accessible information resource on India's environment with proper accreditation to concerned students, teachers and other interested citizens for all items of information.*

**Introduction**

Taking good care of the environment, a human concern that emerged in the second half of the last century, has become all the more pressing in the new millennium. The youth obviously must play a vital role in addressing this challenge. One of the ways to engage them is through the educational process, and this is being attempted in our country with the help of the Supreme Court order of 22/11/91: "We accept on principle that through the medium of education, awareness of the environment and its problems related to pollution should be taught as a compulsory subject." Awareness has to be based on good understanding. For this, we clearly need substantial, good quality information on the manifold aspects of environmental problems as they manifest themselves in our country with its complex society and diverse environmental regimes.

Unfortunately, pertinent information is in very short supply. Most of it is collected through the state machinery, be it by recording of river flow by the Irrigation Department, of water pollution by Pollution Control Boards, or of the number of wild animals by the Forest Department. Regrettably most of the resulting information is of poor quality, often outdated and highly incomplete. A recent striking example of this comes from the census of tigers. Authorities of our Tiger Reserves have been attempting since 1973 to come up with exact tiger numbers based on the 'total pugmark count'. There are several possible sources of errors in such a census of tigers and in consequence, it is difficult to arrive at exact tiger numbers based on total pugmark count. Such difficulties are universal, especially in the study of complex environmental systems, where all signals are confounded by noise. The scientific skill lies in estimating and minimising the noise levels. Thus, it is imperative that one estimates the extent of various sources of error in arriving at tiger numbers. Based on these, one should come up with a range, rather than just one specific number, along with a statement of the likelihood that the actual numbers will fall within that range.

However, the official information stream has the serious weakness of claiming that there is no question of error in the official 'authoritative' information being handed out. But if a single number is provided as if that is a precise estimate, there is every danger

that any lower number arrived at subsequently would be taken to imply a decline tiger numbers. If further, there was a tendency to judge the performance of Tiger Reserve managers on the basis of the supposedly exact number of tigers in the area under their charge, then the managers would be inclined to manipulate the data and project a picture of continually increasing numbers of tigers. Such a tendency could be checked if there was in place a system of public scrutiny of the veracity of the numbers being declared. However, as with almost all government statistics, no such system has been in operation, so that tendencies to manipulate data have gone unchecked. This has, in all probability, been occurring in many Tiger Reserves; we have concrete evidence that it did happen in Sariska, where the publicly declared numbers have been decidedly inflated. An unfortunate consequence of dissemination of manipulated data has been a failure to recognise signs of decline in tiger numbers, till a public outcry forced the authorities to subject official statistics to independent scrutiny. This was done, firstly, through a CBI enquiry, and secondly, through the Prime Minister's Office setting up an independent Tiger Task Force. The Task Force had access to the information available with the field staff and put together the following picture:

Evidently, we must now reform such closed opaque systems of information collection prevalent throughout the country today.

**Organising a collaborative process**

Modern science advances knowledge by actively promoting questioning and enquiry. On the contrary, the official machinery, claiming to collect information by employing scientific methods, violates the spirit of science by discouraging scrutiny. Indeed, scepticism is at the very heart of scientific enquiry, whose main ingredients are:

- Open access to all facts and inferences,
- Rejection of all authority other than that of empirical facts, and
- Welcoming all interested parties to question all assertions as to facts as well as logic.

**TABLE 2: Tiger population estimates in Sariska Tiger Reserve**

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|
| Tiger population (official census) | 24 | 26 | 26 | 26 | 27 | 26 | 17 |
| Tiger sightings by staff* | 17 | 6 | 5 | 3 | 0 | 1 | 0 |
| *Number of distinct animals present as judged by field staff | | | | | | | |

It is this openness that has ensured that in science the proportion of empirically sound to unsound information is very high, and any deliberate manipulation of information is quickly exposed and weeded out. On the other hand, by discouraging scrutiny, official knowledge permits itself to be manipulated by a variety of vested interests. As a result, it often

ends up with a substantial proportion of unsound information.

Modern science has abundantly demonstrated that good information flows from an open, transparent process that welcomes participation from all interested parties. We obviously need to put in place such a broad/ based, open, participatory process to develop a sound, comprehensive base of information on India's environment. This process would most appropriately be spearheaded by students and teachers, who are, after all, in the business of acquiring, growing and managing knowledge. Consider, for instance, the vital issue of depletion of groundwater. Little detailed, reliable, up-to-date information on this issue is available today in the public domain. Yet, such information is readily available from observations of open wells and from the experiences of people digging borewells, and may be compiled locally, through school projects. The projects could be so designed as to regularly update the information and make it available through an electronic database. Moving ahead, we certainly have the technology to pool together such data to create an all-India picture and make it publicly accessible in a transparent fashion on the web.

The Centre for Ecological Sciences (CES) at the Indian Institute of Science (IISc), Bangaluru has been engaged in experiments on such a model with a number of high schools and junior and degree colleges in Karnataka since 1989. These experiments have demonstrated that good quality data can be collected through the exercise of student power provided that sufficient efforts are devoted to develop proper methodology, resource material and training programmes. As an example, students of 42 Karnataka high schools collected good data on the status and recent trends in local abundance for 172 out of 300 medicinal plant species used commercially in the state. Only limited information on 27 of these species is available with government agencies or pharmaceutical industry.

**Information and communication technologies**

The rapidly advancing tools of ICT hold much promise in facilitating a participatory process of knowledge generation. Already many students, especially in the metropolitan schools, are using computers to access curricular material as also information to carry out Environmental Education (EE) and other project assignments. However, these students are forced today to rely on largely irrelevant web based material, mostly pertaining to the very different environmental situation in the U.S.A. It is desirable that they use these media as tools, not only to acquire but to augment the knowledge base on India's environment. This calls for developing software to support EE student projects through communicating proper methodologies of data collection, help validate information such as identification of plant and animal species or of soil and rock types, and organise databases capable of accepting data from many sources. We need to design appropriate websites and portals and put in place mechanisms for the moderation of the content. We need to organise experts'

and citizens' discussion groups to comment on and add to the quality of the material thus brought into the public domain.

***Wiki software***

In fact, the Web 2.0 technologies that facilitate the community (for example, of students of Classes XI-XII and II year undergraduates, undertaking Environmental Education projects) creation of content on the websites are the rage today. An outstanding example of such an application is Wikipedia, the free encyclopedia that anyone can edit. Since its creation in 2001, Wikipedia has rapidly grown into the largest reference website on the Internet. The content of Wikipedia is free, written collaboratively by people from all around the world. This website is a wiki, which means that anyone with access to an Internet-connected computer can edit, correct or improve information throughout the encyclopedia, simply by clicking edit this page link. In every article, links guide the user to associated articles or images or information such as the full taxonomic classification of a species, often with additional information. Users are welcome to add further information, crossreferences or citations so long as they do so within Wikipedia's editing policies and to an appropriate standard. Because Wikipedia is an ongoing work to which in principle anybody can contribute, it differs significantly from a paper-based reference source. In particular, older articles tend to be more comprehensive and balanced, while newer articles may still contain significant misinformation, or vandalism. Users need to be aware of this in order to obtain valid information and avoid misinformation, which has been recently added and not yet removed. However, unlike paper reference sources Wikipedia is completely up to date, with articles on topical events, such as tsunami, being created or updated within minutes or hours, rather than months or years for printed encyclopedias.

Currently, Wikipedia has over 80,000 active contributors working on articles in 268 languages, including several Indian languages. There are over 3.6 million articles in English; and a recent count of the number of articles (in thousands) in various Indian languages shows: Hindi 88, Bengali 22, Punjabi 2, Telugu 48, Tamil 32, Urdu 17, Kannada 11, Gujarthi 20, Oriya 2, Nepali 14, Sanskrit 5. Every day hundreds of thousands of visitors from around the world make tens of thousands of edits and create thousands of new articles to enhance the amount of knowledge held by the Wikipedia encyclopedia. Visitors do not need any special qualification to contribute, and people of all ages help to write Wikipedia articles. The Wikimedia Foundation, a non-profit organisation also hosts a range of other projects:

1. Wiktionary, Dictionary and thesaurus
2. Wikibooks, Free textbooks and manuals
3. Wikisource, Free-content library
4. Wikispecies, Directory of species
5. Commons, Shared media (e.g. photographs, video clips) repository

Wikipedia articles are expected to be encyclopedic, i.e. based on published, authenticated information, and not on primary observations. Hence, a student project could involve a review of published information on birds of Ratnagiri/Sindhudurg district that may be uploaded as a Wikipedia article, in both English and Marathi versions. However, a checklist prepared by students of Gogte-Joglekar College on birds of College campus based on personal observations cannot qualify for an article in Wikipedia. However, the Wiki software is also freely available for other users to create their own websites. Therefore, the Gogte-Joglekar College itself can set up a wiki site on its own website (not just in English, but also in Marathi), and host such a checklist. Taking advantage of the wiki facility, other students or interested citizens, observing additional species may quickly add to that checklist. They may also add images of these bird species in Wikimedia Commons, their Marathi names in the Marathi Wiktionary, classification details in Wikispecies, and show the location of the college campus on Google Earth image. By adding an external link from the Wikipedia article on birds of Ratnagiri/Sindhudurg district to the Gogte-Joglekar College websites article on birds of college campus, all this information maybe made readily accessible.

### *Shared spreadsheets*

Another application of interest is a shared spreadsheet that is made available to all or selected users of the spreadsheet for concurrent data entry or modification, usually on a private or public network. Each authorised user is able to make modifications to the spreadsheet, or simply view it, according to his/her own level of authority. One user may be able to modify any cell in the spreadsheet by changing its value, layout, position or formula whereas other users may be restricted to enter values into one or more cells.

One may visualise students from different colleges in Ratnagiri/ Sindhudurg district collecting information on BOD levels and other water quality parameters, in different water bodies, as a part of their Environmental Education projects. They may all be authorised to access a shared spreadsheet on which information from a number of different investigations can be uploaded, validated by a moderator, integrated, analysed and eventually shared with the public.

### Multiple dimensions

At the heart of Environmental Education is its focus on the interconnected nature of the physical-biological-social-economic system pertinent to environmental issues, the manifold environmental impacts cascading through such an interconnected system, and the continual processes of environmental change. Student projects may, therefore, entail collection of information on a great diversity of themes ranging over physical, chemical, biological parameters to economic, social, political and legal issues. These may pertain to soils, minerals, waters, natural, semi-natural and man-made habitats, man-made artifacts and

biological communities. They may pertain to human activities such as hunting, fishing, agriculture, animal husbandry, mining, road, dams and building construction. They may relate to health and sanitation issues. They may relate to ownership and tenure issues. These may involve questions of social and economic status, gender and other equity issues. They may relate to customary and formal legal regimes. They may address themes relating to management and development of natural resources.

Consider, as an example, the use of groundwater in the coastal tracts of the Uttara Kannada district of Karnataka. Traditionally, the crops of this region include rice (largely cultivated by smallholders) and betel nut (primarily cultivated by wealthier farmers). When, fifty years ago, there were no electrified pump sets, the water table was at a depth of about five metres, and the smallholders were able to hand irrigate and raise a second crop of rice in the winter. Following rural electrification, free power was made available to farmers along with subsidised pump sets. These facilities were primarily availed of by the orchard owners, who began to extensively irrigate betel nut in the dry season, substantially increasing its yields. But this drove the water table down. As a result, the smallholders could no longer raise a second rice crop. This has compelled their women to switch to the sale of fuelwood as a livelihood activity in the dry season, resulting in extensive conflicts with forest authorities and the degradation of forests at a rapid pace.

**Scientific exercises**

Using publicly accessible data developed, at least in part, on the basis of student projects, and augmented from other sources, it would be easily possible to undertake a number of scientific exercises. Thus, countrywide spatial data on soil and rock types, rainfall, cropping patterns, and human population density, along with that on the depth of the ground water, may eventually become widely available. Students could access such data and undertake statistical analyses of different levels of sophistication to assess the influence of various factors on the depth of underground water table. They may then be introduced to the world of hydrological models and try to understand the underlying processes.

Of course, a number of individual projects that could generate useful inputs for such an endeavour, such as surveys of plant and animal species, have been and are being conducted in many schools and colleges in the country today. Some of these are being conducted on an all-India basis with a common framework as well, as is the case with the National Children's Science Congress programme of DST. However, these are not geared towards compiling the information collected together to create a broader picture. Once such a broad picture is available, a number of additional educational and environmental activities of great interests will become possible. These would lead to answers to questions of much social relevance as well.

**Konkan districts pilot project**

We propose to begin such a collaborative process of developing publicly accessible information on India's environment, with a pilot project in Ratnagiri and Sidhudurg districts of Konkan region of Maharashtra. The programme will be spearheaded by a consortium of junior and undergraduate colleges representing both urban and rural localities, and will be coordinated through Gogte-Joglekar College. It will take advantage of the fact that it is now mandatory for students in Classes XI-XII to undertake a major project on environment over the first three terms, as well as for the second year undergraduates in all branches to do so during the first term. The programme will work closely with the National Council of Educational Research and Training, which has the responsibility of guiding and monitoring Environmental Education throughout the country at levels up to Class XII . In this undertaking, students will be the main actors in developing an information base on five different aspects of the district's environment, namely, water, biodiversity-bioresources, roads, energy, and noise; though initially we may concentrate on the first three themes. The project would include the following elements:

*Specifying the geographical context through defining the spatial elements of the study area as villages and town/city wards. Articles may be developed on the geographical-social-economic-environmental setting of each of these localities on the English and Marathi Wikipedias. GPS readings of locations of schools and colleges, post offices and panchayat-municipal offices in these localities may be used to link these articles to Google Earth images through the use of Placeopedia.*

*Downloading satellite (http://geo.arc.nasa.gov/sge/landsat/ and http://glcf.unimcs.umd.edu/data/ for landsat and http://edcdaac.usgs.gov/main.asp for Modis) and Google Earth images, identifying study sites. These images may be uploaded into Wikimedia Commons and linked to pertinent articles in Wikipedia. Photographs or video clips of the localities may similarly be uploaded into Wikimedia Commons and linked to pertinent articles in Wikipedia.*

*Developing a system of assigning people to different Environmental Resources Stakeholder Groups. Such a system has been proposed by the Centre for Ecological Sciences, IISc in the context of biodiversity-bioresources and accepted by National Biodiversity Authority as the starting point for the People's Biodiversity Register exercises mandated to be carried out throughout the country as a follow/up of the Biological Diversity Act. Articles on the various stakeholders may be posted in Wikipedia with associated images uploaded in Wikimedia Commons.*

*Making an inventory of activities linking people to particular environmental resources such as water, biodiversity-bioresources, energy, roads and noise. Preparing activity-time budgets for different seasons, for people of different ages and gender, and belonging to different stakeholder groups. Students may write essays on stakeholder groups and their activities that will be uploaded on school/college websites*

*with wiki versions on the Gogte-Joglekar College website. Students may upload associated images in Wikimedia Commons. Students may enter quantitative information on time-budgets on a shared spreadsheet.*

*Mapping of study localities in terms of distribution of sources of and demands on environmental resources such as water, bioresources-biodiversity (using techniques of landscape ecology), roads etc, as participatory maps prepared by people or through visual interpretation of satellite imagery. Such maps may be uploaded on school/ college web sites. Students may also upload associated images in Wikimedia Commons.*

*Preparing an inventory of locally occurring biodiversity elements. These inventories may be based on scientific studies by students or based on interviews regarding life forms known to people. Such inventories may be entered onto shared spreadsheets, or uploaded on school/college websites with wiki versionson the Gogte-Joglekar College website. Students may upload associated images in Wikimedia Commons, information on classification in Wikispecies and local names in Wiktionary.*

*Preparing inventories of the most significant concerns of people (for people of different ages and gender, and belonging to different stakeholder groups) with respect to different environmental resources. Such inventories may be entered onto shared spreadsheets, and may be uploaded on school/ college websites with wiki versions on the Gogte-Joglekar College website.*

*Documentation of status of environment in terms of spatial elements of interest (e.g. habitats of biological communities, water resources, roads, etc), trends of changes over time in such elements and prevalent and desired patterns of management (for people of different ages and gender, and belonging to different stakeholder groups) for these elements. This documentation may be in the form of essays, for instance, on grazing lands, sewage disposal system or highways. It may also be quantitative documentation, for instance of abundance of weed species on grazing lands or of bioindicators of water quality in different water bodies, or levels of traffic congestion on roads, employing shared spreadsheets. Student essays may be uploaded on school/ college web sites with wiki versions on the Gogte-Joglekar College website. Students may upload associated images in Wikimedia Commons, information on classification in Wikispecies and local terms in Wiktionary.*

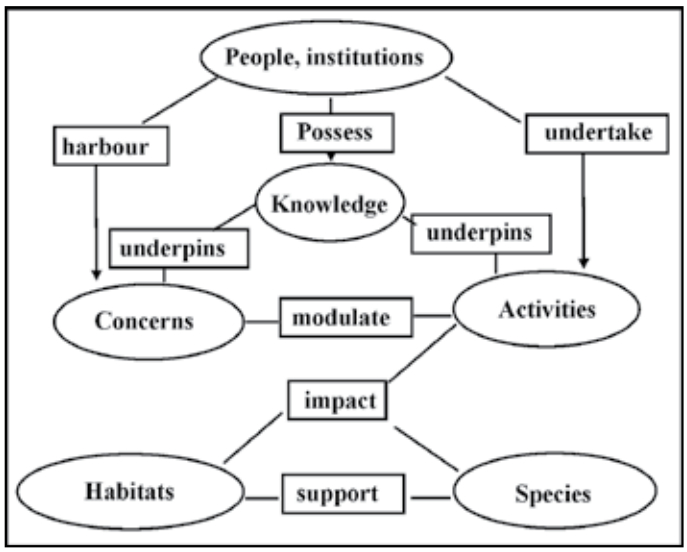
*Documentation of people's knowledge of various aspects of the environmental resources, for example seasonal availability of grazing for sheep, use of herbal insecticides or preparation of vegetable dyes. This documentation may be in the form of essays, or quantitative, for example distribution of knowledge of uses of herbs amongst people of different age and gender, and belonging to different groups of stakeholders. Student essays on these topics may be uploaded on school/ college websites with wiki versions on the Gogte-Joglekar College website. Students may enter quantitative information on shared spreadsheets. Students*

*may upload associated images in Wikimedia Commons, and local terms in Wiktionary.*

**Relational Database Management System**

As noted above, at the heart of Environmental Education is its focus on the interconnected nature of the physical-biological-social-economic system pertinent to environmental issues. Consequently, student projects in EE would generate information on many different kinds of entities, related to each other in a diversity of ways. Take as an example, one particular component, namely, bioresources-biodiversity. Projects focusing on this theme would involve studies on many different kinds of elements: species, their habitats, biological produce, prices of biological produce, harvesting and transport of biological produce, regulations governing harvests, people and their ways of using and managing biodiversity resources, local knowledge of uses and management of biodiversity resources, and so on. These different building blocks or entities would be related to each other in a variety of ways, and a well-designed information system should properly specify the relationships. A Relational Database Management System (RDBMS) helps to efficiently organise information in this fashion.

The Centre for Ecological Sciences at the Indian Institute of Science has designed such an RDBMS termed 'PeBInfo' to support People's Biodiversity Registers exercises being conducted as a follow-up of the Biological Diversity Act, and now formally accepted as a desirable starting point by the National Biodiversity Authority. This RDBMS is a possible model of the kinds of




**Schematic Representation of the Main Classes of Entities and their Major Relationships**

information systems that will have to be developed to effectively organise the wealth of data that would flow from EE projects. PeBInfo specifies six major classes of entities, namely: (1) People and institutions, (2) Knowledge, (3) Concerns, (4) Activities, (5) Species and other taxonomic categories, and (6) Habitats. Diagram 1 depicts the most significant relationships amongst these classes of entities; additionally there are many other relationships not depicted in this diagram. Thus knowledge not only underpins concerns and activities, but it also pertains to species and habitats, and so on.

Such RDBMSs would have to be organised to pool together the wealth of information that would be generated through the EE projects. In the context of the Ratnagiri/Sindhudurg Pilot Project mentioned above, the spreadsheets included in Annexure 2 have been so designed as to be compatible with the PeBInfo schema. This would facilitate the pooling together of this information by a Technical Support Group based at the Gogte-Joglekar College. The resultant database would be hosted on the website of the Gogte-Joglekar College. This would, however, be just a first step. EE projects would eventually generate wealth of data on many other themes besides bioresources-biodiversity such as water and energy, and from several hundred districts beyond Ratnagiri/Sindhudurg.

**Web Portals**

As the next step, then we would need to establish a series of web portals to manage the knowledge thus generated. Web portals are comprehensive (bundled) websites that allow for knowledge management, and integration of information and applications along some central theme. The purpose of a portal is to collect information from different sources and create a single point of access to the information. The portal has to perform a number of technical and organisational tasks like a single entry point giving access to a critical number of resources in a homogeneous way, and ability to handle resources of different kinds: databases, knowledge bases, and programmes, in an integrated way to enable various types of information and styles of presentation to be presented in a coherent form.

The key features of such portals would include the following:

*Interactive, user friendly, dynamic/ adaptive (customisable) in natures; Comprehensive repository of essential knowledge, enabling efficient and effective retrieval of information through online query and analysis; Ability to update and add additional knowledge (expandable architecture); A platform for interaction and exchange of ideas backed by a consortium of organisations, experts and concerned individuals.*

These portals would be based on a collaborative, web based, interoperable framework for providing internally connectedz user interface, feeding upon distributed databases (placed at different geographic locations) that are heterogeneous is size, content and thematic makeup. This is achieved by establishing resource inventory/ search and access/control mechanism by creating Universal Description, Discovery and Integration (UUDI)

registry that facilitates inter operability of data sources from multi disciplinary databases. This is implemented through 'Extensible Markup Language (XML) Schemas' currently in use by similar global initiatives (e.g. GBIF) that can be evolved into 'XML Schemas' specific to Indian datasets to facilitate robust data exchange and analysis across multiple data providers. A mechanism of this kind is essential to enable query formulation across distributed and heterogeneous databases to extract the desired information and present it in a suitable/customisable format to the user through single access interface. Such a framework can be used for integrating both legacy and emergent data and services. While this would aid in increased integrity, interoperability, scalability and extensibility amongst the data sources, it would not compromise on the autonomy of database developers and owners, allowing them full control and independence over the design and development. Most importantly it would achieve both flexible and optimal use of data sources, despite heterogeneity.

There are several ongoing attempts at development of such portals in India. The University of Agricultural Sciences in Bangalore hosts the Indian Biodiversity Information Network (IBIN) funded by the National Bioresources Development Board. An "India Water Portal" promoted by the Arghyam Foundation of Bangalore is being launched in October 2006. The National Biodiversity Authority has approved a proposal to establish an 'Indian Biodivesity Information System'. It would be necessary to work with such portals to fully develop the tremendous potential for knowledge generation of the student EE projects.

**Technical support**

To succeed, such an endeavour clearly needs vigorous scientific support. It is proposed to provide this with the help of a consortium of Ratnagiri/Sindhudurg district based scientists, convened through Gogte-Joglekar College. It will use as one of the starting points, the methodology outlined in 'Ecology is for the People: A Methodology Manual for People's Biodiversity Register' and the associated Relational Database Management System 'PeBInfo'. A series of spreadsheets, compatible with this methodology and RDBMS has been developed to support collection of data through individual student projects. This material focuses on biodiversity-bioresources. The conceptual schema developed so far will have to be further elaborated to deal with other themes such as water and energy. Thus we will have to work out a scheme of classification of stakeholder groups pertinent to various environmental resources.

We will have to develop further manuals detailing study methodologies or suggesting formats in which quantitative data may be collected to support these studies, as also other resource material such as field guides to identification of bioindicators of water quality. These may be published as Wikibooks, so that they will grow further in a collaborative fashion.

The Technical Support Consortium may also consider helping in a number

of ways, by building capacity and developing background material. This could include the following:

- Develop the conceptual framework for carrying out student projects.
- Work out appropriate methodologies.
- Design spreadsheets and databases.
- Help build capacity of teachers to guide and exercise quality control over student projects.
- Help validate and consolidate the data.
- Prepare a directory of people (academics, officials and others) knowledgeable in different aspects of the environment of Ratnagiri/ Sindhudurg district.
- Prepare a bibliography of published, as well as gray literature (e.g. Forest Working Plans) on various aspects of Ratnagiri/Sindhudurg district's environment. Post it on a wiki site on Gogte-Joglekar College website, so that people can continually augment it.
- Prepare reviews based on published information on various aspects of Ratnagiri/Sindhudurg district's environment, for example rainfall patterns, rivers and dams, list of flowering plants, sacred groves, and road network. Post these as Wikipedia articles.
- Write Wikipedia articles on different geographical localities within Ratnagiri/Sindhudurg district. Prepare a database of their GPS readings. Link them to Google Earth images.
- Download relevant satellite imagery.
- Post photographs and video clips pertinent to various aspects of Ratnagiri/Sindhudurg district's environment, for example forests, grasslands, crop fields and orchards, individual plants and animals, sewage outfalls in streams and rivers, stone quarries, state of roads, and so on. Post these on Wikimedia Commons.
- Add all species present in Ratnagiri/ Sindhudurg district to Wikispecies.
- Add Marathi words pertaining to various aspects of environment, such as different types of soils and rocks, names of plant animal species, ecological habitats to Marathi Wiktionary.

**Validation and publication**

Most importantly, the Technical Support Consortium may help through assessing the quality of the primary data posted by students or other interested citizens on the various wiki sites (e.g. on websites of schools/colleges, of RANWA or other institutions), that may be confederated in the form of a non-peer-reviewed publication called 'Ratnagiri/ Sindhudurg Parisara Sthiti'. TCS may help in selecting material of good quality from this non-peer-reviewed resource, help in its interpretation in light of available scientific knowledge and in its publication in an appropriate peer-reviewed medium. Since much of such information, although of good quality, is likely to be of very locality-specific interest, it might be worthwhile organising an online publication to host it. Such a publication may be hosted on any appropriate website

and be called 'Ratnagiri/Sindhudurg Parisara Prakashana'. Once properly peer reviewed and published in this form, the information so published may be used to write Wikipedia articles.

**Virtuous Cycle**

Knowledge is a remarkable positive feedback system; the more knowledge there is, the more rapidly does it grow. Hence, enhancing store of knowledge on Indian environment will lead to a positive feedback. Simultaneously, with students generating environmental knowledge, they will carry out projects of better and better quality. Concurrently, the system of public assessment for the proposed Information System 'Parisara' could create a totally transparent, publicly accessible information resource on India's environment with proper accreditation to concerned students, teachers and interested citizens for all items of information. Parisara would provide a forum for all citizens, including experts to assess, point out possible deficiencies and incorporate improvements. Its transparency would promote honest submissions, as well as grading.

# Working towards Inclusive Growth
## *Skill Development Mission*

Shashi Singh*, Ajay Singh**
Kiran Singh***

**Abstract**

*Skills and knowledge are the driving forces of economic growth and social development of any country. India's position on the skill and research orientation of individuals and institutions are precariously at low level as compared to major economies of the world. Fast growth rate and poor skill index of its population has been the major challenge and obstacle of India to fulfill its cherished dream of inclusive and sustainable growth. Government of India is consistently working and making efforts through its plan policies and other major programmes to achieve these objectives. This paper tries to examine and evaluate the existing scenario of Indian education system and workforce skill index as compared to other major economies of the world. This paper will also study thoroughly the Skill Development Mission and its various dimensions and plans which will help in the generation of skillful population.*

Skills and knowledge are the driving forces of economic growth and social development of any country. They have become even more important given the increasing pace of globalisation and technological changes around the world. Countries having workforce empowered with higher and better levels of skills adjust and exploit effectively to the challenges and opportunities of globalisation. Effectiveness of professional education can be gauge with the generation of skilled workforce that such education produces. Professional education is also an important factor towards the upbringing of entrepreneurial skills in an individual. Entrepreneurs and innovations, worldwide, are considered to be the engine of the nation economic

* *Lecturer,* Meerut Institute of Engineering & Technology, Meerut- 250005
** *Assistant Professor,* Meerut Institute of Engineering & Technology, Meerut-250005.
*** *Sr. Lecturer,* Department of Economics, University of Allahabad, Allahabad, 21100

growth. Almost every stabilised government in the world has kept the issues of entrepreneurship and skill development as one of the main agenda in its policies and plan documents. US Council on Competitiveness (1998) in its report argues that 'The nation that fosters an infrastructure of linkages among and between firms, universities and government gains competitive advantage through quicker information diffusion and products deployment'. In the green paper on entrepreneurship–EC Commission-2003 (Michie, et al., 2002), the EU Policy objectives have been to make the EU the 'leading knowledge based economy in the World' (Lisbon Council) and key issue for the EU is to build a 'climate in which entrepreneurial initiative and business activity can thrive'. Schools, colleges and universities have major responsibility to stimulate innovative and entrepreneurship led economic growth. Thus, professional education has important roles to play for the development of a nation.

**Professional Education and skill development: The Obstacles**

Indian professional education system encounters with many problem which inhibits the skill development in individuals:

**1. Education Standard**

As per the Eleventh Five Year Plan (Vol.1, p-88), the NSS 61st round survey on employment and unemployment indicates that educational institutions attendance rates (5–14 years) drop by nearly half in the age group of 15–19 years and by 86 percent after the age of 15 years. Labour force participation rates rise sharply after the age of 14 years and reach close to 100 percent at the age of 25–29 years. The said results also reflect that 38.8 percent of the Indian labour force is illiterate, 24.9 percent of the labour force has had schooling up to the primary level and the balance 36.3 percent has had schooling up to the middle and higher level. They also reveal that about 80 percent of the workforce in rural and urban areas does not possess any identifiable marketable skills.

Number of recognised educational institutions in India is given in Table 1 but the meagre state of the Indian university can be understood with the fact that none of the Indian University was able to find a place in the top 100 universities of the world. According to Times Higher-QS World University Rankings (2008), US has 37 universities in the top 100 and UK has 17 universities. China has five universities in top 100. India could open her account with IIT Delhi at 154th position while IIT-B at 174th, IIT-K at 242nd and Delhi University at 274th position.

The factors considered for ranking were-Research Quality, Teaching quality, Graduate Employability, International Outlook. India has thus performed below par on these factors. The list of the top Asian universities is dominated by Chinese and Japanese Universities both in 2008 and 2009 ranking (top Asian Universities). Other than IITs, only Delhi University and Pune University could find the place among top 100 universities of Asia (2008 and 2009).

**Table 1**
**Total Number of Recognised Educational Institutions in India (Provisional)**

| Number of Schools[a] (2005-06) | | | Number of Higher Educational Institutions[b] (2006-07) | | | University/ Deemed University/ Institute of National Importance |
|---|---|---|---|---|---|---|
| Primary/ Junior or Basic | Middle/ Senior Or Basic | High/ Higher Second/ Intermediate/ Junior Colleges | General Education | Professional Education | Other Including Research Institutions | |
| 772568 | 288493 | 159667 | 11926 | 5610 | 2746 | 371 |

***Source:*** *Selected Educational Statistics 2005-06[a] and University Grants Commission Data[b] in respect of Higher Education pertains to 2005–06, taken from Economic Survey 2008–09: Table A-121*
*Notes: 1. General Education includes Arts, Science and Commerce Colleges.*
*2. Professional Education includes Engineering, Technology, Architecture, Medical and Teacher Training Colleges.*

## 2. Training and Research

The world over, it is recognised that R&D efforts are imperative for sustained economic growth and social development. However, in India there has been a low level of R&D efforts, mainly due to the inadequate number of highly trained and knowledgeable R&D personnel—particularly at the level of PhDs—relatively low investment in R&D by the corporate sector, and the lack of synergy among R&D institutions and universities (Eleventh Five Year Plan, Vol. 2, p-30).

Our education system also lacks encouragement for short-term and useful vocational training courses. Our higher education system lacks research. We take 7.5 lakh engineers on an average every year but only a handful approx 4000 opt for research. India spent 6 percent of GDP on education while China percent and Malaysia 10 percent (Agarwal, 2008). India accounts for less than 2 percent of the world publications in the areas of science and technology research (Education Times, 23 Sep. 2009, p-12).

The Kothari Commission on Educational Reforms, 1964–66, had visualised that 25 percent of the students at the secondary stage would go for the vocational stream. The Kulandaiswamy Committee Report had targeted this figure at 15 percent to be achieved by 2000. According to the recent National Sample Survey Organization (NSSO) data, only 5 percent of the population of 19–24 age groups in India have acquired some sort of skills through Vocational Education. The corresponding figure for Korea is 96 percent. (Eleventh Five Year Plan - Vol. 2, p-20)

The NSS sixty first round results (Eleventh Five Year Plan, Vol. 1, p-87) also show that among persons of age group 15–29 years, only about two percent are reported to have received formal vocational training and another 8% reported to have received non-formal vocational training indicating

that very few young population actually enter the world of work with any kind of formal vocational training. This proportion of trained youth is one of the lowest in the world. The corresponding figures for industrialised countries are much higher, varying between 60% and 96% of the youth in the age group of 20–24 years. One reason for this poor performance is the near exclusive reliance upon a few training courses with long duration (2 to 3 years) covering around 100 skills. In China, for example, there exist about 4000 short duration modular courses which provide skills more closely tailored to employment requirement. Another factor that is missing in our education system is the integration of pedagogical research within classroom transactions. The number of people involved in research education and cognition are very low (Ramdorai, 2009).

**3. Course Curriculum**

At secondary level there is little emphasis on the topic which enhances skill building. Children in India are unaware of the career opportunities which are non-traditional. The higher education system in India has also, by and large, ignored the paradigm shift brought about by NCF-2005 (Kumar, 2009). The admission procedures for the first year at college have remained as rigid as they were, further reinforcing the rigidity of the Class XII examination. This situation is going to discourage children from utilising the wider range of subject options available in Class XI and XII. NCERT has introduced new subjects like heritage crafts, creative writing and translation, computer and communication technology, human ecology and family studies, but there are few takers of these courses. Such education style produces students who are focused on a targeted path. Average Indian students are generally hard-working but they lack research orientation. On the other hand education at the average American University relies heavily on self-discovery, reflection, open-ended questions and analysis (Niketa, 2009). These concerns have also been raised by the *National Curriculum Framework* (NCF-2005) (Kumar, 2009). It poses three key challenges: Linking the child's life at home with learning at school, Discouraging rote learning and moving beyond the textbook.

**4. Faculty, Infrastructure and Society**

Availability of good teachers is very important to make professional education a successful process. There is shortage of quality teachers in India. Faculty are generally not available in the universities and they lack research orientation. The student teacher ratio is too high which hinders the personal monitoring and guidance from faculty.

A basic problem with the skill development system is that the system is non-responsive to labour market, due to a demand-supply mismatch on several counts: numbers, quality and skill types. It is also seen that the inflexibilities in the course/curriculum set-up, lead to oversupply in some trades and shortages in others. Of the trained candidates, the labour market outcomes as seen from placement/ absorption rates are reportedly very

low. The quality of the training system is also a matter of concern, as the infrastructural facilities, tool/kits, faculty, curriculum are reportedly substandard. The existing institutions also lack financial and administrative autonomy. The testing, certification and accreditation system is reportedly weak, and since the deliverables are not precisely defined, there is no effort at evaluating outcomes and tracking placements. The problem is further complicated with lack of industry and faculty interaction on course curricula and other factors.

**Eleventh Plan Strategies**

In the Eleventh Five Year Plan, the thrust is on creating a pool of personnel in appropriate numbers with adequate skills, in line with the requirements of the ultimate users such as the industry, trade, and service sectors. Such an effort is necessary to support the employment expansion envisaged as a result of inclusive growth, including in particular the shift of surplus labour from agriculture to non-agriculture. This can only take place if this part of the labour force is sufficiently skilled. During the Eleventh Plan, it is proposed to launch a major Skill Development Mission (SDM) with an outlay of Rs. 22800 crores (Eleventh Five Year Plan, Vol. 2, p.87).

**Skill Development Mission**

Skill Development Mission (SDM) as described in Eleventh Five Year Plan (Vol.2, p.87–97) says, "in order to create a pool of skilled personnel in appropriate numbers with adequate skills in line with the employment requirements across the entire economy with particular emphasis on the twenty high growth high employment sectors, the government will set up an SDM consisting of an agglomeration of programmes and appropriate structures aimed at enhancing training opportunities of new entrants to the labour force from the existing 2.5 million in the non-agricultural sector to 10 million per year".

***1. Mission Goal***

The goal of the Skill Development Mission will be to provide within a five- to eight-year timeframe, a pool of trained and skilled workforce, sufficient to meet the domestic requirements of a rapidly growing economy, with surpluses to cater to the skill deficits in other ageing economies, thereby effectively leveraging India's competitive advantage and harnessing India's demographic dividend.

The Skill Development Mission (SDM) will involve both public and private sectors to ensure that our supply-side responses are perpetually in synchronisation with the demand side impulses both from domestic as well as global economies. Public sector will try to expand and establish the requisite infrastructure and private sector will run and manage the Skill Development Programmes, ending with placement of candidates. Private Sector Initiatives will also need to be supplemented by government by one-time capital grants to private institutions and by stipends providing fee supplementation to SC/ST/OBC/ Minorities/other BPL candidates.

### *2. Mision Objectives and Functions*

- Articulate a vision and framework to meet India's Vocational Education and Training (VET) needs.
- Assess skill deficits sector wise and region wise and meet the gaps by planned action in a finite time frame.
- Orchestrate Public Sector/Private Sector Initiatives in a framework of a collaborative action.
- Realign and reposition existing public sector infrastructure, ITIs, polytechnics and VET in school to get into PPP mode and to smoothen their transition into institutions managed and run by private enterprise or industry associations. Give them functional and governance autonomy.
- Establish a 'credible accreditation system' and a 'guidance framework' for all accrediting agencies set up by various ministries and or by industry associations. Get them to move progressively away from regulation to performance measurement and rating/ranking of institutions. Rate institutions on standardised outcomes, for example, percentage graduates placed pre and posts course wage differentials, dropout rates, etc.
- Encourage and support industry associations and other specialised bodies/councils and private enterprise to create their own sectoral skill development plans in 20 High Growth Sectors.
- Establish a 'National Skill Inventory' and another 'National Database for Skill Deficiency Mapping' on a national Web portal—for exchange of information between employers and employment seekers.
- Establish a Trainee Placement and Tracking System for effective evaluation and future policy planning.
- Reposition 'Employment Exchanges as Outreach Points of the Mission' for storing and providing information on employment and skill development. Enable employment exchanges to function as career counselling centres.
- Enlarge the 50000 Skill Development Centres (SDCs) programme eventually into a 'Virtual Skill Development Resource Network' for web-based learning.

### *3. Mission Strategies*

The strategies of the Mission will be to bring about a paradigm change in the architecture of the existing VET system, by doing things differently.

- Encourage ministries to expand existing Public Sector Skill Development infrastructure and its utilisation by a factor of five. This will take the VET capacity from 3.1 million to 15 million. This will be sufficient to meet the annual workforce accretion or accreditation, which is of the order of 12.8 million. In fact, the surplus capacity could be used to train those in the existing labour force as only 2 percent thereof are skilled. This infrastructure should be shifted to private management over the next 2–3 years. States must be guided as incentiviser to manage this transition.
- Enlarge the coverage of skill spectrum from the existing level. Skill Development programmes should be delivered in modules of 6–12 weeks; with an end of module examination/ certification. For calibrating manual

skills, a 4–6 level certification system must be established based on increasing order of dexterity of the craftsman.

- Make a distinction between structural, interventional and last mile un-employability and correspondingly set-up programmes for 24 months, 12 months and 6 months duration. Encourage 'Finishing Schools' to take care of last mile un-employability.
- Establish a National Qualification Framework, which establishes equivalence and provision for horizontal mobility between various VET, technical and academic streams at more than one career points. Expand VET to cover more classes and move progressively from post matric to cover IX class dropouts and then VII class dropouts.
- Encourage 'Accreditation Agencies' in different domains to move away from regulation to performance measurement and rating and ranking of institutions.
- Encourage institutional autonomy coupled with self regulation and stake holder accountability. Institutions must have freedom of action in governance, as also on the financial management.
- For standard setting and curriculum setting, establish or notify at least one 'standard setting/quality audit institution' in each vertical domain.
- Move from a system of funding training institutes to funding the candidates. Institutional funding could be limited to an upfront capital grant. Recurring funding requirement could be met by appropriate disbursement to the institute at the end of successful certification. Candidates from SC/ST/ OBC/ Minorities/ BPL, etc. could be funded in two parts—

(i) Stipend (monthly) to be paid to trainee

(ii) Fee subsidisation at the end of the programme to be given to the institute after placement.

Thus, the mission will encompass the efforts of several ministries of the central government, state governments and the activity of the private arm, supported by the following institutions: (i) Prime Minister's National Council on Skill Development, (ii) National Skill Development Coordination Board, and (iii) National Skill Development Corporation/Trust. The central ministries which have skill development programmes will continue to be funded as at present. However the spectrum of skill development efforts will be reviewed periodically for policy directions by the Prime Minister's Council on Skill Development. The council will be supported by a National Skill Development Coordination Board, which will be charged with the coordination and harmonisation of the governments' initiatives for skill development spread across the seventeen Central ministries and State Governments with the initiatives of the National Skill Development Corporation/Trust. State governments will be encouraged to set up State-level Skill Development Missions. A non-profit National Skill Development Corporation may-be set up as a company under Section 25 of the Companies Act, and/or a National Skill Development Trust may be set up under the Societies Act to encourage private sector arm of the Mission.

**Conclusion**

The initiatives described above involving both the states and the centre, often with private partnership will lead to the establishment of a credible, trustworthy and reliable training, testing and certification edifice linked to global standards and responsive to the needs of the ultimate consumers of skill. With an estimated 58.6 million new jobs in the domestic economy and about 45 million jobs in the international economy inviting skilled personnel for quality jobs beckoning the Indian youth, the government and private sector will act in a concerted manner so that these opportunities materialise and operate as an employability guarantee.

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# The UGC: Financing of Higher Education in India

JANAILUNG KAMEI FRANCIS*

**Abstract**

*This paper deals with the emerging issues in public financing of higher education. The funding mechanism of the government-funded institutions and the role of the UGC in this regard, an apex and statutory body by an Act of Parliament solely responsible for the disbursement of grants to all the eligible colleges and universities in the country need to be studied. The UGC in India is not merely a grants giving agency but it is also concerned about the coordination and maintenance of standards. It has to shoulder wide-ranging responsibilities in the process of coordination and maintenance of standards, allocation and disbursement of grants. All these responsibilities are now being challenged as the share of private sector grows and the public sector seems to be keen to partner with the private sector, country opens up to the globalising forces and more importantly the government faces fiscal constraint in a federal set-up. 'Value for money', accountability and veering towards competitive funding are the emerging trends world over. Higher education in India needs a huge amount of resources not merely to provide good quality of education but to transform the nation as a whole. The Commission disburses more fund to Central Universities as compare to State Universities. And even within the Central Universities there exist disparities in disbursement of fund. In fact, only some of the reputed Central Universities received a larger share of the funds from the Commission. Higher education in India suffers as the fund is allotted more on maintenance and less on the development expenditure.*

## Introduction

The establishment of UGC was mooted by the Radhakrishnan Commission or the First Education Commission (FEC). The Commission considered it necessary to expand the extent of coverage of the higher educational system in India. Universities too were

* *Research Scholar*, Zakir Hussain Centre for Educational Studies, School of Social Science, JNU, New Delhi-110067.

in favour of establishing a highest statutory body for coordination and determination of the standards of higher learning. Eventually the UGC was established as an apex and the statutory body on 28th December, 1953 though it 'became a statutory organisation by an Act of Parliament only in 1956'[1]. The UGC in India is not merely a grants giving agency but it is also concerned about the coordination and maintenance of standards. It has to shoulder wide-ranging responsibilities in the process of coordination and maintenance of standards, allocation and disbursement of grants.

Since ancient times higher education has occupied an important place in the art of higher learning in India. Universities like Nalanda, Takshshila and Vikramsila attracted not only the students from within the country but also from abroad. However the present system of higher education owes its origin to Lord Macaulay and Sir Charles Wood's Dispatch of 1854. The idea of universities in India was first incorporated by Sir Charles Wood's Dispatch commonly known as the Magna Carta. Through this Wood's Dispatch, the present system of higher education was put in place covering the entire gambit of education from primary school to the university. Three leading universities were established in Mumbai, Kolkata and Chennai in 1857. These universities were modelled after the London University. Subsequently some universities were also established in different parts of the country like Allahabad, Aligarh and Banaras. In 1924, Government of India organised a conference in Shimla to discuss the issues related to higher education and suggest concrete measures. On the recommendations of this conference, fourteen universities agreed to establish the first All India University organisation in 1924. Subsequently, an Association of Indian Universities (AIU) was set up in 1925 for the promotion of Indian university activities in different spheres. According to Sharma (2006), AIU was established to promote the sharing of information and cooperation in the field of education, culture, sport and allied areas. In the process, the first attempt was also made to formulate a national system of education in 1944. The University Education Commission was set up in 1948 under Dr. S. Radhakrishnan which is known as the First Education Commission (FEC). The Commission recommended that the UGC should be empowered to allocate grants-in-aid from public funds to the universities and the institutions of higher learning. As per the Act, it was vested with the powers and responsibilities for 'the determination and maintenance of the standards in teaching, examination and research'[2]. Accordingly, the Commission has statutory authority of recommending to universities the measures necessary for improvement in education and also advise them to take necessary action in that regard.[3]

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[1] UGC. 2008 *Annual Report* 2007–08, New Delhi, UGC, p.16.

[2] A.S. Desai. 1995. Policies in Higher Education in India, Association of Indian Universities, New Delhi, p.2.

[3] UGC. 1991. *Annual Report* 1990-91, University Grants Commission, New Delhi, p.1.

Besides, the UGC will also take the responsibility to look into the financial needs of universities and allocate or disburse funds for development of the infrastructural facilities and other components of the university system. Thus the main function of the UGC is to allocate and distribute the available grants to the different universities.

The organisational set-up of the Commission consists of twelve members. The Commission consists of the Chairperson, Vice-Chairperson and ten other members appointed by the Government of India.[4] Chairman and the Vice-Chairman are the full-time working members of the Commission while the other members are part-time. Among the ten members of the Commission, the two members represent the Central Government. The four members of the Commission represent the university teachers and the remaining four are appointed from among Vice-chancellors, who are known and reputed educationists.[5] The secretary is the head of the executive. In formulation, evaluation and monitoring of its programmes, the UGC seeks the help of the subject experts from the universities, colleges, national laboratories and other institutions.

**Powers and Functions of the Commission**

As mentioned above, the Indian University Grants Commission is established more or less on the British Model of UGC. The main concern of the British UGC is to assess the financial needs of the universities and also to disburse grants. But between the two models there is a major difference. Indian UGC's prime responsibility is not only the disbursement of funds/ grants to the universities but it has to coordinate, prescribe and determine the standards of the higher education. According to Singh (2004), the UGC in India is different from any grant-giving agency in any country of the world. In fact, the UGC in India is vested with two powers at the same time.

In some developed countries like Canada, Australia, USA and Germany the funds are allotted by the federal governments unlike in India. Besides this, the federal governments do not have the powers to set standards. In India, UGC is not only the grant-giving agency but also a policy-making body. The UGC as an apex and statutory body has got the powers to provide grants to all the universities who are eligible to receive these grants. In its formative years, all the universities were not eligible to receive this grant in accordance with the section 12(B) of the Act. It was only in 1974 the Act was amended to provide grants-in-aid to all the universities. It covered all the universities established after the commencement of the UGC Act, 1972 with certain exceptions. No grant is provided either by the Central Government or by the UGC if the university is established after the UGC Amendment Act 1972 unless the Commission declared it fit for receiving

[4] UGC. 2008. *Annual Report* 2007-08, University Grants Commission', New Delhi, p.16.

[5] S.R. Sharma. 2006. University Grants Commission: *Role in Development and Growth of Higher Education,* Mangal Deep Publications, Jaipur, p.38.

such grant.

The UGC's policy on the eligibility for grants, had become restrictive because of the funds constraint and this is likely to be reversed during the Eleventh Five Year Plan (EFYP). As a consequence, few institutions of the higher education received the grants from the UGC or Central Government. In terms of funding the budgetary allocation made by UGC on 'higher education is grossly inadequate and skewed in favour of selected universities and colleges in India'.[6] It may be noted that some State Colleges and Universities received more grant than the other. According to Bhushan (2008), states like Maharashtra and Tamil Nadu received the maximum plan support of 12 per cent and 11 per cent respectively. Six states like Maharashtra, Tamil Nadu, West Bengal, Uttar Pradesh and Andhra Pradesh received around 47 per cent of the plan resources from the Commission.

But the economically and educationally backward states like Bihar, Chhattisgarh, Jharkhand, Uttaranchal and Rajasthan received abysmally a low amount of plan support from the Commission. Besides, these states are also faced with resource constraint in financing higher education. Owing to this fact, some states have a favourable support from the UGC and received more grants from them. The UGC at present is funding about 145 universities and 4600 colleges under different schemes apart from funds given to research and teachers.[7] Therefore, most of the institutions of higher education receive no grants from the Central Government or the UGC because in majority of the cases, they are not affiliated as they are required to conform to the UGC regulation regarding quality. In the recently held Vice-chancellors conference, it was proposed that UGC grants may be given 'without insistence on 12(B) recognition as a pre-condition'.[8] It may be noted that the states often suffer from the fiscal constraints. The FRBM (Fiscal Responsibility and Budgetary Management) Act arguably restricts the state governments' spending so that the state fiscal deficits remain within the stipulated limit of three per cent of SGDP (State Gross Domestic Product). Subsequently, the states face a problem to meet the demands of access, equity and quality in investment of higher education. Therefore, the UGC is urgently required to address these very issues to support the financial need of the universities in order to supplement inadequacy in the state government fund allocation as well as to ensure coordination, avoid conflicts and regional disparities.

The Commission has the authority to regulate fees structure and prohibit the donations in certain cases. 'No grants shall be given by the central

[6] Pawan Agarwal. 2009. *Indian Higher Education: Envisioning the Future.* Sage Publications, New Delhi. p.131.

[7] Kavita. A. Sharma. 2003. *Fifty Years of University Grants Commission,* UGC, New Delhi. p.45.

[8] *University and Society (Draft) Proceedings of the Vice-Chancellors' of State and Central Universities,* p.38.

government, the commission, or any other organisation receiving any funds from the central government, to a university which is established after the commencement of UGC Act, 1972, unless the Commission has, after satisfying itself as to such matters as may be prescribed, declared such university to be fit for receiving grant as per 12(B)'.[9] The Commission also has the power to make rules, regulations and delegate. But all these rules and regulations have to be made by the parliament.

Since UGC receives funds from the central government, this affects the capability of the Commission to provide the grants to the universities and higher education institutions. Grants consist of both plan and non-plan expenditure to meet the maintenance and development needs of all the universities and colleges that declared fit to receive such grants. But the 'State Universities, Colleges and other institutions of higher education receive support only from the plan grant for development schemes'[10].

Higher education in India exists with lot of heterogeneity. We have the people from different social and economic backgrounds, religions and regions. Consequently, higher education in India is not free from disparities and imbalances. These problems are still visible among the different regions and religions. The overall Gross Enrolment Ratio (GER) in higher education in India is about 10 per cent, the GER for SC/ST and OBC is only six-seven per cent, compared to 17 per cent for others.[11] Further, Duraisamy (2008), stated that the GER in term of religious groups the for Muslims are 5.2 per cent as compared to 10.4 per cent for Hindu, 11.2 per cent for Sikhs and 18.6 per cent for the Christians and other religious groups.

Until now the masses of the population in the country are excluded from higher education on the basis of economic, social, gender and some other factors through discrimination. Due to this fact the higher education in India face major challenges in term of accessibility and equity. This is 'one of the greatest challenges to the system so that it makes higher education more accessible, more relevant and at same time more affordable.'[12] Consequently, the concern of the commission was to promote some of the schemes, so that it helps to overcome those social and economic barriers in higher education.

Further it is observed that there are wide disparities in the assistance provided by the Commission to different types of educational institutions[13]. In fact there are great disparities in allocation of budgetary resources

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[9] R.K. Tiwari. 2009. *Financing Higher Education in India.* Neeraj Publications, New Delhi, p.53.

[10] Op.cit, S.R. Sharma, University Grants Commission: *Role in Development & Growth of Higher Education,* p.21.

[11] P.Duraisamy. 2008. *'Enrolment Forecast of Higher Education for Inclusive Growth in the 11th Five Year plan',* UGC, New Delhi, p.27.

[12] Op. cit, S.R. Sharma, University Grants Commission: Role in Development & Growth of Higher Education, p.21.

[13] R.B. Agarwal. 1993. *Financing of Higher Education in India*, Ganga Kaveri Publishing House, Varanasi, p.95.

among the central universities, state universities and colleges. Subsequently the universities and colleges are not equally developed and it varied from region-to-region. Some of the backward places like hill and tribal regions are still left far behind the national level. These institutions lack not only physical infrastructure facilities but also suffer from poor performance of the staff (ibid). The teachers are not well trained or well equipped in the field. It is the responsibility of the UGC to look after these universities and colleges and provide grants and well-trained staff to these institutions. Besides, there also exist young and newly established universities which are yet to be developed firmly. These institutions require special development grant from the Commission which will enable them to introduce innovations in academic programmes.

According to Sharma (2006), UGC operates a scheme of autonomous colleges which enables potential college to design their curriculum, evolve new methods of learning, frame their own rules for admission and prescribe their own course of studies and conduct of examination. The concern of the Commission was to improve the quality of the autonomous colleges by giving them more academic freedom. It has also operated special schemes for the disadvantaged sections of the society. In most of the universities in India ST/SC Cells are functioning to enhance more opportunities to these deprived sections during the time of admissions, recruitment and provision of residential facilities, etc.

In addition to this, the Commission also organises special coaching class for qualifying the JRF and NET. These measures were intended to address the issues of access and equity. In the present scenario, the number of the students enrolled in higher education has increased but the infrastructure facilities are still in a bad shape. Subsequently the institutions of higher education suffer from both poor quality and excellence. The Commission has been promoting a large number of reforms in classroom teaching, laboratory practices, fieldwork, evaluation methods and other related aspects, which have a bearing on the quality of education.[14] The Commission is also constantly in touch with the Central and State governments for the necessary measures to be taken in order to improve quality of higher education. In the country like India there is an existence of numerous fake universities. To monitor this problem the UGC has special malpractice cells which are responsible to collect and submit the list of fake universities before the Commission for further necessary action.

An Indian higher education system is also assessed and accredited by a body called the NAAC (National Assessment and Accreditation Committee) which was established in 1994. The main concern of the body was to assess and accredit colleges and universities within a specific time frame. Number of

[14] Op. cit, S.R.Sharma. University Grants Commission: *Role in Development & Growth of Higher Education.* p.31.

colleges and universities were assessed and accredited. NAAC in India was set up through voluntary initiative but it has worked under the supervision and purview of the UGC. To some extent, NAAC also works autonomously. The UGC also nominates a number of persons who sit on the various NAAC bodies.[15] In the case of general education courses in India, the development grants provided to the colleges and universities are largely given by the UGC. The UGC normally sends the review committees in order to review and ascertain the financial needs, standards of teaching, examination and research after consultation with the university. In case of the State Universities, it is the government who send the review committees for the inspection rather than the UGC. UGC provides a small amount of grants to the State Universities and Colleges. Consequently, the major portion of the grants flows from the State Governments itself.

In fact, only the central universities and central government institutions of higher learning are funded by the UGC. The other institutions are either funded by other ministries, agencies of Central Government, State Government and trusts. Higher education in India is also funded either through 'entrepreneurial activities'[16] or donations. Besides this, we have the bodies like AICTE for financing, coordination or management of technical educations. A number of higher education institutions in India are also funded through private sources.

**UGC-funding Mechanisms**

In a developing country like India, higher education needs a huge amount of funds because of the rapid growth in demand and building up of quality infrastructure. Till today, the funds for universities are always in a shortage. Consequently, the resource for universities and higher education in India is in crisis. However 'a higher education requires a large amount of funds not only to provide good knowledge but also to give country great architects of society'.[17] Considering this, Governments provide a direct financial assistance to both the universities and colleges. The other main reason for the public support towards higher education was its positive externalities. Perhaps, the positive externalities can be either monetary or non-monetary benefits that accrue to the society. And in view of the positive externalities and inclusive expansion of higher education, the government has continued to provide subsidies to universities and higher education. In fact, the UGC funding is revisited; the funding approaches are either influenced through political, social and economic factors. And in funding of

[15] Amrik Singh. 2004. *Fifty Years of Higher Education in India: The Role of the University Grants Commission,* Sage Publications, New Delhi, p.124.

[16] Entrepreneurial activities includes various forms of franchising, licensing, sponsorship and partnering with the third parties, technology transfer, business incubator, research parks, testing services, executive education, venture capital investment and investment in real estate and so on.

[17] Op.cit,R.K Tiwari. *Financing Higher Education in India,* p.57.

higher education, the Government has its own objective functions essentially based on 'egalitarian approach'[18] to overcome shortages of labour supply and a steering philosophy or in other word, a market driven system.

Funding of higher education in some of the countries follows a pattern related to 'inputs funding'.[19] And it is through the input funding that constructs a relationship between costs and efficiency. The cost here has parameters which includes like student-teacher ratio, staff-student ratio and space allocation, etc.[20] However, an input funding still remains a problem particularly in the case of quality as it puts the institutions under pressure. An input funding also affected the innovation and diversification, hence research is likely to suffer.[21] And in contrast to this we also has an 'output funding'.[22] In fact, institutions are rewarded for their output and the number of graduates and post-graduates they have in their institutions. But still the issues of quality could not be solved. The third type is the negotiated funding where most of the countries follow this methods including India. Funding is also based on extent of the availability of funds, requirements, negotiating skills of the institutions and its political influence. Finally we have a student funding where the institutions are free to fix the fees and the state funds students, thereby their tuition and living costs are met.

### *(i) Planned, Input-based Funding through Providers*

A planned, input-based funding through providers is a centralised or regulated system of funding. In other words, it is a negotiated funding. In fact, this mechanism seems to be more of traditional in funding where the budgetary authority allocates funds to the institutions on the basis of their planned activities and proposals. The budgetary authority sanctions and allocates the funds based on this criterion. Allocations of the budget are always dependent on the previous budget allocations. Perhaps, there is a specific budget items on allocation of the budget. Hence a planned, input-based funding through providers is based on 'line item based'.[23]

### *(ii) Performance-based Funding of Providers*

Though the performance-based funding of providers also comes under the centralised or regulated system of funding but the fund is allocated on the outputs base. Therefore under this

[18] For instance an equal subsidy is to be provided to all students in all the programmes.

[19] A financial means available to institutions to cover distinct costs such as staff salaries, material means, building maintenance costs, and investment.

[20] Justice K. Punnayya Committee. 1992-93. *'UGC Funding of Institutions of Higher Education.'* New Delhi, UGC Publications.

[21] ibid.

[22] A funding arrangement where institutional budgets are tied to specific teaching and research outcomes of the institutions activities.

[23] It shows the different expenditure items as separate lines of the budget and it is determined by referring to norms with respect to indicators such as unit cost or capacity (e.g., funded number of students).

mechanism, funds are allocated based on the performance of the institutions. Under this mechanism universities or institutions of higher learning have to compete with one another to attract more funds from the funding agency. According to Chattopadhyay 2009, a reputed institution attracts more funds in a scenario of competitive funding, more endowments from the reputed alumni as they come forward to donate and form a network, which enable those institutions to offer more scholarships and lower fees to attract good students. Therefore, the best educators and the learners are attracted to this institution; consequently the best minds in the country cling to the best institutions. Hence, the top institutions continue to remain the same and the mediocre institutions at the middle and not so good ones are at the bottom (ibid, p.55).

### *(iii) Purpose-specific Purchasing from Providers*

Perhaps, this is also one of the funding mechanisms. It is a market-oriented system. Funds for the research work are awarded through the research councils. According to Jongbloed (2007), higher education institutions are invited to submit a tender for a given supply of graduates or research activities. And the tenders are selected by the funding agency which become that most price competitive (ibid, p.124). This creates the higher education institutions to compete with one another for education, training and research and produce high skill manpower and meet the needs of the society. And the funds for the research work are awarded through the research councils. A contract is signed between the two agents, an institution and funding agency. And in the contract, the institution agrees to produce a number of graduates and research output and supply a number of labour forces to the market and strengthen the innovative capacity of the country.

### *(iv) Demand-driven, Input-based Funding through Clients*

The demand-driven input-based funding through clients is the last stage of the funding mechanism for higher education. Under this mechanism 'a voucher systems' [24] is one of the alternative method in financing of higher education. A voucher system provides a student more freedom of exercising his/her own choice. This programme attracts more students to the institutions and receives more funds from the funding agency. And this system of funding creates more incentives and competition among the institutions. According to Teixeira et al. (2004) a voucher system entails flow of government funding directly to students and from them to the institutions which would create, arguably, more competition between the institutions and would lead to a proper utilisation of resources. Therefore, universities and other higher education institutions have to compete with one another in terms of 'the quality of their teaching

[24] It is only one of the options that was brought forward for funding of higher education. It promotes greater competition among providers of a good or service by providing public support indirectly to the consumers rather than directly to providers.

and their supply of courses'.[25] This programme attracts more students to the institutions and receives more funds from the funding agency. The voucher system creates a competition between the two, i. c. agent's supply side (institutions) and demand side (students). 'Students compete for limited supports and only the best students get the voucher likewise to compete for the students, institutions have to respond the students and labour demands'.[26]

According to Cheung (2004), the rationale and functions of the voucher systems are stated below; (1) Consumer based choice, which refers to a freedom of choice of institutes and shift of focus from institutes-centred to student-centred; (2) Personal advancement, which is on the belief that people want to shape their own destinies, such a decision can stimulate interest, participation, enthusiasm and dedication; (3) Promotion of competition, based on marketing sense, under competition only the good and strong players can stay, so it can be further deduced that competitions provide institute with incentives to improve quality and to introduce dynamic innovation while at the same time costs can be reduced; (4) Last but not the least the voucher system provides equal opportunity, which envisages that disadvantaged students will not be discriminated.

Perhaps, the core idea of the voucher system is that the students have the choice of their own freedom to what institutions to be attended and programme. Universities and higher institutions have to compete with one another for students. Hence a competition exists between the two sides, the demand and supply sides.[27] A voucher system provides a student-centred funding methods rather than the direct transfer of public funds from government to higher education institutes (ibid, p.55).

Now, let us examine the relative share of the grants under the plan and non-plan composition of the UGC budget under two different phases. A phase from 1993-94 to 2005-06 was placed under the first phase. And the phase from 2006-07 to 2008-09 was placed under the second phase. Perhaps, there exist wide disparities in allocation of the plan and non-plan grants between Central and State Universities and colleges. During the first phase, the State Universities received a larger share of the plan grant from the UGC budget. However, the mode of funding continued to remain till the second phase. The relative share of the plan grants composition is given in the Figure 1.

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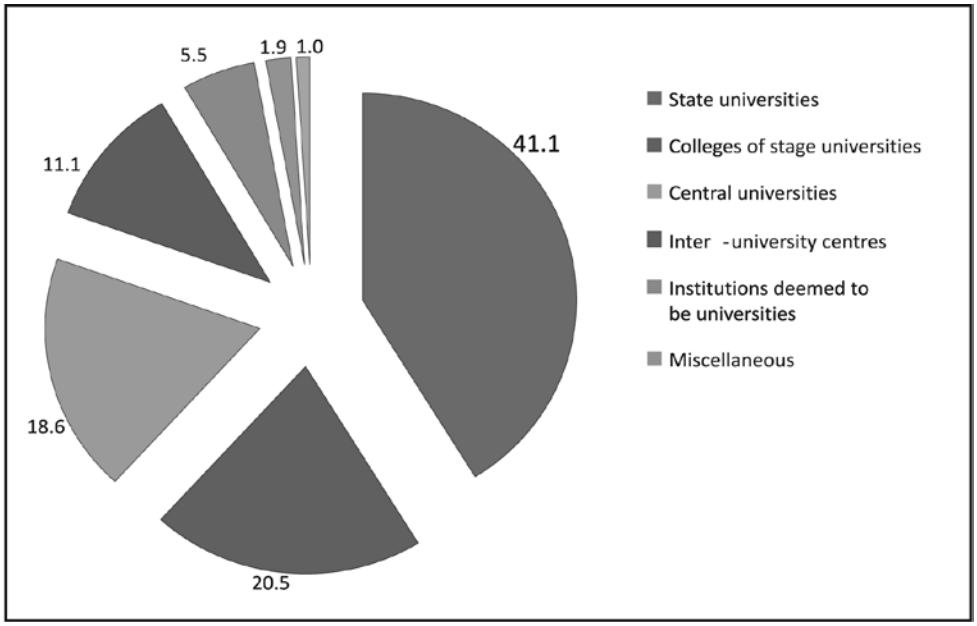
[25] Ben Jongbloed. 2007. *'Creating Public-Private Dynamics in Higher Education Funding: A Discussion of Three Options,* p.125.

[26] Bryan Cheung. 2004. 'Adoption of the Voucher system in government funded universities: Perspectives of higher education students and workers of Hong Kong', Delhi Business Review, Vol. 5, No. 1, p.56.

[27] The concept and nature of competition it is argued is not similar to the text-book description.

**Figure 1: Percentage of Plan Grants on Various Compositions (Rupees. in Crores) 1993-94**




*Source: UGC (1994) Annual Report 1993-94, New Delhi.*

It is clear from Figure1, that the major share of the plan grant was released to state universities with 41.1 per cent. But the relative share of the central Universities was worked out to be 18.6 per cent. Similarly, the relative share of the Deemed Universities was 5.5 per cent during the same year. In fact, this shows that the UGC funding of higher education in India is inadequate and skewed in favour of the selected colleges and universities.[28] Besides, the UGC policy on eligibility for grants becomes restrictive as a consequence of resources constraint (ibid). Due to this policy most of the colleges and universities in the country are left out from the UGC grants.

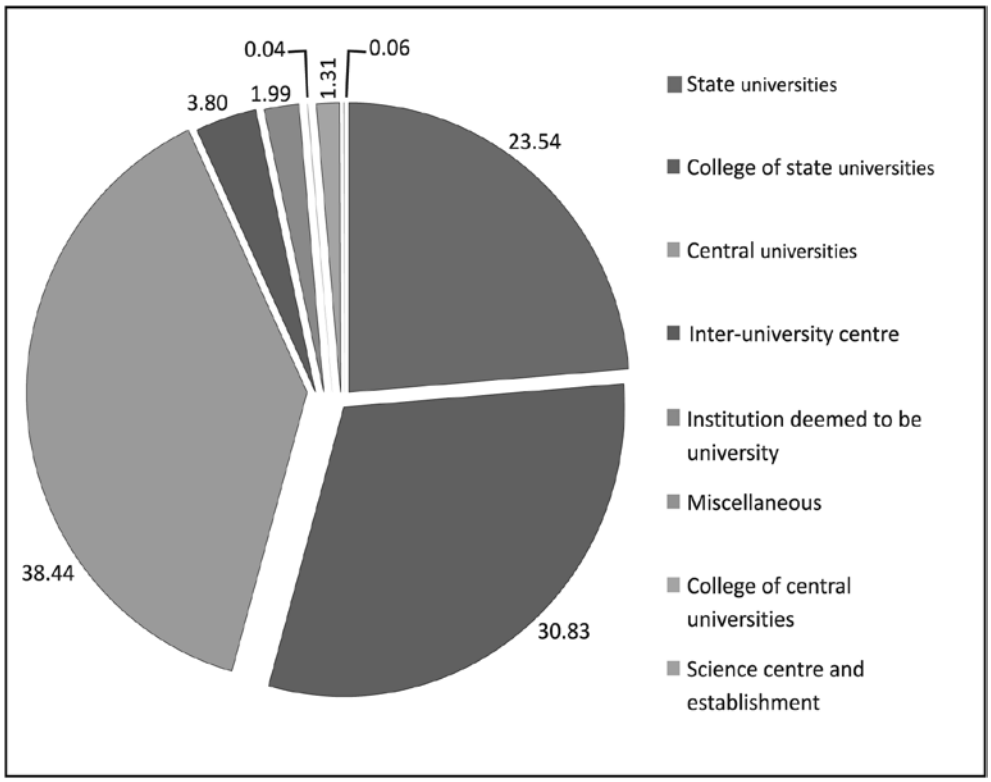
But on the contrary, the non-plan grant disburses more to the central Universities during the same year. And this mode of funding continued to remain till 2005-06. Therefore, the relative share of the non-plan expenditure on central Universities was 65.7 per cent. But the state universities received a share of 0.8 percent in the same year. Therefore, this indicates that larger amount of the maintenance expenditure was disbursed to the Central Universities. According to Agarwal (2009) most of

[28] Op.cit, Pawan Agarwal, *'Indian Higher Education: Envisioning the Future',* New Delhi, Sage Publications, p.131.

the public funding for higher education is institution-based. Consequently, a better Central Universities received a larger share of the budget from the commission.

But there was a U-turn of the plan grant released on central and state universities in 2006-07. The plan grants accrued more to the Central Universities as against the State Universities. The UGC budget (consisting both plan and non-plan) expenditure begins to disburse more on the central Universities from this second phase onward. Therefore, the relative share of both plan and non-plan expenditure for the state universities was worked out to be 23.5 and 0.6 per cent respectively in 2006-07. Similarly, the relative share of the plan and non-plan expenditure for the central universities was 38.4 and 61.0 per cent respectively. But the relative share of the plan grants on science centre and establishment was abysmally low with 0.04 per cent. The percentage of the plan grants expenditure on various compositions of the budget is given below.

**Figure 2: Percentage of Plan Grants on Various Compositions (Rupees in Crores) 2006-07**

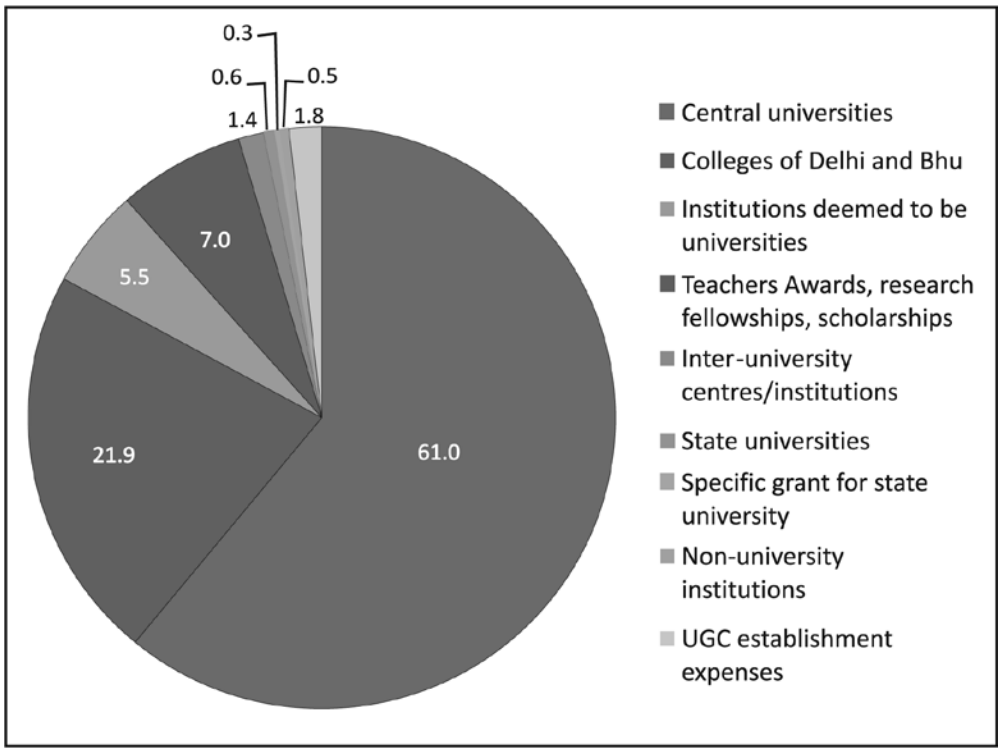



*Source:* UGC. (2007) *Annual Report 2006-07,* New Delhi.

Similarly if we examine the UGC budget on non-plan grants under the different composition, the major portion of the funds was disbursesd to the Central Universities. Hence, under the non-plan grant the Central Universities constitute a proportion of 61 per cent. The colleges of Delhi Universities and BHU constitute a proportion of 21.9 per cent similarly the State Universities constitute a very small amount of 0.6 per cent respectively. No doubt, the Central Universities is the major recipient of both plan and non-plan grants since the second phase.

The second phase (2006-07) was the beginning of the Eleventh Five Year Plan and the end of the Tenth Five Year Plan. The plan was given a well-deserved policy in development of higher education in India. According to Vice Chancellor Conference on higher education (2011), there is around a ninefold increase in the Eleventh FYP allocation as compared to the Tenth FYP grants to higher education. There are 376 universities in India during this period including 229 State Universities, 20 Central Universities, 109 Deemed Universities,

**Figure 3: Percentage of Non-plan Grants on Various Compositions (Rupees in Crores) 2006-07**




*Source:* UGC. (2007) *Annual Report 2006-07, UGC,* New Delhi.

13 Institute of National Importance and five institutions established under State legislature (UGC, Annual Report, 2006-07). Under the Section 12(B) of the UGC Act, out of 229 State Universities, 160 are eligible to receive the grants from the central assistance and three institutes that established under the state legislature are eligible to receive the grant from the UGC. Likewise the enrolment of the students on various courses in different level of higher education also increased from 110.28 lakh to 116.13 lakh in 2006-07. The strength of the faculty member in both the universities and colleges registered an increased from 4.88 lakh to 5.05 lakh during the same year. And number of the women colleges also increases from 1195 to 2166 since 1996-97 to 2006-07. Accordingly the enrolment of the women students in higher education has increased from 10 per cent to 40.55 per cent since independence to 2006-07 (ibid).

We had already mentioned in the above discussion that the UGC grant consists of both plan and non-plan expenditure that accrued to the Central Universities. Out of 20 Central Universities in India, 18 Central Universities received plan grant assistance from the UGC.[29] And the plan assistance was disbursed to 18 Central Universities under the various 'scheme and programme.'[30] The UGC disbursed a plan grant of ₹.480.59 crore to 18 Central Universities. But under the non-plan assistance, the UGC disbursed a grant for meeting both the recurring and non-recurring expenditure. And during 2006-07, the UGC released maintenance grants of ₹.992.32 crore in meeting the assistance of 18 Central Universities. And under the plan grant assistance, BHU received the highest funds from the Commission and least amount of grant was accrued to University of Assam (Figure 4).

Similarly, let us examine non-plan grant for the various Central Universities during the same period (Figure 5). Under the non-plan assistance, BHU received the major portion of the grants from the Commission. The least amount of grant was disbursed to M.G. Antarrashtriya Hindi Vishwavidyalaya in the same year. And during the same period, the Commission also disburse a maintenance grant of ₹.22.71 crore to the University College of Medical Sciences under Delhi University. And in the same academic year (2006-07) the UGC provided a development grant of ₹.294.25 crores to 136 State eligible Universities. Besides, the Commission also released a grant of ₹.178.58 lakh to 14 State Universities as Jubilee grants for completing anniversaries of 25, 50, 75, 100 and 150 years.

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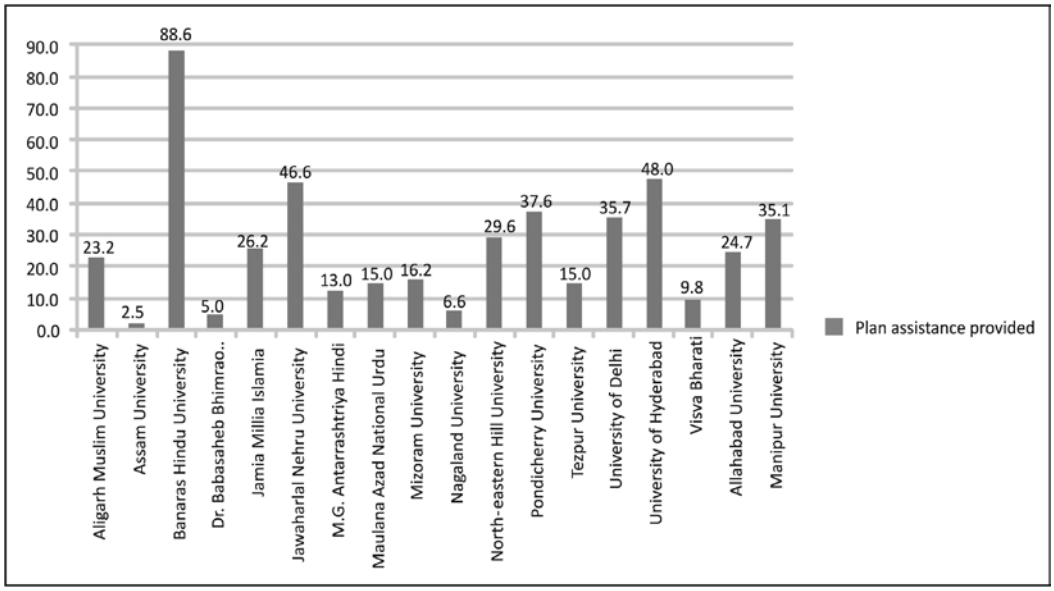
[29] UGC. 2007. *Annual Report 2006-07*, New Delhi, UGC, p.49.

[30] The grant is utilized for modernizing teaching, research and administration as also fore the extension and for carrying out research activities and to meet the changing needs of the universities to respond appropriately to the demands of the society. It is also meant for meeting the assistance of central universities under sub head such as staff, building, equipment, books and, books and journals and campus development etc.

**Figure 4: Plan Grant Assistance Provided to Central Universities (Rupees. in Crores) 2006-07**

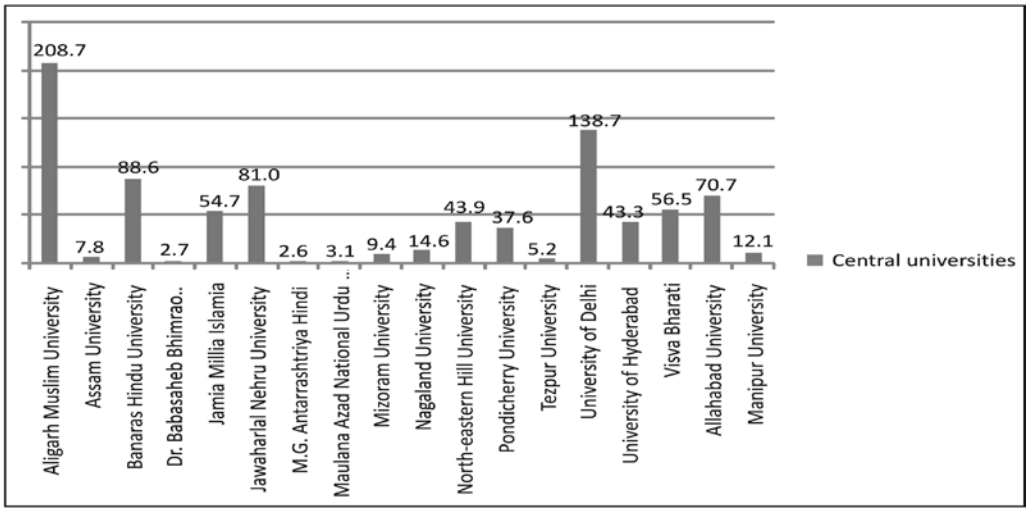



*Source:* UGC. 2007. *Annual Report 2006-07, UGC,* New Delhi.

The central objective of the Eleventh Plan is expansion of enrolment in higher education with inclusiveness, quality and relevant education and supported by necessary academic reforms in the university and the colleges system. First two years of the Eleventh Plan allocation on the university and higher education was ₹.5,800 crores which touched the peak as compared to the total Tenth Plan expenditure of ₹.4,183 crores in university and higher education. Similarly, the grants released by the Commission was on the peak in 2008-09 with the total allocation of ₹.5879.28 crores as compared to ₹. 2198.56 crores in 2005-06. Hence, the Elevenths Five Year Plan has marked a visible shift in financing of university and higher education in India.

In 1947, there were only 20 universities and 500 colleges in India. Around 679 new colleges were established alone in this year, therefore the total number of the colleges has increased to 16,885 as compared to 16,206 in 2002-03. On the other hand, the enrolment of the students also increases very significantly. The total number of the student's enrolment on higher education in 2003-04 was 99, 53,506 as against 95, and 16,773 in the previous year.

**Figure 5: Non-plan Assistance Provided to Various Central Universities (Rupees in Crores) 2006-07**




*Source: Annual Report (2006-07) UGC,* New Delhi.

The UGC also provided a plan assistance of ₹.24.82 crore to 36 Deemed Universities for meeting the development expenditure; and non-plan assistance to 30 Deemed Universities amounting to ₹.98.14 crore in 2006-07. ₹.98.14 crore was provided to 30 Deemed Universities for meeting the maintenance expenditure during the same period. And an amount of ₹.5.36 crore was provided to 16 young universities under the special development grants to universities. And similarly an amount of ₹.4.03 crore was paid to 25 universities including 20 State Universities and five Deemed Universities situated in the in the backward areas. Besides, a regular special grant, additional plan grant was provided to seven universities including Aligarh Muslim University, BHU, Manipur University, Jamia Millia Islamia, JNU, University of Hyderabad and Pondicherry University amounting to ₹.82.75 crore in 2006-07 (Annual Report UGC, 2006-07).

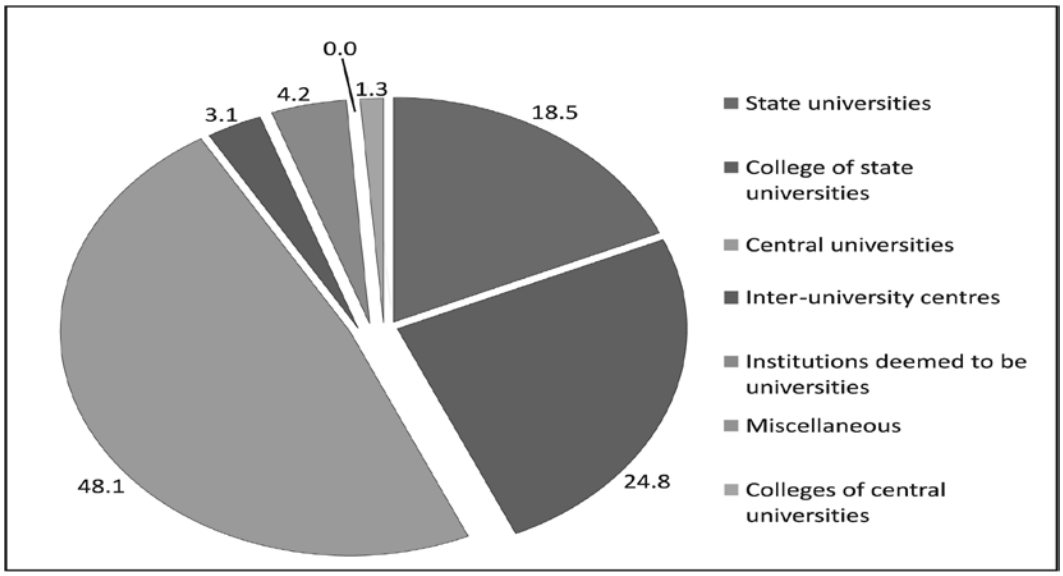
And the plan grant of ₹.385.42 crore was provided to 23 State Universities. Similarly, non-plan grants of ₹.330.08 and ₹.3.35 crore are provided to Delhi Colleges and BHU Colleges in 2006-07. And under the autonomy grant all the regional offices of UGC have released a grant of ₹.15.61 crore to the autonomous colleges during the same period (ibid, p.88). And a scheme of development assistance to colleges is also initiated in 2006-2007. In fact, the scheme was to strengthen infrastructure, remove or reduce social disparities and regional imbalances and to provide special remedial coaching class to backward classes.[31] Accordingly an amount of ₹.472.91 crores is allocated to 4898 colleges during the plan. A total grant

[31] ibid., p.5.

of ₹.61.81 crore is provided to all 2734 eligible colleges in 2006-2007.[32]

The UGC plan and non-plan grants continued to accrue more on the Central Universities in the academic year 2007-08. In the academic year 2007-08, the total number of colleges recognised under the Section 2(f) of the UGC Act, 1956 has been 6,773 as compared to 6,352 in 2006-07 (UGC, Annual Report, 2008). And out of 6773 colleges, 5819 colleges are eligible to receive the assistance from the Commission under the Section 12(B) of the Act, 1956. And out of 242 State Universities, 75 universities and two institutions out of five institutions established through State Legislative Act are not eligible to receive central assistance from the Commission under the Section 12(B) of the UGC Act, 1956. And the 13 State Universities, 11 Deemed universities, five Central Universities and 20 Institutes of National Importance have been included in the UGC list of universities recognised under Section 2(f) and four universities have been declared fit to receive central assistance under Section 12(B) of the Act, 1956 (ibid). And under plan grants the Commission disburses ₹.630.35 crores to 23 Central Universities for various development schemes in 2007-08. Similarly the UGC also disburses an amount of ₹.1304.52 crores under non-plan grants assistance on 21 Central Universities in the same year. The Commission also disburses a plan grant of ₹.572.20 crores to 22 State Universities and plan grant of ₹.55.74 crores and non-plan grants of

**Figure 6: Percentage of Plan Grants on Central Universities (Rupees in Crores) 2008-09**




*Source:* UGC. 2009. *Annual Report 2008-09, UGC,* New Delhi.

[32] ibid.

₹.87.20 crores respectively to Deemed Universities (ibid).

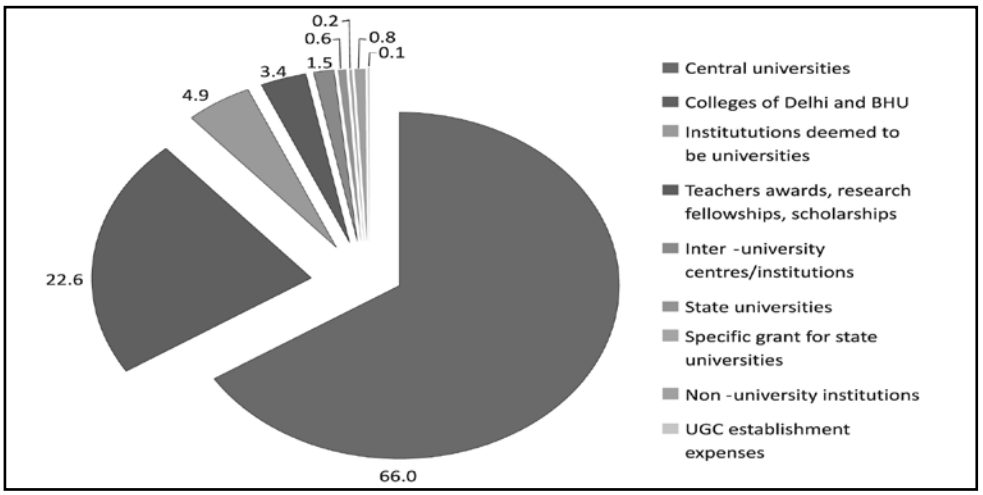
Since the beginning of the Eleventh Plan, the allocations of the resources on university and higher education was given a high priority. Therefore, total expenditure (plan and the non-plan) on university and higher education increased very significantly. The total expenditure (plan and non-plan) also increased to a great extent. The total plan grants exceed the non-plan grant expenditure in 2008-09. Perhaps, the UGC budget began to release more on the Central University under the plan expenditure since the beginning of Eleventh Plan. The relative share of plan grant for the Central Universities claimed was 48.0 per cent and State Universities and Colleges of State Universities got 18.5 per cent and 24.8 per cent respectively in 2008-09. Therefore, this reflects wide disparities of the resource allocation on State and Central Universities.

Similarly, the non-plan expenditure under various budget heads is released to the central universities. The relative share of the non-plan grant under central universities was 66.0 per cent in 2008-09.The Colleges of Delhi and BHU were worked out to be 22.6 per cent. Similarly the State Universities was also worked out to be 0.6 per cent in the same year. Therefore, this indicates that the Central Universities were given more importance in allocation of resources since the beginning of the Eleventh Plan. Hence, Central Universities begin to receive more grants (plan and non-plan) from the Commission.

## Conclusion

The UGC in India is an apex and statutory body. The Commission is not only responsible for funding through grant but also for the determination and maintenance of standards of higher education. The UGC disburses grants

**Figure 7: Percentage of the Non-plan Grants on Various Compositions (Rupees in Crores) 2008-09**




*Source:* UGC. 2009. *Annual Report 2008-09, UGC,* New Delhi.

to the State, Deemed and Central Universities. The Central Universities received both plan and non-plan expenditure from the Commission. On the contrary, the State Universities received only plan expenditure from the Commission. Further the number of State Universities is far greater than the Central Universities. Allocation of grants is in favour of the Central Universities. Hence, there is skewed in the distribution of the UGC budget between the State and Central Universities. During the first phase, the State Universities received a larger share of the plan expenditure from the UGC. But the Central Universities received smaller proportion of the UGC budget under the plan head expenditure in this phase.

However the mode of funding universities in India begins to shift in the second phase. Hence, there is a U-turn in allocations of the resources from the UGC. The Central Universities continued to receive a larger share of both plan and non-plan expenditure from the UGC. In fact, the second phase is the beginning of the Eleventh FYP where the government has given a well-deserved priority in development of higher education in India. Consequently, the UGC budget begins to prioritise the Central Universities. And it was from this juncture both the (plan) development and (non-plan) maintenance expenditure were released to the Central Universities. The government has given so much importance to the Central Universities even under the development expenditure; the development expenditure began to grow more than maintenance expenditure in 2008-09. Nonetheless, even within the Central Universities there exist wide disparities in allocations of funds. The Central University like BHU, JNU and University of Hyderabad received a major share of the grants (plan and non-plan) from the UGC. But on other hand, the Central University like Assam, Nagaland and Ambedkar University received a small amount of plan assistance from the UGC. This reflects that better and reputed Central Universities receive a major portion of the budget from the UGC.

But the mode of funding, the UGC was contemplating the changes the Vice Chancellor meeting recently held in New Delhi, was likely to bring about a share in funding. In fact, the formula base funding seeks to treat the State and Central Universities in terms of funds release because the disbursement would be need base. Therefore, this will lead the Central Universities to explore out an alternative source of funding, like cost recovery system, etc. The public expenditure on higher education is abysmally low but the demand for the higher education in India increases over the years. Hence, the government under different Commissions felt that there is a need for the funds to raise a level of 1 to 1.5 per cent of GDP. In fact, this will not only addressed the issues of equity, accessibility but also a quality. Consequently the government regulation on higher education is considered to be indispensable to address the above issues. The Commission also provided special schemes like Rajiv

Gandhi National Fellowship and Maulana Azad Fellowship to all the economically challenge classes and other backward classes who enrol in research level. Basically, the main concerned of the government was to raise the GER to 15 per cent by the end of the Eleventh FYP and finally to raise the level of 21 per cent by the end of the Twelfth FYP.

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# ICT Kit in Mathematics

P.K. Chaurasia*

**Abstract**

*The role of ICT in the mathematics curriculum is much more than simply a passing trend and it is envisaged not simply as a technical skill or as a means of improving learning effectiveness but also as a way of transforming the goals and processes of education. It provides a real opportunity for teachers of all stages and subjects to rethink fundamental pedagogical issues alongside the approaches to learning that students need to apply in classrooms. Innovations that require teachers to change many aspects of their daily routines are very demanding for them. Complex innovations can only be successful if a number of interacting conditions are met. This paper describes a design for an ICT based tool which can be fitted in mathematics teachers' daily routine easily. Though every teacher has her own style, this paper provides a comprehensive technology exposure along with how to design digital content resources using open source mathematical software with the pedagogical approaches and an evaluation mechanism through ICT. This ICT Kit in mathematics describes a design of a source for teacher's professional development in mathematics as well as rubrics based continuous and comprehensive evaluation tool.*

## Background and need

We believe that use of ICT foregrounds the ways in which teachers can match in school the opportunities for learning provided in home and child's other surroundings. In fact, there is increasing evidence that young people who have always been surrounded by and interacted continuously with ICT develop a different approach to learning and knowledge management from students who have not had this opportunity. Therefore, the integration of ICT is believed to be very crucial for the welfare and well-being of our future generations.

In educational reforms the teacher is the last but most crucial chain. However, when considering ICT related innovations in education we cannot conceive teachers as isolated actors. Teachers follow routines that they have learnt during pre-service training and on the job, they are

**Assistant Professor*, DESM, NCERT, New Delhi-110016

required to implement curricular objectives and contents that quite often are formally established, they work within the constraints of the school organisation having fixed timetables, etc. Innovations that require teachers to change many aspects of their daily routines are very demanding for them. Complex innovations can only be successful if a number of interacting conditions are met.

It is believed that when students learn with technology, they may use it as a cognitive tool that helps them to construct meaning based on their prior knowledge and conceptual framework. Also, the growth rate of Web users and developers has increased exponentially.

Publishers, curriculum specialists, mathematicians, teachers, and students have placed a great deal of mathematics and mathematics-related information and activities on the Web. There is a need to consolidate these applications so that students can access a greater range of learning opportunities and teachers can have a stronger sense of the technology's utility and connection to learning outcomes. Also technology enhances learning opportunities because it can efficiently support graphing, visualising, and computing. Moreover, the technology is used as a medium to provide resources and learning situations that would otherwise be unrealistic or impossible to create.

Keeping in view this visionary attitude, this article 'ICT Kit in Mathematics' focuses on following broad objectives:

i. How to design and develop e-content using different subject-specific open source software on various concepts of Mathematics as digital-interactive content

ii. How to develop rubric based Continuous and Comprehensive Evaluation system on process evaluation

**Digital Technologies and Mathematics Education**

The mathematics education community is engaged in a constant quest to find out how children best learn mathematics. Due to coherence property, mathematics is an enormous and constantly expanding network of interrelated facts and ideas like the fields of cognitive development and the psychology of learning. A large proportion of teachers these days try to base much of their teaching practice on constructivist ideas – that is, on the belief that the teacher's role is to create opportunities for children to build their own understanding of the concepts. However, if only we could discover precisely how the child best learns mathematics then we could work out exactly how to teach the child the subject in the most effective way. Many would say that this is an impossible dream. We can never achieve ultimate professional enlightenment, not only because every child and every teacher is different, but because the social and cultural contexts keep changing. The impact of advances in science and technology cannot be underestimated.

Even though technology can influence what is taught, teachers need

to be mindful of designing instruction and environment that promote these content and learning framework. In fact, technology supports learning requirements when it is used 'as a tool for processing the concepts with investigations and problem-solving'. Digital technologies can be seen as catalysts for a paradigm shift. Since printed material and books became readily accessible, education has experienced a gradual shift away from the idea that its success relies on the student's capacity to memorise and accurately recall large amounts of information. Instead, greater emphasis has been placed on developing research and problem-solving skills. In recent years, with emerging information and communication technologies (ICTs), the pressure has rapidly mounted to shift our views on effective teaching and learning even further. Emphasis is now placed on equipping students with effective 'inquiry skills, including the ability to find and process new information using digital technologies. Many educators are now seeing digital technologies, with their interconnectedness, as environments, rather than just tools, for learning and teaching. The difference between these two perspectives is significant, the former requiring a fundamental change in teaching practice for many teachers.

**Continuous Professional Development of Teachers**

Towards the one of the major objectives, i.e. Teachers' professional Development programme, we need to come up with a very innovative and effective approach. This ICT Kit in Mathematics will provide a design of a utility tool for the professional development.

We know that teaching is closely connected to the affective aspect of human minds, and being a teacher means to be emotionally involved. Education is deeply rooted in personal attitudes and values. The fact that teaching is closely linked to emotions, means that teaching by its nature is impossible to dictate. Consequently the idea of teachers' professional development should be built on the acknowledgment that teachers' concern is their students.

Teachers' professional development is an elusive term. To some it may conjure images of short term courses and workshops. Others may associate it with ongoing and reflective practice. So, what does the term teachers' professional development actually mean? According to Darling-Hammond (1994) teachers' professional development is a process of enhancing teachers' status through increased awareness and an expanding knowledge base. Linda Evans (2002) defines Teachers' professional development as 'an ideologically-, attitudinally-, intellectually- and epistemologically- based stance on the part of an individual, in relation to the practice of the profession to which s/he belongs and which influences her/his professional practice'. She also mentions that teachers' professional development is an ongoing process. In fact, her definition implies that professionalism should be enhanced through a development process.

De Corte, 2000 has written that the teacher's task is to enable his or her students to develop their individually different processes of knowledge building and meaning construction as well as positive attitudes. It is a common belief that mathematics is a difficult subject. Therefore, in order to help learners succeed it is of the utmost importance that the teacher should examine and analyse possible barriers that might have a negative impact on learning. A good mathematics teacher should be able to suggest ways to minimise these and to use a variety of effective teaching strategies that help to overcome individual learning difficulties.

The general question is 'What professional skills, what attitudes are to be acquired for the teaching of mathematics?' Learning to teach requires a balance between teachers' theoretical and practical knowledge and skills including knowledge of mathematics, knowledge of teaching mathematics, and knowledge of psychology and pedagogy. These components are only general; they do not answer the basic question about the content and extent of the knowledge required.

It is, therefore, mentioned that evolving effective pedagogy with digital technology for teaching and learning mathematics content will enhance professional skills.

**1. Continuous Professional Development through ICT Kit**

The ICT Kit will be about supporting quality teaching in mathematics. Our intent with the ICT Kit is to provide design of a tool for teachers as they seek to improve their effectiveness in delivering high quality, productive learning experiences for all students.

We will define tools and techniques in the ICT Kit for practical and user-friendly support for effective teaching. Regardless of how effective any one of us might be in our teaching, we can continue to grow and improve. The ICT Kit will be aimed at continual improvement and sustaining quality teaching as well as for the beginners it will be designed to help identify areas for performance improvement, and to focus support for the important and ongoing process of development. With ICT Kit in Mathematics, our ultimate goal is to improve the educational experiences and achievement of the students we serve in our schools by focusing directly on teacher effectiveness. The focus is for pedagogical enhancement, technological empowerment of users along with implementing a rubric-based effective evaluation system. The most important point to make about the use of ICT is that it cannot and should not replace the teacher. Excellent teaching and effective learning can only occur when a good teacher is present. The key lies in how the technology is used and employed, not in the teaching of the technology itself.

In order to enhance the quality resources and its availability to a teacher of mathematics, following points should be met by effective use of ICT:

- It should integrate easily into the teacher's daily work.
- Increase interest for learning and making it a fun for those who find

the concepts tough by providing innovative presentations of content.

**Working of the ICT Kit**

**1. Pedagogical Enhancement**

Teaching is being viewed as a process of facilitating students' learning by creating a learning environment conducive to enquiry. This necessitates the teachers to upgrade and reorient themselves. Though every teacher has her own style, here comprehensive technology exposures along with how to design digital content resources with pedagogical approaches and evaluation mechanism through ICT will be discussed. If ICT is to be successfully incorporated into any lesson then there are some fundamental issues that need to be tackled at a very early stage. The subsequent success of the lesson depends upon that. Employing ICT as part of a mathematics lesson is not difficult, but it adds another dimension and the place and purpose of it need careful consideration.

**Planning the ICT Lesson**

So what does mathematics lesson where ICT is to be used look like? Much of it will be familiar, containing as it does all of the key features that one would expect in a plan for a mathematics lesson. This is detailed below:

- Selecting an appropriate topic: Why has a particular mathematics topic been chosen?
- Key learning objectives: What are the intended learning outcomes as a result of the lesson?
- The content of the lesson: What exactly is to be taught?
- Details of any prior learning: The starting point may often be the children's previous experiences.
- Teaching methodology to be used: Particularly crucial, whenever ICT is involved.
- Key teaching points: What are you actually going to teach the students? What are you going to say to them? What are you going to ask them so as to ensure that they learn what you want them to learn?
- The foci for assessment: How are you going to assess what you hope the children have learned? What do you think they will have learned? What are the intended learning outcomes?
- Cross-curricular links: Are there any clear and relevant connections to other areas of the curriculum?
- Follow-up work: Where does this lesson fit into an overall sequence of work?
- Resources: What hardware or software is to be used?

On the basis of above exhaustive features, following design for our template may be selected to develop a mathematics lesson:

(i) Learning objectives

(ii) Introduction of a topic

(iii) Some thought-provoking questions

(iv) Flow of chapter (Step by Step)

(v) Examples

(vi) Hands-on activities

(vii) Self exploratory experiments (if any)

(viii) Daily life application

(ix) Application (Problem solving)

(x) Interdisciplinary applications/ problems

(xi) HOTS questions

(xii) Extension activities

(xiii) External Web resources for the content

(xiv) Time management tricks for teachers

(xv) Suggestive reading

(xvi) Some thought provoking questions that lead students to do some kind of exploration.

**2. Towards Technological Empowerment**

Many ICT tools are available to support and enhance teaching and learning. Different software tools offer widely varied experiences and access to different aspects of a topic. Simply to consider the range of number of applications which users are learning to use is generally not a good way to monitor the value of new technologies. One user who only uses a single application may achieve far more in the same time than another user who uses several. Software applications are resources and it is more important to think about the nature of the user's experiences. The ICT use can be invoked in two distinct ways. Sometimes it is appropriate to give the users a ready-made document or file which has been already created and invite them to explore it. At other times, it may be better for users to create their own from scratch, as they express themselves with contentment by means of a more open application or resource. Users give shape to their own ideas using technology in this latter 'expressive mode', as well as tasks in which users work with software in a more constrained, pre-planned 'exploratory mode'. Geogebra applets can be pre-built for users to explore or they can build their own reflecting their particular way of looking at a situation.

We may use following open source software to develop the kit:

(i) Latex and PStricks for presentation

(ii) Maxima

(iii) SVG or Canvas

(iv) Screen capturing - Jing, Camstudio

(v) Picture lessons - Microsoft Photostory 3

(vi) Geometry and Algebra Applets -GeoGebra

(vii) Small animations - UnFreez (See examples UnFREEz )

(viii) Complete lesson module - eXe

(ix) Snag it

(x) Eclipse crossword

(xi) Tarsia Formulator (creating puzzles (jigsaw type)

(xii) Graph 4.3 for graphing

(xiii) Open Office

(xiv) Scratch programming: useful to develop logical thinking

(xv) Geogebra : Geometry and Algebra

(xvi) Dr. Geo: Geometry, school level

(xvii) DIA Diagram Creation Program

(xviii) Freemind (Mind mapping)

(xix) Geonext

(xx) Picture Collage maker Pro

(xxi) WinPlot (ploting and animating), LOGO, etc.

LOGO (Logic Oriented Graphics Oriented.) is open-source software easy to use by teachers and students. It may be downloaded from softronics. Winplot is a general-purpose plotting utility, which can draw curves and surfaces in various formats and can be animated.

**3. General Approaches**

It is a common assumption that when using ICT in mathematics education meaningful interaction with the learning situation depends upon students individually constructing their own figures from a blank screen (the expressive option).

Here may be two further possibilities:

1. One way to develop meaningful interaction is to run a teacher-centred lesson using a single laptop with a data projector and an interactive whiteboard.
2. A second possibility is to provide the students with preconstructed files. In such files, students could manipulate the figures that appear before them; many of the initial access problems can be somewhat bypassed.

**4. Thinking Geometrically Dynamics through Software (Pedagogical implications)**

Geometry software is a powerful tool for facilitating mathematical learning, exploration and problem-solving. Arising from its richness and scope, there are, perhaps unsurprisingly, significant pedagogic issues to be addressed in order to use geometry software effectively in secondary classrooms. Through ICT Kit in Mathematics we may show the potential for interactive geometry to support teaching and learning of mathematics, as well as considering how learners can be introduced to the considerable possibilities afforded by the software.

In mathematical endeavour we know that 'Geometry' is a skill of the eyes and hands as well as of the mind. The word 'Theorem' has the Greek word meaning 'Vision' at its root, as well as linking to the word 'theatre': both are concerned with show, with display; both have a touch of revelatory magic about them. The Interactive Geometry Softwares' essence lies in the way users can interact directly with geometric figures they have constructed (or that have been preconstructed for them). This interaction occurs in a continuous and dynamic way, by means of the direct control of your hand on the mouse. It is also possible to 'animate' a construction, so that the screen images move 'on their own'. But, for us, the most striking and powerful impact comes when, in pursuit of a mathematical question or goal, students directly explore a geometric realm informed by hand and eye, focused by their minds.

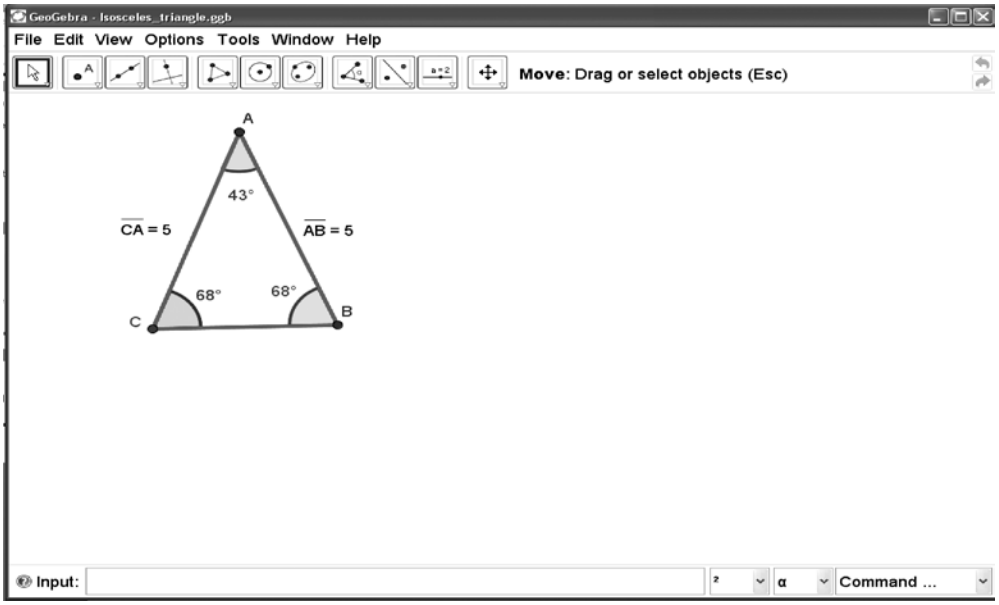
One of the issues in trying to describe motion and its effects in text is that one necessarily has to miss out on all of the essential ingredients. Not least among these is the sense of surprise and wonder that animating mathematical diagrams and images can bring, externalising and setting back in motion images that have been held static within the pages of textbooks.

We need to separate out of exploratory versus expressive approaches to using ICT. One place where this distinction arises in relation to interactive geometry is with the question of offering users pre-constructed files to explore, rather than having them construct figures of their own. And, as always, there is the general pedagogic question of what kinds of question and tasks can help students to focus their attention on the mathematically important aspects of the situations presented to them by others or generated by them.

At this place some questions arise, 'how to evoke the need for students to prove or otherwise explain and justify general claims or results that the software seems to show them directly.' A dynamic demonstration can be very compelling. How can a geometric diagram which is always and necessarily particular be used to argue convincingly about what must happen in general? With interactive geometry, most often seeing is believing, especially given the sense of generality evoked by the plurality of linked instances of a given configuration. In fact, when a new piece of software is used in a lesson for the first time, some things do not go quite as expected or hoped. We need to work on some of the issues involved in making effective use of the software.

With any software, there is a learning curve involved in acquiring a certain facility with it. A task that looks simple when demonstrated by an informed individual might involve steps that are not so easily discovered by a beginner. Interactive geometry software, geogebra, is very open, offering a wide variety of tools and facilities. Some users thrive in such an open-search setting, exploring at length and at will. Others can become somewhat overwhelmed initially by the variety of options in the menu and by the fact that each tool does something mathematical to the image on the screen and is related to a geometrical concept. However, with a structured introduction to certain of the available tools, and with perhaps some introduction to the experience of dragging dynamic constructions, users can acquire confidence and build valuable insights.

There are two different but related kinds of learning involved in using software, which we call instrumental and conceptual. Instrumental learning is about how to do things in the specific software: how to create points or lines or circles, how to operate with menu items (like 'rotate' or 'construct perpendicular bisector'), how to perform calculations (like measuring lengths, areas or angles). It reflects the decisions made by the software designer. For example, in order to be an effective user of the software, the student may need to find and use the tool to




construct a mid-point. Such learning is not intrinsically mathematical and can be developed in a context in which students are not deliberately extending their mathematical understanding. Tasks that develop instrumental understanding may involve the creation of images or the use of features such as reflection or animation. One striking thing about interactive geometry is that instrumental learning is also frequently conceptual. Mathematical language of the interface both provides and seeds the preferred vocabulary for subsequent mathematical discussion. An understanding of some or many of these terms is gained in the software environment and the words act as both labels for that experience as well as the commands to make that action occur. Thus, the words can serve as both verbs and nouns. This is a common process in mathematics, where verbs are turned into nouns. However, effective use of the software also requires conceptual learning. Conceptual learning develops gradually through deepening experience with both geometry and the software, both on and off the computer. It can be difficult at times for users to make sense of the visual complexity of a filled, changeable computer screen. A more experienced user learns to 'hide' objects used in a construction and to construct visible line segments where they need to be visible.

**5. Working with Reconstructed Files**

A major feature of such files is that it is possible to modify or add to them. The use of preconstructed files involves students working in 'exploratory mode', to explore within the constraints set by the creator of the files. This is in contrast to the students engaged in making constructions of their own, which can be seen as working in 'expressive mode'.

**Advantages and Disadvantages of Preconstructed Files**

| *Advantages* | *Disadvantages* |
|---|---|
| Students (and teachers) only need to be able to manipulate: no initial knowledge of the software is needed. | Resources to either acquire (cost), find (time) or create (time). |
| Less time-consuming for students, as object does not need to be constructed. | |
| Can focus immediately on desired learning outcomes without the distraction of needing to construct the required figures. | May restrict student exploration. |
| Files can be modified or added to. | Files can be drastically messed up. |
| Such files may lead to questions such as 'how did they do that? Which may motivate students (and teachers) to begin to create their own files. | Some students (and teachers) need to know how a file works before they can be comfortable using it, and hence get little by using it. |

Although learning to use a new tool takes time, there are advantages for students in making constructions of their own. Construction offers considerable scope for students to be creative, to be challenged and to engage in open-ended problem-posing and problem-solving. They can work at their own mathematics. The process can give the student ownership of what they create and can lead to a deeper understanding of the figure. Of course, it is possible that some tasks may be too challenging for certain students, leaving them frustrated and not knowing where to begin, but with support these issues can be overcome.

**When to Use a Preconstructed File and When to Construct**

| *When to use a preconstructed file* | *When to construct* |
|---|---|
| In the early stages of learning to use the software (by either teacher or student). | When students have sufficient confidence with the software (or the geometry). |
| In the early stages of geometry learning when shapes can be identified visually, but the idea of properties of the shape is not understood. | When students have some idea of the relationship of the properties of a shape to the construction of a shape. |
| When the learning objectives are unrelated to the way in which the file was constructed. | When the process of construction is intrinsic to learning objectives, such as exploring ways to create a rhombus or constructing a figure in order to explain its properties. |
| When a situation seems to be bit complex for construction. | When the complexity of construction is an appropriate challenge to the student. |
| When instructions to create a figure are more complex than the resulting figure. | In open-ended tasks or when using the software to solve a particular problem or when looking for an explanation of why something is happening. |

***Focusing Attention when Exploring Geometry***

Whether constructing from a blank screen (expressing) or exploring a preconstructed file (exploring), many students will benefit from having some fundamental questions to ask themselves as they investigate. Some fundamental questions need to be addressed while working geometrically, both with and without preconstructed files. It might be involved in helping students deal meaningfully with these questions.

***What's Happening?***

This is the fundamental question that all students must ask when confronted with an interactive geometry file. It is not always a straightforward question to answer, as it is not always easy to make sense of a confusion of changing geometric figures. One way of beginning to make sense of what's happening is to start with the question —What stays the same and what changes? This question focuses attention on the hunt for invariance, a fundamental issue in geometrical thinking. Interactive geometry software is particularly useful for exploring this question in various contexts.

***What If ?***

'What if . . .?' questions provide a variation on the theme of looking for invariance. The process is now one of asking 'If I change this, what else changes?' and, by implication, 'What stays the same?'. 'What if . . .?' questions are particularly important in whole-class discussion around a single screen. At every stage, students can be asked to predict what will happen if the teacher changes something. It is also an important question in independent exploration, where the question can lead to changing initial aspects of the situation to extend a task. It is always questions that drive exploration and investigation.

***Can I Make ... Happen?***

The question might be quite simple (Can I create a triangle of a certain area?) or it might involve complex problem-solving (Can I create a file to depict a rotating icosahedron?). The answer to the question may turn out to be 'no', but the process of exploration still may well be valuable. For example, an attempt to create a triangle with two right angles may lead to an understanding of why this is not possible.

Thus, we have looked at some of the issues involved in using interactive geometry software in the classroom and some of the ways of dealing with them. Although interactive geometry can be used anywhere in the mathematics curriculum where a visual approach is appropriate, it is geometry and geometric thinking that underlie all such models. Preconstructed files can be created for students to manipulate but if the geometry is neglected, students will not be able to represent mathematical situations expressively for themselves. The ultimate aim should be to equip students so that they are able to choose to use such software in support of their mathematical thinking, whenever and wherever it is useful.

In fact, digital- interactive content materials based on the software will form a resource pool and motivate users from exploratory mode towards expressive mode. To make the process simple and effective, several video tutorials focusing on above mentioned attention may also be added for its effectiveness at maximum extent.

**Continuous and Comprehensive Evaluation (CCE)**

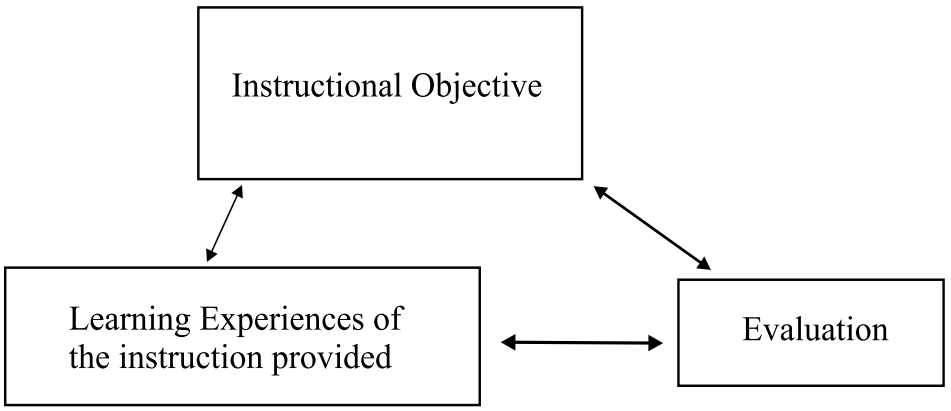
Evaluation is an integral part of any teaching and learning programme. Whenever a question is asked in a class and answered by a student and the answer is judged by the teacher, evaluation takes place. Thus, both teaching and evaluation go hand in hand with each other. In fact, it is not possible to have teaching and learning without evaluation.

Both teaching and evaluation are based on the instructional objectives which provide direction to them. Instructional objectives are those desirable behaviour which are to be developed in students through the learning experiences. These are reflected in the form of syllabus, instructional material and information given by the teacher. Instructions are given for achieving the objectives and evaluation is done to see whether the instructional objectives have been achieved and to what extent. The interrelationship of objectives, instructional process or the learning experiences and evaluation in a programme of teaching can be expressed more clearly through the following diagram:

The above diagram illustrates that the three components—teaching, learning and evaluation constitute an integrated network in which each component depends on the other. Thus, through evaluation, the teacher not only assesses as to how far the student has achieved the objectives but also examines the effectiveness of the teaching strategy such as methodologies, means and the materials used for achieving those objectives.

**Introducing Rubrics**

At its most basic, a rubric is a scoring tool that lays out the specific expectations



for an assignment. Rubrics divide an assignment into its component parts and provide a detailed description of what constitutes acceptable or unacceptable levels of performance for each of those parts. Rubrics can be used for grading a large variety of assignments and tasks: Project evaluation, discussion, participation, laboratory reports, portfolios, group work, oral presentations, and more.

**(i) Do We Need a Rubric?**

How do we know that we need a rubric? One sure sign is if we check off more than three items from the following list:

- We are getting pain from writing the same comments on almost every student's paper.
- We're far behind in our grading.
- Students often complain that they cannot read the notes we worked so long to produce.
- We have graded all our papers and worry that the last ones were graded slightly differently from the first ones.
- We want students to complete a complex assignment that integrates all the work over the term and are not sure how to communicate all the varied expectations easily and clearly.
- We want students to develop the ability to reflect on ill-structured problems but we aren't sure how to clearly communicate that to them.
- We give a carefully planned assignment that we never used before and to our surprise, it takes the whole class period to explain it to the students.
- We give a long narrative description of the assignment in the syllabus, but the students continually ask two to three questions per class about our expectations.
- We work with our colleagues and collaborate on designing the same assignments for programme courses, yet we wonder if our grading scales are different.
- We've sometimes been disappointed by whole assignments because all or most of the class turned out to be unaware of academic expectations.
- We have worked very hard to explain the complex paper; yet students are starting to regard then as incomprehensible assignments. Rubrics set us on the path to addressing these concerns.

**(ii) What Are the Parts of a Rubric?**

Rubrics are composed of four basic parts in which the teacher sets out the parameters of the assignment. The parties and processes involved in making a rubric can and should vary tremendously, but the basic format remains the same. In its simplest form, the rubric includes a task description (the assignment), a scale of some sort (levels of achievement, possibly in the form of grades), the dimensions of the assignment (a breakdown of the skills/knowledge involved in the assignment), and descriptions of what constitutes each level of performance (specific feedback) all set out on a grid, as shown in Table 1.

**Table 1 : Basic Rubric Grid Format**

| *Task Description* | *Scale level 1* | *Scale level 2* | *Scale level 3* |
|---|---|---|---|
| Dimension 1 | | | |
| Dimension 2 | | | |
| Dimension 3 | | | |
| Dimension 4 | | | |

This is the most common, but sometimes we may use more. Rarely, however, we may go over our maximum of five scale levels and six to seven dimensions. We look at the four component parts of the rubric and, using an assignment as an example, provide the above grid part-by-part until it is a useful grading tool (a usable rubric) for the teacher and a clear indication of expectations and actual performance for the student.

**(iii) Part-by-Part Development of a Rubric**

***Part 1: Task Description***

The task description is almost always originally framed by the teacher and involves a performance of some sort by the student. The task can take the form of a specific assignment, such as a project, an activity, or a presentation.

***Part 2: Scale***

The scale describes how well or poorly any given task has been performed and occupies yet another side of the grid to complete the rubric's evaluative goal. Terms used to describe the level of performance should be tactful but clear. Here are compiled some commonly used labels:

- Sophisticated, competent, partly competent, not yet competent
- Exemplary, proficient, marginal, unacceptable
- Advanced, intermediate high, intermediate, novice
- Distinguished, proficient, intermediate, novice
- Accomplished, average, developing, beginning

There is no set formula for the number of levels a rubric scale should have. We should prefer to clearly describe the performances at three levels using a scale. The more levels there are, the more difficult it becomes to differentiate between them and to articulate precisely why one student's wzzork falls into the scale level it does. On the other hand, more specific levels make the task clearer for the student and they reduce the Teacher's time needed to furnish detailed grading notes. We may have the following grid for scaling in the ICT Kit in Mathematics:

**Table 2 : Parts of Scales**

| Dimensions | Exemplary | Competent | Developing |
|---|---|---|---|
| Knowledge/ Understanding | | | |
| Geometrical Skills | | | |
| Analytical skills | | | |
| Applications | | | |

***Part 3: Dimensions***

The dimensions of a rubric lay out the parts of the task simply and completely. A rubric can also clarify for students how their task can be broken down into components and which of those components are most important. Is it calculation? The analysis? The factual content? The process techniques? And how much weight is given to each of these aspects of the assignment? Adding points or percentages to each dimension emphasises the relative importance of each aspect of the task. Dimensions should actually represent the type of component skills students must combine in a successful work, such as the need for a firm grasp of content, technique, citation, examples, analysis, etc. When well done, the dimensions of a rubric (usually listed along one side of the rubric- Table 2) will not only outline these component skills, but after the work is graded, should provide a quick overview of the student's strengths and weaknesses in each dimension.

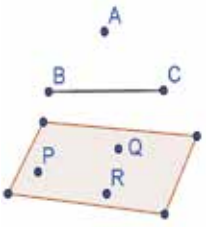
Breaking up the assignment into its distinct dimensions leads to a kind of task analysis with the components of the task clearly identified. Both students and teachers find this useful. It tells the student much more than a mere task assignment or a grade reflecting only the finished product. Together with good descriptions, the dimensions of a rubric provide detailed feedback on specific parts of the assignment and how well or poorly those were carried out.

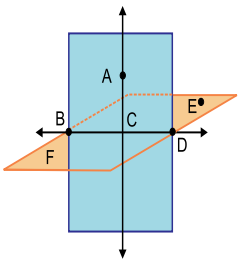
***Part 4: Description of the Dimensions***

Dimensions alone are all-encompassing categories, so for each of the dimensions, a rubric should also contain at the very least a description of the highest level of performance in that dimension. A rubric that contains only the description of the highest level of performance is called a scoring guide rubric. Scoring guide rubrics allow for greater flexibility and the personal touch, but the need to explain in writing where the student has failed to meet the highest levels of performance does increase the time it takes to grade using scoring guide rubrics.

On the basis of learning objective of modules several task may be identified. For each task towards the dimensions Knowledge/understanding, geometrical skill, analytical skill and application—performance anchors have been described in the form of rubric related to the task. Sufficient number of mathematical illustration would also be provided for the effective utilisation of these various task-based rubrics.

**Task: To check whether the student has understood the basic terminology (Point, Line, Plane, etc.) of Geometry**

| *Dimensions* | *Exemplary* | *Competent* | *Developing* |
|---|---|---|---|
| Knowledge/ Understanding | • The student understands the meaning of the word Geometry. He is able to recognise and draw the basic building blocks of geometry viz point, line and plane and knows that they are undefined terms.<br>  <br> | • The student understands the meaning of the word Geometry. He does not know that the basic building blocks of Geometry viz point, line and plane are undefined. He is able to draw basic building blocks. | • The student understands the meaning of the word Geometry. |
| | • The student understands the meaning of the word Geometry.<br>• He is able to recognise and draw the basic building blocks of geometry viz point, line and plane and knows that they are undefined terms.concurrent lines, etc.<br>• He is able to solve the following question successfully. | • He is able to recognise the geometrical shapes in his surroundings.<br>• He is not able to define terms like collinear points, coplanar points, line segment, ray, intersecting lines, parallel lines, concurrent lines, etc. But he is able to draw them.<br>• He is able to solve the question | • He is not able to recognise the geometrical shapes in his surroundings.<br>• He is able to draw points, lines, etc. but not able to draw intersecting lines, parallel lines, concurrent lines, etc.<br>• He is able to solve the question but not able to label the figures correctly. |

| | | | |
|---|---|---|---|
| Qu.1. Draw and label each of the following:<br>a) a segment with endpoints U and V<br>opposite rays with a common end pointQ | | | |
| Analytical Skills | • The student applies his problem-solving skills to solve the following question successfully:<br><br>Qu. Use the figure to name each of the following<br><br>  <br><br><br>a Three points<br>b Two lines<br>c Two planes<br>d One ray<br>e Intersecting lines<br><br>The student understands the meaning of the following statement :<br>• If two rays share a common end point, then they form a line. | • The student is able to recognise and name points and lines but unable to recognise plane, ray and intersecting lines. | • The student is able to recognise points and line but not able to name them. |

| | | | |
|---|---|---|---|
| Applications | • The student is able to recognise a sheet of paper as a plane.<br>• He is able to draw a line segment by paper folding.<br>• He is also able to locate a point as the intersection of two line segments by paper folding. | • The student is able to recognise a sheet of paper as a plane. He is not able to draw line segment and point using paper folding. | • The student is not able to understand paper folding activities. |

For most tasks, we prefer to use a rubric that contains at least three scales and a description of the most common ways in which students fail to meet the highest level of expectations.

Note how the next level down on the scale indicates the difference between that level of performance and the ideal, whereas the last level places the emphasis on what might have been accomplished but was not. This puts the emphasis not on the failure alone, but also on the possibilities.

In this sample rubric, the descriptions are limited enough that when a student does not fit neatly into one column or the other, we can convey that fact by circling elements of two or more columns.

When we first began constructing and using rubrics, we quickly found that they not only cut down on grading time and provided fuller feedback to our students, but they affected our classroom preparation and instruction as well.

Rubrics not only save time in the long run, but they are also a valuable pedagogical tool because they make us more aware of our individual teaching styles and methods, allow us to impart more clearly our intentions and expectations, and provide timely, informative feedback to our students.

In fact, rubrics will make grading easier and faster in several ways:

- Establishing performance anchors
- Providing detailed, formative feedback
- Supporting individualised, flexible, formative feedback (scoring guide rubrics)
- Conveying summative feedback (grade)

These four ways are generally chronological in nature. Establishing performance anchors will help us get started more quickly and also more fairly. Three-to-five-level rubrics allow us to provide detailed, informative feedback very rapidly by simply checking and circling prewritten criteria, whereas scoring guide rubrics allow us to do the same thing more flexibly and in a more individualised fashion, at the cost of speed. Finally, by conveying summative feedback in an easy to read, almost graphic fashion, rubrics will enable us to assign grades more rapidly and defend them more easily.

**Conclusion**

The characteristics of digital technology provide potentially powerful learning and assessment tools, but in schools it's the teacher who creates the learning environment that either unleashes this potential or inhibits it. Teacher can create learning environments likely to maximise the educational benefits of using digital technologies. These learning environments exist, at least partially, within the technologies themselves.

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# Perceptions Regarding OERs: The Case of Prospective Teachers

SHAMIM AHMAD*

**Abstract**

*Whatever its pedagogical credence or relevance, the open educational resource is above all an incredibly rich resource of learning, knowledge and research. At the turn of the twenty first century, its creation, dissemination and application are much more emphasised. This study examines the perceptions of prospective teachers regarding open educational resources (OERs). The methodology employed was descriptive survey and the subjects under investigation were chosen, based on simple random sampling from secondary teacher education programme. In the study, the investigator among other things found that the perceptions of prospective teachers regarding OERs are as production of educational resources and other learning management systems. The analysis brings forth that the OERs continue to be a potential resource to accelerate progress towards education, training and development for all. However, no significant difference was found when the subjects were compared with respect to the methodology of teaching, their gender and age groups. Considering OERs, as tool of education, training and development, link to the production and dissemination of knowledge, and the more recent perception as the agent of change in the learning process.*

## Introduction

Education being a dynamic process, changes with the prevailing global competitive environment. The need for creating and disseminating knowledge world over has been felt acutely. One of the most effective ways of achieving this would be to stimulate the development and dissemination of quality Open Access (OA) materials and Open Educational Resources (OERs) through broadband Internet connectivity (National Knowledge Commission, 2007, p.51). In the context, the open educational resource movement has got momentum in the domain of tertiary education. OERs are educational materials and resources offered freely and openly for anyone

* *Assistant Professor*, Department of Education, Maulana Azad National Urdu University, Hyderabad-32.

to use and under some licenses to remix, improve and redistribute (COL, 2009, 25). Another definition to open educational resources as proposed by the William and Flora Hewlett Foundation may be referred to

OERs are teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software and any other tools, materials or technologies used to support access to knowledge" (Atkins, Danial E. et al, 2007, p4).

OERs are learning resources specifically designed and developed in the digital format that are open and made available freely on the web. However, it is the openness of these resources that distinguishes it in good part from any other traditional methods of seeking information and knowledge. NKC (2007) maintains that it is vital for India to leverage these initiatives as they are readily available for adoption and adaptation and to serve as a model for further indigenous content production. To reach the masses we need to use the mass media and other technologies, because face-to-face communication cannot be scaled up to meet the challenge (Daniel, John et al, 2007, 24).

The powers of low-tech and high-tech go further than this, however. Indeed, observations have been made to integrate technology to strengthen the open-learning environment. Scanlon (2011) maintains that: *The striking change that is currently happening is the ability to personalize educational resources in the widest sense and combine this with social networking enabled by technology, with control over how public or private your different information sharing activities are (Scanlon, E. 2011, p. 107).*

This tells us that the academia and researchers have to be consistent in their involvement for creative and innovative practices. One reason for the rapid take-up of the OERs is that it has the potential to narrowing the knowledge divide between various groups. Ostensibly, the spread of knowledge and learning provisions have made greater strides in the last two to three decades of technological advancements. Bates (2000) discusses World Wide Web both as presentational tool in lectures and as a means of making lecture notes conveniently available to students at other times (Bates, A.W. 2000, p.23). Developing OERs is therefore time and resource-consuming but promising and requires significant technical expertise. It also requires involvement in sophisticated tools, applications and appliances both for creation and dissemination of knowledge. Venkaiah (2008) found that the development and use of OERs in India is still low when compared to the developed countries. Given the situation, creative and innovative practices are more favourable to the large and growing number of people. Through OERs, learning tools and applications provide self-paced production of educational materials on a host of issues. To justify the endeavour, a considerable and rich

learning provision is made available globally. OERs are accessible on demand through WWW.

**Need and Significance**

At the turn of the twenty first century, the whole notion of education, learning and research is seen more in line with the ICT and other networking technologies. The Internet technology has emerged as a dynamic and potential medium for channelising the educational resources. In the highly cohesive and interconnected society, sources of learning become wider. The role of teachers, educators and researchers continues to change. This has led to the information and knowledge revolution taking place expeditiously. The emerging technologies have the potential to radically transform the ways and means of accessing and communicating information and knowledge. Contributors bring more focused and diverse educational materials than ever before. OER, as tool to produce and disseminate knowledge, is in tune with the requirements of the learning groups. For the effective utilisation of these resources, the teachers have to be consistent and positively involved in the creation and dissemination of the resourceful materials. In the present paper, analysis is made on the perceptions of prospective teachers regarding OERs with respect to the methodology of teaching, their gender and age groups.

**Objectives of the Study**

The objectives of the paper are

- to study the perceptions regarding OERs among prospective teachers;
- to analyse the significant difference, if any, in the perceptions regarding OERs between prospective science and social studies teachers,
- to find out the impact of gender in the perception of the prospective teachers regarding OERs; and
- to evaluate the impact of age group of the prospective teachers in the perception regarding OERs.

**Hypotheses**

- The prospective teachers perceive OERs as potential creative activity for creating and disseminating contents on interdisciplinary concerns.
- There is no significant difference in the perceptions regarding OERs between prospective science and social studies teachers.
- There is no significant difference in the perceptions regarding OERs among prospective teachers with respect to their gender.
- There is no significant difference in the perceptions regarding OERs among prospective teachers with respect to their age group.

**Design of the Study**

The methodology employed was descriptive survey wherein prospective science and social studies teachers' perceptions on OERs with respect to their gender and age groups at secondary level teacher education were compared.

### *Sample Size*

Keeping the objectives in view, a total of 112 prospective teachers of which 50 (44.64%) prospective science teachers and 62 (55.36%) prospective social studies teachers enrolled under one year full time secondary teacher education programme at Maulana Azad National Urdu University, Hyderabad were selected using simple random sampling technique.

### *Tools*

The present study was conducted with the help of a five-point rating scale developed by the investigator. The tool consists of 20 items representing with the different OER aspects. The tool was administered and the data was collected from the prospective teachers. Necessary instructions to the subjects were given to mark free and frank responses.

### *Data Analyses*

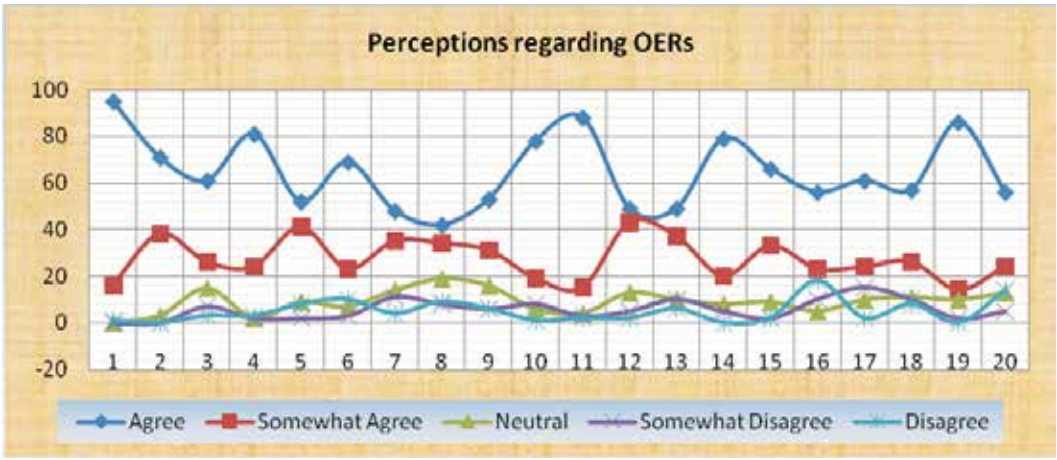
Scores were calculated, based on the responses to all items of the tool. The responses were recorded on a five-point scale through survey method and the data were analyzed and interpreted with the help of statistical techniques, i.e. mean, standard deviation and t-test. Finally, conclusions were drawn with all objectivity and emotional detachment.

### Findings

On the basis of the discussions and interpretations of the results, the following findings have been emerged out of the study:

Figure 1 shows the percentage of frequencies of all the 20 items marked by the prospective teachers as agree, somewhat agree, neutral, somewhat disagree and disagree on perception regarding OERs.

**Figure 1: Distribution of Frequency Percentage of Prospective Teachers' Perceptions regarding OERs**




The data gathered for analysis and interpretation were properly arranged to apply suitable statistics and the observed differences between means were tested with t-ratio.

**Table 1: Significance of Difference between Science and Social Studies Prospective Teachers Regarding OERs**

| *Group of Prospective Teachers* | | *N* | *Mean* | *SD* | *t-ratio* | *Significance* |
|---|---|---|---|---|---|---|
| Methodology of Teaching | Science | 50 | 32.97 | 46.2528 | 0.7307 | NS* |
| | Social Studies | 62 | 40.11 | 57.0797 | | |

**Not significant at 0.05 level.*

Table 1 shows that the t-value obtained for the comparison of the scores of science and social studies prospective teachers is 0.7307 which is less than 1.98 at 0.05 level. So the null hypothesis is accepted. Hence, it is concluded that there is no significant difference in the perception of science and social studies prospective teachers regarding OERs.

**Table 2: Significance of Difference between Male and Female Prospective Teachers Regarding OERs**

| *Group of Prospective Teachers* | | *N* | *Mean* | *SD* | *t-ratio* | *Significance* |
|---|---|---|---|---|---|---|
| Gender | Male | 64 | 41.13 | 57.2497 | 0.9349 | NS* |
| | Female | 48 | 31.95 | 46.5792 | | |

**Not significant at 0.05 level.*

Table 2 reveals that the t-value calculated for the comparison of the scores of male and female prospective teachers does not exceed 1.98, the required table value for significance testing at 0.05 levels. Here, H0 is accepted. Hence, it is concluded that there is no significant difference in the perception of male and female prospective teachers regarding OERs.

Table 3 shows that the t-value obtained for the comparison of the scores of prospective teachers up to twenty four years and above twenty four years is 1.612 which is less than the required table value i.e.1.98 at 0.05 level. So the null hypothesis is accepted. Hence, it is concluded that there is no significant difference in the perception of up to twenty four

**Table 3 : Significance of Difference between Prospective Teachers upto Twenty Four Years and Above Twenty Four Years regarding OERs**

| *Group of Prospective Teachers* | | *N* | *Mean* | *SD* | *t-ratio* | *Significance* |
|---|---|---|---|---|---|---|
| Age Groups | Up to 24 | 67 | 44.50 | 65.1477 | 1.612 | NS* |
| | Above 24 | 45 | 28.63 | 38.8677 | | |

**Not Significant at 0.05 level.*

years and above twenty four years prospective teachers regarding OERs.

Thus, the fact to which pointed attention needs to be drawn is that the open educational resource is a large-scale, web-based digital publishing initiative. The courses are made freely available for educational purposes that users across the world can use, reuse, redistribute and adapt materials under open licenses like creative common license (Ghalib, M.A.M, et al., 2009, p.43). It is high time to encourage the technology integration in all academic endeavours to benefit the ever increasing learning groups.

**Conclusion**

The study helps the investigator to draw the following conclusions: It is revealed from the study that the prospective teachers perceive OERs as resourceful learning provision. The methodologies of teaching, gender and age groups have no significant impact in the prospective teachers' perception regarding OERs. The prospective teachers irrespective of the methodology of teaching, gender and age groups believe that OERs' contents in multimedia formats benefit the large and growing number of learners. The study also concludes that OERs create new opportunities to accelerate progress towards education, training and development for all.

**Educational Implications**

On the basis of results obtained from the present study several educational implications can be derived; a few of them are outlined below:

- Uses of open educational resources be included as a part of creative learning activity.
- Prospective teachers have to be specially trained to share educational resources for the benefit of the various target learning groups.
- On the basis of rich and diverse materials produced and disseminated, the knowledge divide may be narrowed down.

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# A Study of Work Values of Secondary School Teachers in Relation to Organisational Culture

JOSE C. C. *

**Abstract**

*In recent years, interest among researchers in the study of work values and their correlates in understanding the functioning of organisation is gaining importance. It was intended through the present investigation to study the work values of secondary school teachers in relation to organisational culture. Based on a survey, the sample constituted 172 secondary school teachers belonging to Christian schools in Bangalore. The data were analysed using correlation and t–test techniques. Results indicated significant relationship between work values of secondary school teachers of Christian schools with organisational culture. Further there were significant differences between male and female teachers; teachers of type of Christian Denominations with respect to (catholic and others) and (protestant and others) of secondary school of Christian schools differ significantly with respect to organisational culture. Implications in the light of empowering educational leaders and suggestions for further research are discussed.*

## Introduction

Secondary education in India is at a critical juncture as there is an increasing demand for secondary education and a large number of school-aged children are still outside the school system. The major issues and problems at the secondary stage are largely related to quality and management of the system. Quality services refer to provision of curriculum, teaching and learning, the examination system, school management and monitoring. Government schools located in rural areas and schools run by local bodies suffer from lack

* *Associate Professor,* Department of History, Christ University, Bangalore, Karnataka-560029.

of equipment and consumables to conduct lab experiments and the teaching aids and library facilities in these schools are largely inadequate. It is generally felt that the quality of education imparted by Christian institutions and government-run institutions varies. What makes this difference is the system of education of these Christian institutions. The performance of an organisation largely depends on its people. The work values of an organisation determine the organisational culture of the teachers in the schools run by these Christian managements.

The working environment constitutes an organisational culture in each of these institutions. Organisational culture is the shared norms and values that guide the participants' behaviour. The belief systems shared by teachers as organisational members make a lot of difference in the delivery mechanism of instructional process. It has now gained considerable importance as it affects performance of teachers and their work values and their satisfaction

## Theoretical Background and Hypotheses

The theoretical framework employed in this study is derived from the conceptual model on work values proposed by Wollack et al. (1971). The current study attempts to find the impact of organisational culture and the effect of background variables on the consequences of work values of secondary school teachers of Christian schools. The proposed model considers one independent variable namely organisational culture proposed by Priya Nair and C. Diftuar, secondary school teachers of Christian schools and biographical variables namely gender, age, teaching experience, marital status, type of school management, type of school affiliation and type of Christian denominations.

A pictorial representation of the proposed model at the construct level is given in figure 1.

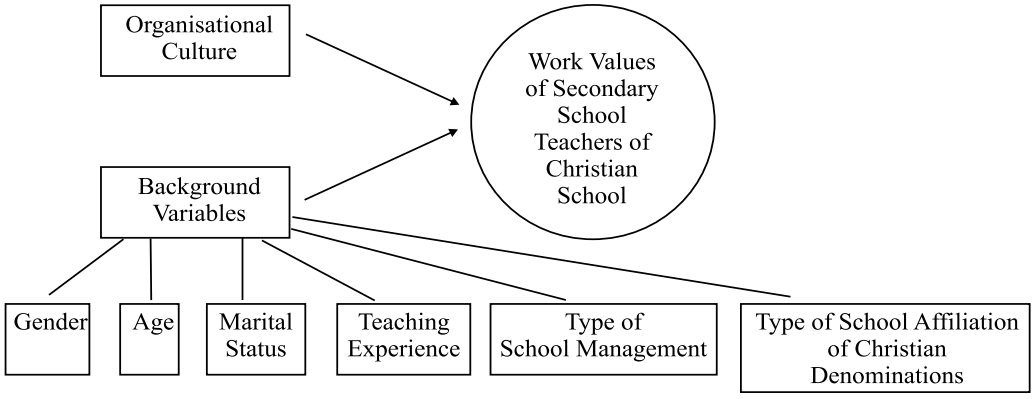


**Figure 1: Proposed model at construct level**

**Dependent Variable: Work Values**

Work values and general values from a semantic perspective are highly related constructs, but in the field of research they have been analysed from distinct perspectives (Sagie, Elizur and Koslowsky, 1996). Values have been conceptualised as cognitive representations of universal needs (Rokeach, 1973; Schwartz, 1992), as enduring states of a proper social behaviour (Rokeach, 1973), as trans-situational criteria or as goals ordered by importance as guiding principles in life (Schwartz, 1999). The study of general values has developed a well supported definition of the construct (e.g. Rokeach, 1973; Schwartz, 1992), and even more important, a dynamic structure that allows to classify them (Schwartz, 1992). The universal theory of the content of values (Schwartz, 1992), establishes that the essence of a value is the motivational goal it expresses. During the last decade deep attention has been paid to the structure of both constructs. Meanwhile in the field of general values the universal structure of values proposed by Schwartz (1992) is the most widely known theory. In the arena of work values, the structure proposed by Elizur (1984) has shed light for many researchers in the systematic study of the construct. Work values have been studied and measured in isolation from mainstream research in general values (Rokeach, 1973; Schwartz, 1992). Work values have been defined as goals, results, or characteristics that can be found in a job (MOW, International Research Team, 1987). From the perspective of vocational behaviour, Super (1995) affirmed that work values are the result of a process of refinement, where the individual learns through socialisation how to express his needs in a socially accept manner, these ideas being compatible with the conceptualisation of values as cognitive representations of universal needs.

Recent studies support that the constructs of work values and general values have similar structures (Elizur and Sagie, 1999). In line with these ideas and based on the newest definitions of values, we consider that work values are cognitive representations of universal needs that are expressed through trans-situational goals in the work setting and ordered by importance.

The definitions seek to give an understanding of the underlying values and attitudes towards work for several reasons and on-the-job activities and behaviours. Work attitudes, values, and behaviour are learned through work experiences in the home, at school, in individual work-related activities (whether voluntary or necessary), and from interactions with the business community—all followed by individual evaluations of their meaning, outcomes, and significance.

In the present study the definition given by Wollack et al. has been used by the researcher. According to Wollack et al., Work values are an index of a person's attitude towards work in general rather than his feeling about a specific job. It is the meaning an individual attaches to his work role. Work values are enduring beliefs about work which guide actions, attitudes,

judgements in work situation. Work values are regarded as conceptions of what is desirable that individuals hold with respect to their work activity.

**Independent Variable: Organisational Culture**

The term culture derives from the Latin cultura, 'cultivation,' and is allied to cultus, the past participle is colere, 'to till' (Tyrelle, 2000). The term has a cyclical connotation to time and reverence, where past behaviours and principles are repeated and regenerated over time to produce the same results time and again. Culture is a pattern of assumptions judged as a valid way to perceive, think, and feel as the organisation deals with change and problems (Schein, 1992). Hence, the culture of an organisation such as a college can be thought of as its personality. The culture reflects the school values, philosophy, norms, and unwritten rules. The culture has a powerful effect on organisational members because underlying assumptions guide behaviour and the way the college processes information as an organisation. Theorists and practitioners who are interested in organisational culture generally possess an interest in studying the creation, characteristics, development, and survival of organisations (Ouchi and Wilkins, 1985). Although many research studies have been conducted employing organisational culture in the business world, only now has an interest in organisational culture begun to surface in higher education.

Researches in the area of organisational culture indicate that cultural characteristics play an important role in determining how well an individual fits into the organisational context (Rousseau, 1990). However, there is considerable disagreement on the issue of the level at which cultural values are meaningful to the individuals and organisations. When organisations promote a certain set of values, like respect for people and high pay for good performance, they create a social energy or motivation that influences employees' attitudes and behaviours. For instance, Peters and Waterman (1982) found excellent organisations that held values such as quality, service, the importance of people as individuals, and innovation that motivated employees to improve performance and increase their morale, satisfaction, and commitment. Sheridan (1992) identified firms that emphasised interpersonal relationship values were able to retain employees more successfully than firms emphasising work task values.

The work value system of individuals tends to take the overtones of culture within which the individual grows up and lives (Blood 1969). In recent years, interest among researchers in the study of work values and their correlates in understanding the functioning of organisation is gaining importance. An organisation is embedded in a social/cultural environment which exerts a pervasive influence on the organisation's activities, employees and administrators or like in terms of what they bring with them to the work situation, pattern of values, beliefs and social relationships.

Organisational researchers tend to explain employee satisfaction and behavioural intentions in terms of either organisational or individual characteristics. Organisational characteristics researchers or "situationalists" are concerned with how people make sense of their environment, while also identifying those environmental elements that affect attitudes and behaviors (Davis-Blake and Pfeffer, 1989; Sheridan, 1992). The situational perspective emphasises measurement of the environment as a method of predicting attitudes and behaviours. On the other hand, individual characteristics researchers or 'personalogists' suggest that such individual characteristics as personality traits, values and beliefs affect attitudes and actions in consistent and characteristic ways across situations and over time (Staw, Bell, & Clausen, 1986; Weiss and Adler, 1984). The personal approach emphasises that one can predict behaviour by measuring needs, traits, values, and motives. Sommer, Bae and Luthans (1996) found that employees who perceived greater warmth, supportiveness, assigned responsibility, and rewards in their organisations increased their organisational commitment. Kazanas (1978) found employees with intrinsic work value orientation (for example, independence, self-discipline, and self-actualisation) were more satisfied with their jobs and more productive than employees with extrinsic work value orientations (for example, working conditions, interpersonal relations, and security).

Organisational culture in the present study is defined as the shared values, beliefs, norms, expectations and assumptions that bind people and systems together. 'Organisational culture' is what the members of the organisation perceive and a pattern of beliefs, values and expectations this perception creates.

Organisational culture differs from one institution to another. Moreover, it is felt and seen that institutions run by private agencies, especially the Christian institutions perform better than aided institutions. Therefore, it is the felt need of the investigator to understand and study how organisational culture impacts the work values of teachers in Christian institutions. It was intended through the present investigation to study the work values of secondary school teachers in relation to organisation culture. The variables are work values of secondary school teachers and organisational culture. Background variables included gender, age, teaching experience, marital status, type of school management, type of school affiliation and type of Christian denominations. Therefore it is hypothesised that:

***Hypothesis 1 :*** There is no significant relationship between work values of secondary school teachers of Christian schools with respect to organisational culture.

**Background Variables**

In recent years researchers have examined several background/ biographical/demographic variables as antecedents of work values. In one of the few studies to explore the

issue of work values, Keller et al. (1992) studied 23 monozygotic and 20 dizygotic twin pairs raised apart from each other and found 40 per cent of the variance in measured work values was genetic in origin and 60 per cent was environmentally based. Cherrington, Conde and England (1979) found that age, education and seniority were correlated with several work values and gender probably was the most popular demographic variable in work values studies. Rowe (1995) investigated the relationship between the work values of male and female employees of large industrial organisation to the following variables; national cultural groups, gender, age, cohorts, occupational and educational levels found educational levels were the most important demographic variable related to work values and gender differences were not significant for any factor once occupational levels were taken into account. Vaus and Mcallister 1991 studied Gender and Work Orientation Values and Satisfaction in Western Europe and observed that there is considerable disagreement about the extent, direction, and causes of gender differences in work values and job satisfaction. The results show that gender differences are small and vary according to the country and the aspect of work orientation under examination The data therefore cast doubt on the existence of gender differences in work values and job satisfaction. The results also question current explanations for the supposed differences between men's and women's work orientation. Jolideh and Yeshodhara (2007) compared Indian and Iranian teachers and found high significant differences in their effective and material components of work values. Age groups and subject taught do not have any influence over work values.

Though researches have considered several background variables as possible correlates of work values, there have been studies related to organisations, industrial and management sectors. These studies have been carried out on managers, engineers, and employees. Therefore, studies on biographical variables and work values of teachers are still an area to be explored, especially to augment the contradictory influence of biographical variables on work values and the dearth of researches on teachers in specific and the educational sector in general the following hypotheses have been formulated.

***Hypothesis 2:*** There is no significant relationship between work values of secondary school male teachers of Christian schools with respect to organisational culture.

***Hypothesis 3:*** There is no significant relationship between work values of secondary school female teachers of Christian schools with respect to organisational culture.

***Hypothesis 4:*** There is no significant relationship between work values of secondary school teachers of type of school affiliation (ICSE) of Christian schools with respect to organisational culture.

***Hypothesis 5:*** There is no significant relationship between work values of secondary school teachers of type of school affiliation (SSLC) of Christian schools with respect to organisational culture.

***Hypothesis 6:*** There is no significant relationship between work values of secondary school teachers of Catholic Christian schools with respect to organisational culture.

***Hypothesis 7:*** There is no significant relationship between work values of secondary school teachers of Protestant Christian schools with respect to organisational culture.

***Hypothesis 8:*** There is no significant relationship between work values of secondary school teachers of other Christian schools with respect to organisational culture.

***Hypothesis 9:*** There is no significant difference between type of school affiliation (SSLC and ICSE) secondary school teachers of Christian schools with respect to their work values and organisational culture.

***Hypothesis 10:*** There is no significant difference between male and female secondary school teachers of Christian schools with respect to their work values and organisational culture.

***Hypothesis 11:*** There is no significant difference between type of Christian denominations (Catholic, Protestant and others) with respect to work value and organisational culture of secondary school teachers of Christian schools.

***Hypothesis 12:*** There is no significant difference between younger (up to 45 years) and older (more than 45 years) secondary school teachers of Christian schools with respect to work value and organisational culture.

***Hypothesis 13:*** There is no significant difference between secondary school teachers of Christian schools with different teaching experience (3–10 yrs, 11–20 yrs, more than 21 yrs) with respect to work value and organisational culture.

**Method**

## Measures

In the present study the investigator has used two tools namely Work Value scale by Wollack et al. (1971) adapted and standardised by Thomas Chathamparampil and Organisational Culture scale by Priya Nair and C. Diftuar adapted and standardised by Tara Sabapathy. The scale consists of 38 items, all of which are positively oriented.

A Proforma was used to collect information regarding the background variables.

1. Work Value Scale by Wollack et al. (1971) adapted and standardised by Chathamparampil Thomas was used to measure work values. Accordingly work values in the present study are a measure of the index of a person's attitude towards work in general rather than his feeling about a specific job. It is the meaning an individual attaches to his work role. The scale consists of 50 items scored on a seven point scale, ranging from strongly disagree, moderately disagree, slightly disagree, neither disagree nor agree, slightly agree, moderately agree to strongly agree. The positive items were scored on a seven point scale from 7 to 1 and negative items were scored in the reverse order.

The tool was adapted and re-standardised among the degree college teachers. The test was given

and repeated on a group of 120 degree teachers and the co-relation was computed between the first and second sets of scores by using Pearson product moment co-relation. The obtained 'r' was found to be 0.80 with the time gap of one month between two administrations.

### *Organisational Culture Scale*

The Organisational Culture Scale by Priya Nair and C. Diftuar was adopted and standardised by Tara Sabapathy to measure Organisational culture in the present study defined as the shared values, beliefs, norms, expectations and assumptions that bind people and systems together. 'Organisational culture' is what the members of the organisation perceive and a pattern of beliefs, values and expectations this perception creates.

The scale consists of 38 items, all of which are positively oriented. To test the reliability of the scale, the list of 38 items was administered to 120 degree college teachers. The reliability of the scale was found to be 0.76. Validity was found by using Guilford's formula, that is, by applying square roots of reliability. The validity was found to be fairly high and ranged from 0.78 – 0.94. The scoring of the organisational culture scale is done on a 5 point scale, following the summated rating technique of Likert. The total score range may be anywhere between 38 to 190 with 38–76, 79–117, 118–156, 157–190 and interpreted as Very poor culture, Poor culture, Moderate culture, High culture, respectively. The mid-point range being 76–80. That means the mean score of more than 76 for a population in an organisation indicates a positive culture.

**Procedure**

Work Value scale by Wollack et al. (1971) adapted and standardised by Thomas Chathamparampil and Organisational Culture Scale by Priya Nair and C. Diftuar was adopted and standardized by Tara Sabapathy were administered to the sample of 172 teachers from 21 schools by the investigator himself. The data were collected by the researcher himself by personally visiting the schools. The data were analyzed to test the hypothesis stated. The questionnaires were collected after many visits to the schools.

**Sample of the Study**

The sample comprised 200 secondary school teachers from Christian schools. A simple random sampling technique was employed to select the sample. The final sample constituted of 172 teachers. The sample included 72 male teachers and 100 female teachers.

**Analysis**

The data were analysed using statistical techniques, Pearson product moment coefficient of correlation and t- test for testing the mean differences. Product moment correlation was used to examine the relationship between work values and organisational culture of secondary school teachers while t-test analysis was used to find out differences in the variables, namely work values and organisational culture regarding, gender, type of school management based on type of Christian denominations, type

of school affiliation, age, teaching experience and marital status.

**Results**

The results of analysis on the study are presented as follows:

***Hypothesis 1:*** There is no significant relationship between work values of secondary school teachers of Christian schools with respect to organisational culture.

There was a positive significant relationship between work values of secondary school teachers of Christian schools with organisational culture. From the table A 1 it can be seen that the obtained 'r' value 0.1944 is higher than the table value 0.181 at 0.01 level of significance. Therefore the null hypothesis is rejected and the alternate hypothesis is accepted.

***Hypothesis 2:*** There is no significant relationship between work values of secondary school male teachers of Christian schools with respect to organisational culture.

There was no significant relationship between work values of secondary school male teachers of Christian schools with organisational culture. From table A2 it can be seen that the 'r' value of male teachers 0.1754 is below the table value 0.217 at 0.05 level of significance.

***Hypothesis 3:*** There is no significant relationship between work values of secondary school female teachers of Christian schools with respect to organisational culture.

There was no significant relationship between work values of secondary school female teachers of Christian schools with organisational culture. From Table A2 it can be seen that 'r' value of female teachers is -0.1044, which is below the table value 0.195 at 0.05 level of significance.

***Hypothesis 4:*** There is no significant relationship between work values of secondary school teachers of type of school affiliation (ICSE) of Christian schools with respect to organisational culture.

There was no significant relationship between work values of secondary school teachers by Type of school affiliation (ICSE) of Christian schools with respect to organisational culture. From the Table A3 it can be seen that 'r' value of ICSE teachers is -0.0698, which is below the table value 0.217 at 0.05 level of significance.

***Hypothesis 5:*** There is no significant relationship between work values of secondary school teachers of type of school affiliation (SSLC) of Christian schools with respect to organisational culture.

There was no significant relationship between work values of secondary school teachers of Type of School Affiliation (SSLC) Christian schools with respect to organisational culture. From the table A3 it can be seen that 'r' value of SSLC teachers is 0.0962, which is below the table value 0.195 at 0.05 level of significance.

***Hypothesis 6:*** There is no significant relationship between work values of secondary school teachers of Catholic Christian schools with respect to organisational culture.

There was no significant relationship between work values of secondary school teachers of Catholic Christian schools with respect to organisational culture. From table A 4 it can be seen that 'r' value of Catholic teachers is -0.0764 which is below the table value 0.159 at 0.05 level of significance.

***Hypothesis 7:*** There is no significant relationship between work values of secondary school teachers of Protestant Christian schools with respect to organisational culture.

There was no significant relationship between work values of secondary school teachers of Protestant Christian schools with respect to organisational culture. From Table A 4 it can be seen that 'r' value of protestant teachers is 0.2028, which is below the table value 0.304 at 0.05 level of significance.

***Hypothesis 8:*** There is no significant relationship between work values of secondary school teachers of other Christian schools with respect to organisational culture.

There was no significant relationship between work values of secondary school teachers of other Christian schools with respect to organisational culture. From Table A4 it can be seen that 'r' value of other Christian teachers is 0.1997, which is below the table value 0.666 at 0.05 level of significance.

***Hypothesis 9:*** There is no significant difference between type of school affiliation (SSLC and ICSE) secondary school teachers of Christian schools with respect to their work values and organisational culture.

Table A5 indicates that teachers of type of school affiliation (SSLC and ICSE) of teachers of secondary school of Christian schools do not differ significantly with respect to work value (-0.8704 ) at 0.05 level of significance. It means that, secondary school teachers of Christian schools working in different type of school affiliation (SSLC and ICSE) have same work value.

Further, teachers of type of school affiliation (SSLC and ICSE) of teachers of secondary school of Christian schools school do not differ significantly with respect to organisational culture (1.3044) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools working in different type of school affiliation (SSLC and ICSE) have same organisational culture.

***Hypothesis 10:*** There is no significant difference between male and female secondary school teachers of Christian schools with respect to their work values and organisational culture.

From Table A6 we see that male and female teachers of secondary schools do not differ significantly with respect to work value (t-value 0.0082) at 0.05 per cent level of significance. It means that male and female secondary school teachers of Christian schools have same work values.

Further, male and female teachers of secondary schools differ significantly with respect to organisational culture (2.6517 ) at 0.05 per cent level of significance. It means that, male and female secondary school teachers of Christian schools have different organisational culture.

***Hypothesis 11:*** There is no significant difference between type of Christian denominations (Catholic, Protestant and others) with respect to work value and organisational culture of secondary school teachers of Christian schools.

Table A7 indicates that Secondary school teachers of Christian schools belonging to Catholic and Protestant types of Christian denominations do not differ significantly with respect to work value (t-0.8807) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools belonging to Catholic and Protestant types of Christian denominations have similar work values.

Secondary school teachers of Christian schools belonging to Catholic and other types of Christian denominations do not differ significantly with respect to work values (t-1.4731) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools belonging to Catholic and other types of Christian denominations have similar work values.

Secondary school teachers of Christian schools belonging to Protestant and other types of Christian denominations do not differ significantly with respect to work values (t-1.6107) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools belonging to Protestant and other types of Christian denominations have similar work values.

Secondary school teachers of Christian schools belonging to Catholic and Protestant types of Christian denominations do not differ significantly with respect to organisational culture (t-0.0438) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools belonging to Catholic and Protestant types of Christian denominations have similar organisational cultures.

Secondary school Teachers of Christian schools belonging to Catholic and other types of Christian denominations differ significantly with respect to organisational culture (t-2.3318) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools belonging to Catholic and other types of Christian denominations have different organisational cultures.

Secondary school teachers of Christian schools belonging to Protestant and other types of Christian denominations differ significantly with respect to organisational culture (t-2.2537, <0.05) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools belonging to Protestant and other types of Christian denominations have different organisational cultures.

***Hypothesis 12:*** There is no significant difference between younger (up to 45 years) and older (more than 45 years) secondary school teachers of Christian schools with respect to work value and organisational culture.

Table A8 indicates that younger (up to 45 years) and older (more than 45 years) secondary school teachers of Christian schools do not differ significantly with respect to work values (t-0.5502) at 0.05 per cent level of significance. It means that younger

(up to 45 years) and older (more than 45 years) secondary school teachers of Christian schools have similar work values.

Younger (up to 45 years) and older (more than 45 years) teachers of secondary school of Christian schools do not differ significantly with respect to organisational culture (t-0.2104) at 0.05 per cent level of significance. It means that, younger (up to 45 years) and older (more than 45 years) secondary school teachers of Christian schools have similar organisational culture.

***Hypothesis 13:*** There is no significant difference between secondary school teachers of Christian schools with different teaching experience (3–10 years, 11–20 years, more than 21 years) with respect to work value and organisational culture.

From Table A9 we see that secondary school teachers of Christian schools having 3-10 years and 11-20 years teaching experience do not differ significantly with respect to work value (t1.5094) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools with 3–10 years and 11–20 years teaching experience have similar work values.

Secondary school teachers of Christian schools having 3–10 years and 21+ years teaching experienced not differ significantly with respect to work value (t0.8218) at 0.05 per cent level of significance. It means that, secondary school teachers of Christian schools with 3–10 years and 21+ years teaching experience have similar work values.

Secondary school teachers of Christian schools having 11–20 years and 21+ years-teaching experience do not differ significantly with respect to work value (t-0.7054) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools with 11–20 years and 21+ years teaching experience have similar work values.

Secondary school teachers of Christian schools having 3–10 years and 11–20 years teaching experience do not differ significantly with respect to organisational culture (t-0.0843) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools with 3–10 years and 11–20 years teaching experience have similar organisational cultures.

Secondary school teachers of Christian schools having 3–10 years and 21+ years teaching experience do not differ significantly with respect to organisational culture (t-0.2035) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools with 3–10 years and 21+ years teaching experience have similar organisational cultures.

Secondary school teachers of Christian schools having 11–20 years and 21+ years teaching experience do not differ significantly with respect to organisational culture (t-0.3039, <0.05) at 0.05 per cent level of significance. It means that secondary school teachers of Christian schools with 11–20 years and 21+ years teaching experience have similar organisational cultures.

***Hypothesis 14:*** There is no significant difference between married and unmarried secondary school teachers of Christian schools with respect to

their work value and organisational culture.

From Table A10 we see that married and unmarried secondary school teachers of Christian schools do not differ significantly with respect to their work value (t-0.1783) at 0.05 per cent level of significance. It means that married and unmarried teachers of secondary schools have similar work values.

Married and unmarried secondary school teachers of Christian schools do not differ significantly with respect to organisational culture (t-1.1921) at 0.05 per cent level of significance. It means that married and unmarried secondary school teachers of Christian schools have similar organisational culture.

**Discussion**

The findings of correlation analysis reveal that there was a significant and positive relation between work values and organisation culture. Since organisation culture involves shared expectation values, attitudes and assumptions it exerts influence on individu als, groups, organisational processes. Educational institution, therefore, must create and nurture constructive organisational culture that requires a strong mission statement and a sense of purpose to guide behaviour of teachers. The aspects of culture such as a set of symbols, ceremonies, values and beliefs of an institution bind, support and create a unique work environment. The members, therefore, develop a positive

**SUMMARY OF STATISTICAL ANALYSIS**

**Table A1 : Work Values and Organisational Culture of Secondary School Teachers**

| *Sl. No.* | *Variables* | *N* | *Df* | *r-value* | *S/NS* |
|---|---|---|---|---|---|
| 1.<br>2. | Work Values<br>Organisational Culture | 172 | 170 | 0.1944 | S** |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A2 : Work Values and Organisational Culture by Teachers' Gender**

| *Sl. No.* | *Variables* | *N* | *Df* | *r-value* | *S/NS* |
|---|---|---|---|---|---|
| 1.<br>2. | Work Values (Male)<br>Organisational Culture (Male) | 72 | 70 | 0.1754 | NS |
| 1.<br>2. | Work Values (Female)<br>Organisational Culture (Female) | 100 | 98 | -0.1044 | NS |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A3 : Work Values and Organisational Culture by the type of Affiliation**

| *Sl. No.* | *Variables* | *N* | *Df* | *r-value* | *S/NS* |
|---|---|---|---|---|---|
| 1.<br>2. | Work Values ICSE<br>Organisational Culture ICSE | 72 | 70 | -0.0698 | NS |
| 1.<br>2. | Work Values SSLC<br>Organisational Culture SSLC | 100 | 98 | 0.0962 | NS |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A4 : Work Values and Organisational Culture by the School Type**

| *Sl. No.* | *Variables* | *N* | *Df* | *r-value* | *S/NS* |
|---|---|---|---|---|---|
| 1.<br>2. | Work Values, Catholic<br>Organisational Culture, Catholic | 126 | 124 | -0.0764 | NS |
| 1.<br>2. | Work Values, Protestant<br>Organisational Culture, Protestant | 39 | 37 | 0.2028 | NS |
| 1.<br>2. | Work Values, Other Christian<br>Organisational Culture, Other Christian | 7 | 5 | 0.1997 | NS |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A5 : Work Value and Organisational Culture – Significance Level by School Affiliation**

| *Variable* | *Type of School Affiliation* | *N* | *Mean* | *SD* | *t-value* | *S/NS* |
|---|---|---|---|---|---|---|
| Work Values | SSLC | 100 | 226.9600 | 27.6727 | -0.8704 | NS |
| | ICSE | 72 | 230.7222 | 28.3664 | | |
| Organisational Culture | SSLC | 100 | 140.2100 | 23.4888 | -1.3044 | NS |
| | ICSE | 72 | 145.5417 | 30.0862 | | |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A6 : Work Value and Organisational Culture – Significance Level by Gender**

| *Variables* | *Male (n=100)* | | *Female (n=72)* | | *t-value* | *S/NS* |
|---|---|---|---|---|---|---|
| | Mean | Std. Dev | Mean | Std. Dev | | |
| Work values | 228.5556 | 28.6356 | 228.5200 | 27.5818 | 0.0082 | NS |
| Organisational Culture | 136.2361 | 27.3122 | 146.9100 | 25.0950 | -2.6517 | S** |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A7 : Work Value and Organisational Culture by the type of Christian Denominations**

| *Variable* | *Type* | *N* | *Mean* | *SD* | *t-value* | *S/NS* |
|---|---|---|---|---|---|---|
| Work Values | Catholic | 126 | 228.9524 | 27.1063 | 0.8807 | NS |
| | Protestant | 39 | 224.3846 | 31.9346 | | |
| | Catholic | 126 | 228.9524 | 27.1063 | 1.4731 | NS |
| | Others | 7 | 244.1429 | 9.4768 | | |
| | Protestant | 39 | 224.3846 | 31.9346 | 1.6107 | NS |
| | Others | 7 | 244.1429 | 9.4768 | | |
| Organisational Culture | Catholic | 126 | 141.4286 | 26.5208 | 0.0438 | NS |
| | Protestant | 39 | 141.6410 | 26.3903 | | |
| | Catholic | 126 | 141.4286 | 26.5208 | 2.3318 | *S |
| | Others | 7 | 165.1429 | 17.9483 | | |
| | Protestant | 39 | 141.6410 | 26.3903 | 2.2537 | *S |
| | Others | 7 | 165.1429 | 17.9483 | | |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: not significant)*

**Table A8 : Work Value and Organisational Culture by the Teachers' Age Group**

| *Variable* | *Age Group* | *N* | *Mean* | *SD* | *t-value* | *S/NS* |
|---|---|---|---|---|---|---|
| Work Values | < - 45 | 96 | 227.4896 | 28.6055 | 0.5502 | NS |
| | 45 - > | 76 | 229.8553 | 27.2180 | | |
| Organisational Culture | < - 45 | 96 | 142.0625 | 24.5592 | 0.2104 | NS |
| | 45 - > | 76 | 142.9211 | 28.9246 | | |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A9 : Work Value and Organisational Culture by Teachers' Experience**

| *Variable* | *Teachers. Exp (in Years)* | *N* | *Mean* | *SD* | *t-value* | *S/NS* |
|---|---|---|---|---|---|---|
| Work Values | 3-10 | 46 | 232.9783 | 20.5442 | 1.5094 | NS |
| | 11-20 | 64 | 225.0469 | 31.0711 | | |
| | 3-10 | 46 | 232.9783 | 20.5442 | 0.8218 | NS |
| | 21+yrs | 62 | 228.8387 | 29.2049 | | |
| | 11-20 | 64 | 225.0469 | 31.0711 | 0.7054 | NS |
| | 21+yrs | 62 | 228.8387 | 29.2049 | | |
| Organisational Culture | 3-10 | 46 | 142.1957 | 23.9069 | 0.0843 | NS |
| | 11-20 | 64 | 141.7969 | 24.8782 | | |
| | 3-10 | 46 | 142.1957 | 23.9069 | 0.2035 | NS |
| | 21+ | 62 | 143.2903 | 30.1071 | | |
| | 11-20 | 64 | 141.7969 | 24.8782 | 0.3039 | NS |
| | 21+yrs | 62 | 143.2903 | 30.1071 | | |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

**Table A10 : Work Value and Organisational Culture by Teachers' Marital Status**

| *Variables* | *Marital status* | *N* | *Mean* | *SD* | *t-value* | *S/NS* |
|---|---|---|---|---|---|---|
| Work Values | Married | 149 | 228.6846 | 28.3828 | 0.1783 | NS |
| | Unmarried | 23 | 227.5652 | 25.4805 | | |
| Organisational Culture | Married | 149 | 141.4966 | 27.6143 | 1.1921 | NS |
| | Unmarried | 23 | 148.5652 | 16.8221 | | |

*(S** - Significant at 0.01 level; * S - Significant at 0.05 level; NS: Not significant)*

colleague interactions and approach task in a manner that helps them attain high order, personal satisfaction of teachers and meet organisational goals.

Further, the results of the t-test analysis reveal that secondary school female teachers of Christian schools had higher levels of organisational culture than male teachers. This indicates female teachers contribute more to organisational culture than their male counterparts. Similarly "other Christian" secondary school teachers had higher level of organisational culture than secondary school teachers of protestant management schools. Further 'other Christian' school teachers had higher level of organisational culture than secondary school teachers of catholic management schools. This indicates the teachers from "other Christian schools have more flexibility and a strong tradition of organisation culture.

## Implications

Educational leaders can use human resource management practices such as recruitment, training, and socialisation to enhance work values of their teachers. In the work environment, inspired teamwork empowers teachers to provide compassion and deliver a high quality educational service.

Therefore, effort should be made to enhance the work culture of male teachers through seminars, workshops and other management strategies to make the teaching profession exciting and challenging for male teachers to enhance their work values.

Therefore, a strong culture should be created to enable solidarity, respect, collaboration, and supportive organisational routines that are characterised by positive relationship between the teachers and their practice to integrate the tasks effectively. The sense of personal calling and strong socialisation into the teaching profession will create and enhance work values and serve as a driving force behind the high level of commitment of the teaching profession.

Educational leaders need to understand that their work force embody certain work values and the need to be valued as part of an organisation culture. Educational leadership of institutions must understand that work values differ from the type of institutions and therefore to an extent determine the organisation

culture. The organisation culture of an institution must encourage the positive work values that teachers bring to the work context. It is evident that work rewards are related to work values which in turn account for variation of organisation culture depending on the type of management.

**Conclusion**

This study confirms that both work values and organisational culture congruence create organisational success and develop competitive advantage for educational institutions. Work value of teachers in an educational environment is an issue that has attracted the interest of educationists. In service organisations such as schools, colleges, hospitals, etc., effectiveness and efficiency are directly an outcome of work values the teachers' possess.

Educational managers need to make efforts to develop and share the same core values and mission among teachers to enable them to work in a very cordial environment. It is therefore imperative for educational administrators to strive to create a bridge between the work values of teachers and the organisational culture of educational institutions. Organisational socialisation is an effective way to integrate the individual values of the teachers and that of the organisation as any organisation that depends upon teams or work groups for the development of work would benefit from understanding conditions which aim at the co-workers' level. As a limitation the sample considered only Christian schools and was limited to urban schools of Bangalore city only.

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# Teacher Preparation for Inclusive Education: A Major Concern for India in New Times

RADHAKANTA GARTIA *
SUSHAMA SHARMA**

**Abstract**

*Fifteen to twenty years ago, regular education teachers had little or no preparation about to educate students with disabilities (D' Anzola and Giordano, 2006). In recent years, the movement of inclusion to include students with disabilities in regular education settings has reached to mass number of teachers and teacher educated and now it is also creating space in the communities. United Nations Convention on the Rights of the Child in 1989 embodied the human rights for students with disabilities, stating that students with disabilities didn't want their future decided by others or limited according to their disabilities. They have the right to receive an education to develop their skills.*

The Salamanca statement on Education of Children With Special Needs (CWSN) and other international declarations emphasise the need for inclusive education as a strategy for achieving Education for All (Basir, 2006). The key role of teachers in giving birth and maintaining a truly inclusive classroom is unquestionable (Anderson, Klassen and Georgiou, 2007), but such an important mission also requires that suitable, effective and barrier free educational means should be employed. Since inclusion requires new approaches to teaching and learning (Lacey, 2006), it is fundamental to give teachers appropriate advice and support to face these challenges. As India is home to nearly 30 million children with special needs, and 82.74 per cent out of which are enrolled in regular schools, it is more challenging to provide quality education to all of them.

* *Senior Research Fellow* (UGC), Department of Education, Kurukshetra University, Kurukshetra
** *Professor* of Special Education, Department of Education, Kurukshetra University, Kurukshetra

**Students with Special Needs in India: Present Scenario**

It is estimated that over 650 million people, 10 per cent of the world's population, have a disability. Eighty per cent live in developing countries (United Nations Human Rights, 2010). The 2001 census of India found 21.91 million people with disabilities (2.13 percent of the population), while the 2002 NSS round's disability estimate is 1.8 percent of the population. As for any other group, education is critical to expand the life prospects of people with disabilities. Disabled people have much lower educational attainment rates, with 52 per cent illiteracy against a 35 per cent average for the general population.

Report of the National Workshop on Inclusive Education in SSA (2008) states that 30.38 lakh CWSN were identified in 2006-07 as compared to 14.59 lakh CWSN identified in 2003-04. Similarly the enrolment of children with disabilities/CWSN in 2006-07 has gone up to 19.97 lakh, as compared to 11.71 lakh in 2003-04. The current coverage of children with disabilities is 21.86 lakh (71.99 per cent) thus leaving approximately 30 per cent of the identified children with disabilities out of the education circumference. So far in SSA, 1.70 million children with disabilities have been enrolled in regular schools (MHRD, 2007). This increasing enrolment of CWSN in regular schools brings a herculean task for the teachers, as they are bound to provide quality education to CWSN without any discrimination.

Equally, the share of disabled children who are out of school is around five and a half times the general rate and around four times even that of the ST population. In even the best performing major states, a significant share of out of school children are those with disabilities (in Kerala, 27 percent; in Tamil Nadu over 33 percent). Indeed, evidence from more advanced states demonstrates that Children with Disabilities (CWD) remain perhaps the most difficult group to bring into the educational net even where overall enrolments are very high. Across all levels of severity, CWD very rarely progress beyond primary school. This underlines the importance of getting CWD into school if India is to achieve the education Millennium Development Goals (Human Development Unit South Asia Region, 2009). Here also teacher has to lead from the front to achieve this challenging task.

Inclusive education is about embracing all.

- Disability is a social responsibility.
- No selection procedures to be adopted for denying admission to learners with disabilities.
- Children do not fail, they only indicate failure of the school.
- Accept difference and elebrate diversity.
- Inclusive is not confined to the disabled. It also means non-existence.
- Learn human rights and conquer human wrongs.
- Handicap is a social construct,

deconstruct handicap.

- Make provisions and not restrictions; adjust to the needs of the child.
- Remove physical, social and attitudinal barriers.
- Partnership is our strength such as:
  - School community; school teachers;teachers-children; children- children; teachers parents; school systems and outside system.
- All good practices of teaching are practices of inclusion.
- Learning together is beneficial for every child.
- Support services are essential services.
- If you want to teach, learn from the child. Identify his strengths and not limitations.
- Inculcate mutual respect and inter-dependence.

—NCF-2005: 84

**Teacher Preparation for Inclusive Education: Need of the Hour**

Educating students with and without disabilities in the general classroom is becoming the current practice which is commonly known as inclusive education (Mukhopadhyay, Molosiwa and Moswela, 2009). Inclusive education is perceived to be one of the ways to increase educational access to large number of students with disabilities. This means more children with disabilities will be placed in the regular classroom than before. In order to provide effective inclusive education for all students, teachers need to develop a different set of skills and knowledge than traditionally required by the profession. Given the complex nature of classrooms and the increasing demands on teachers, who often have little or no specialised training in working with (SWSN) structures should be set up to provide the necessary help and guidance for teachers to make changes in their instruction (Magg and Katsiyannis, 2000). With the increasing diversity among students in today's classrooms, teacher preparation programmes are increasingly called on to train teachers who are able to respond competently to the challenges of inclusive classrooms (Munby, Lock, Hutchinson, Whitehead, and Martin, 1999). A major part of responding to the diversity found inside the classroom is through effective and efficient teacher preparation. Further, training on student-centred pedagogy and other effective teaching strategies are not unique to inclusive education, nor are special education needs SEN students the only students who benefit from these approaches. In fact, these strategies are central to current training in general education and are essential for the academic success of all including SWSN and SEN learners (Singhal, 2006). Essentially, if a learner does not have the opportunity to experience effective teaching and learning, their present and future options are consequently put at-risk. To meet the challenges of inclusion, general education classroom teachers need to provide instruction that is

appropriate to a much wider range of student abilities than has previously been the case. Therefore, classroom teachers must be comfortable with and competent at adapting and modifying curriculum and instruction to meet the needs of all of their students, including those students who have disabilities that affect their learning. Unfortunately, many teachers who are currently teaching in such classrooms have not been prepared to meet the challenges they face on a daily basis. Additionally, significant numbers of teacher training programmes have yet to adapt to these new challenges (Stanovich and Jordan, 2002). In this juncture teacher training programme for inclusion is of utmost importance and well trained skilful teachers are the immediate need of the schools.

United Nations Children's Fund (2003) made the following three important observations related to the prominence of teacher preparation for inclusive education;

1. Many schools have a large number of children in each classroom and few teachers. As a consequence of this, many teachers are reluctant to work with children with disabilities. They consider it an additional workload.
2. Training for sensitisation towards disability and inclusion issues, and how to converge efforts for effective implementation of programmes, they are important concerns.
3. The number of skilled and trained personnel for supporting inclusive practices is not adequate to meet the needs of different types of disability.

**Rationale Behind Teacher Preparation for Inclusive Education**

Teacher education is a core element for building the capacity of the education system to do inclusion. Teacher's education is essential to implement the concept of inclusive education for the children with disabilities. Consequently it must be a priorit to train all teachers in same way to enhance their skills and update their knowledge. Teachers can be benefited by the approach of inclusive education in various ways. Zerin (2005) mentions the following points in this regard:

- Inclusive education helps teachers appreciate the diversity of individual human being.
- It helps teachers recognise that all students have strengths;
- It creates an awareness of the importance of direct individualised instruction;
- It increases ways of creatively addressing challenges;
- It teaches collaborative problem solving skills;
- It develops teamwork skills;
- It acquires different ways of perceiving challenges as a result of being on a multi-disciplinary team;
- It enhances accountability skills;
- It combats monotony.

In Salamanca, Spain in 1994, more than 300 people representing 92 governments and 25 international organisations came together under the Spanish Government and UNESCO

organisation. The conference was about "Special Needs Education: Access and Quality". In the final report (Salamanca statement) the Participants proclaim that

- Every child has a fundamental right to education, and must be given the opportunity to achieve and maintain an acceptable level of learning;
- Every child has unique characteristics, interests, abilities, and learning needs;
- Education systems should be designed and educational programmes implemented to take into account the wide diversity of these characteristics and needs;
- Those with SEN must have access to regular schools, which should accommodate them within a child-centred pedagogy capable of meeting these needs;
- Regular schools with this inclusive orientation are the most effective means of combating discriminatory attitudes, creating welcoming communities, building an inclusive society and achieving education for all; moreover, they provide an effective education to the majority of children and improve the efficiency and ultimately the cost-effectiveness of the entire education system. (UNESCO, 1994 part 2)

The Right to Education Act (2009) has brought ample pressure to the government to provide free and compulsory quality education to all children irrespective of any discrimination. Schools across the country are moving toward more inclusive models of education and both pre-service and in-service teachers must be prepared to meet challenges of inclusion through a sound knowledge base and culturally responsive attitudes to teach in diversified and multicultural settings. Pre-service teacher candidates will most likely be placed in situations where they will teach in ways not only contradictory to their educational preparation, but to students who differ from them in language, culture, and experiences (Sobel and Taylor, 2005). These teacher candidates crave authentic real-world experiences about how to implement inclusive teaching practices. They need explicit modelling and demonstrations of how to accommodate instruction for diverse learners and more guided exposure to realities and perspectives different from their own.

Schumm and Vaughn (1995) and Baker and Zigmond (1995) observed that increasing numbers of CWSN are being served in regular classrooms which are dramatically changing the way special education services are being provided in schools. They stressed that this development must be addressed in pre-service teacher education programmes so that the next generation of educators will be better prepared to work more efficiently and effectively. Therefore, the importance of changing the traditional ways of teaching in regular classrooms cannot be overemphasised. Given the complex nature of classrooms and the increasing demands on teachers, who often have little or no specialised

training in working with exceptional students, structures should be set up to provide the necessary help and guidance for teachers to make changes in their instruction (Magg and Katsiyannis, 2000).

With the increasing diversity among children in today's classrooms, teacher preparation programmes are increasingly called onto train teachers who are able to respond competently to the challenges of inclusive classrooms (Munby, Lock, Hutchinson, Whitehead, and Martin, 1999). A major part of responding to the diversity found inside the classroom is through effective and efficient teacher preparation.

Johnson and Hawkins (2008) stated in a study that teachers reported a high percentage of CWSN in their classrooms who had a wide range of disabilities. They revealed a grave concern pertaining to the lack of support services available to the students and themselves, and disclosed a perceived inability to provide optimal educational programmes to CWSN because of inadequate teacher preparation and lack of adequate resources.

**What and How to Prepare Teachers for Inclusion?**

The training of general teachers at pre-service and in-service levels should address the issue of education of children with disabilities, so that teachers are better equipped to work in an inclusive environment. Some of the issues in training that need to be addressed include the methodology to be adopted for identifying children with disabilities; classroom management; use of appropriate teaching methodologies; skills for adapting the curriculum; development of teaching-learning materials that are multi-sensory in nature; evaluation of learning; etc. Central/ State departments of education, local educational districts, and colleges and universities must provide high quality pre-service and continuing professional development experiences that prepare all general educators to work effectively with children, youth and young adults representing a wide range of abilities and disabilities, experiences, cultural and linguistic backgrounds, attitudes and expectations.

Kamens, Loprete and Slostad (2000) advocated for the following points to be included in the curriculum for teacher preparation for inclusive education:

***Behavioural Concerns:*** In order to facilitate successful inclusion, pre-service teachers need to be prepared to deal with behaviour problems. Teachers seem to be concerned about how to maintain order and meet the emotional and social needs of all of the students. The following topics should be included in the course;

(a) helping each child to deal with frustration, (b) facilitating self-concept and self-esteem, and (c) maintaining consistency in expectations.

***Identification of Students with Special Needs:*** Teaching programme should make general education teachers to identify students with special needs and understand the characteristics inherent in the legal classifications of disabilities. An understanding of the characteristics of such classifications

would help them to comprehend how to more effectively meet the needs of students with disabilities.

***Adaptation of Curriculum and Materials:*** Teachers should learn methods to adapt materials, lessons, and assessments to meet the needs of special education students. Prospective teachers need to be prepared for (a) teaching students at the appropriate instructional level, (b) using alternative curriculum and assessment techniques and (c) modifying lessons and assessments for students with disabilities. This may indicate the need for teachers to adjust expectations, standards, and assessment techniques to accommodate students who are included in general education classrooms.

***Adaptation of Instructional Strategies :*** In addition to adapting curriculum and materials, pre-service teachers should have a wealth of strategies and techniques for adapting instruction. The needs of all children should be made through a variety of approaches, such as cooperative learning, multiple intelligences, and learning styles. Pre-service teachers need to know how to monitor and adjust lessons to meet the needs of children with disabilities. Prospective teachers would benefit from learning how to individualise instruction to meet the needs of all children.

***Legal Regulations and Individualised Education Programmes (IEPs):*** There is a need for prospective teachers to know the legal regulations governing special education. The importance of knowledge of legal terminologiest and procedures, including the IEP process should be introduced to the teachers.

***Co-teaching, Teaming, and Collaboration:*** There is a need for prospective teachers to be prepared to work with others. Pre-service teachers need to learn how to communicate effectively with the special teachers, work and plan with other professionals in the classroom, and co-teach with special education teachers. They need to foster a positive attitude about working with others by listing the need for a "spirit of cooperation".

Besides all the above mentioned points, Zerin (2005) advocated following competences as the needs of the teachers for fruitful inclusive education:

**Practical and Functional Competences**

- Creating a learning environment in which learners challenge stereotypes about language, disability, race, gender, ethnicity, cultural, and geographical location;
- Undertaking analyses of barriers to learning and participation in the local schooling context;
- Creating an environment in which all learners are equally valued;
- Developing strategies, through the curriculum, to build students' self-esteem;
- Creating lesson plans that are responsive to student diversity;
- Developing resources to support learning and participation;
- Managing various approaches

to teaching such as group work, collaborative learning, individualised learning, peer-mediated learning, in different educational contexts and with diverse groups of learners;

- Working with other peers in participative decision-making and collaborative teaching with the aim of maximising the participation of all learners
- Creating an inclusive ethos in the school where all learners, staff, parents and community members are valued;
- Promoting and supporting innovative practices in order to improve the school's responsiveness to diversity;

***Foundational Competences***

- Understanding the philosophy and assumptions regarding inclusive education policy and practices;
- Understanding current legislation and policy with respect to the management of inclusive education;
- Understanding the nature of barriers to learning and participation, and the principles underlying different strategies that can be used to address them;
- Understanding the nature of diversity in schools and communities;
- Understanding the assumptions that underlie a range of assessment approaches, and their particular strengths and weaknesses in relation to learner diversity;
- Understanding that inclusion is concerned with increasing the participation of all students who are vulnerable to exclusion, not just those with disabilities;
- Understanding various approaches to managing classrooms in order to ensure that they are responsive to diversity;
- Understanding approaches to conflict resolution, problem-solving, and mediation;
- Understanding and engaging with current research on inclusive education in order to promote an inclusive culture in the school;

***Reflexive and Spontaneous Competences***

- Reflecting on the extent to which objectives of the learning experience have been achieved and deciding on adaptations where necessary;
- Reflecting on how language, disability, race, gender, ethnicity, culture, geographical location and other differences impact on learning, and making appropriate adaptations to teaching strategies;
- Reflecting on whether children are actively involved in their own learning, and developing strategies to maximise participation for all learners;
- Reflecting on all skills learners bring to the class and making it explicit that all skills are valued, not merely academic skills;

- Reflecting on and interpreting assessment results, and feeding these into processes for the improvement of learning programmes;
- Reflecting on whether there are any exclusionary practices in the ethos and culture of the school, and developing strategies to address them;
- Reflecting on strategies to assist teachers in working collaboratively to develop inclusive curricula; and
- Reflecting on the effectiveness of staff development programmes, and finding ways to ensure that they meet the needs in the school context.

**Suggestions for Successful Teacher Preparation Programme for Inclusion**

Orientation training of policy-makers and education department officials, both at the state and block level is essential. In addition, there is a need to develop on-site support systems for teachers. Grassroots workers, parents, special school teachers, para-teachers and other individuals can be shown how to provide the required support.

The existing handful of teacher trainers cannot reach to the vast number of teachers working with children with disabilities in rural/ remote areas. There is a need to explore alternatives such as training para-teachers, investing in pilot studies to develop tele-rehabilitation programmes, and exploring strategies for distance education. Pre-service teachers argue that teacher preparation programmes devote too much attention to theory and not enough to the practical skills of teaching. These teachers leave their teacher preparation with an understanding of the democratic purposes of education, learning theory, a curricular vision and a basic repertoire of teaching strategies. However, they often need support drawing on this foundational knowledge to plan and implement curriculum within their particular classrooms (Liston, Whitcomb, and Borko, 2006). Pre-service teacher education programmes and school districts must collaborate to ensure that instruction is based on the use of research-based methodologies and learning theories that would support students' learning; thereby honouring culturally diverse and creative classrooms with teachable and sustainable moments.

**Conclusion**

Teacher development is at the heart of initiatives for inclusive practices in the schools (Ainscow, 2003). Though regular classroom teachers are willing to take responsibility of all children, including those with special needs, they will not be confident if they are not equipped with necessary skills (Gafoor and Asaraf, 2009). Further, inclusion requires the ability to deal with diversities and make use of them for the education of all using a variety of instructional strategies. The success of inclusive education is dependent in part on the mainstream teachers' perceptions of special need children and educability of these students and on

the extent of their willingness to make adaptations to accommodate individual differences. If teachers responsible for inclusive teacher practices have unclear perceptions of their role, it may seriously undermine the efforts in maintenance and restructuring of the programmes towards inclusion (Jelas, 2000). In order to consider about the responsibility of teacher education for inclusion, the designers and implementers of teacher education (i.e. the universities) are required to understand with great accuracy and depth the notion of inclusion, and accordingly design and implement a curriculum for training all teachers throughout the country.

In conclusion, with the philosophical orientation of today's educational system, every classroom should include students with diverse needs and every teacher should be required to meet the needs of these students. This necessitates that teachers have confidence in their abilities, knowledge and skills in inclusive education to meet the individual challenges that they may encounter in the present school climate (Johnson and Hawkins, 2008). Teacher education reform view of preparing future teachers for inclusive education needs serious attention and efforts, if we want to achieve the goal as inclusive classrooms, inclusive schools and ultimately inclusive society.

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# Policies and Programmes on ECCE in India: An Evaluation

Sujit Kumar Choudhary*

**Abstract**

*The World Education Forum in Dakar, Senegal approved a comprehensive vision of Education For All (EFA) to be achieved by 2015 based on the six goals. The six goals related to the areas of Early Childhood Care and Education (ECCE), universalising primary education, gender, youth and adolescents, adult education and quality of education. In the very first goal, EFA emphasises on expanding and improving comprehensive ECCE, especially the most vulnerable and disadvantaged children. The main focus is on 'reaching the unreached' for ensuring complete coverage of education. Indian Constitution directs the state to provide free and compulsory education for all children up to the age of 14 years. This goal has been pursued by India for nearly six decades through different programmes. The last two decades have witnessed significant improvements in children's participation in schooling. The recent effort to raise resources for the sector through imposition of an education cess is major effort in that direction. The present paper focuses and analyses various policies and programmes on ECCE in India and also tries to evaluate these.*

## Introduction

The existence of the ECCE is found in many countries of Europe and North America, and even in developing countries such as China and India. Kindergartens and nurseries were first established in the nineteenth century on the basis of Froebel, Pestalozzi and Montessori models. The major distinction between 'kindergarten' and 'nursery' is that the previous is for educational purposes and the latter is to provide care. However, the development of ECCE was slow, with some expansion occurring during World War II and some following that, Except for the eastern European socialist countries, with extensive developments occurring right after the War II, and France, with the integration

**Assistant Professor* in Sociology, School of Humanities and Social Sciences, Central University of Jharkhand, Ranchi, Jharkhand.

of preschool into the education system in 1886 and the expansion of the ecole maternelle in the 1950s (Kamerman 2006:3). It was the third Medium Term Plan (1990-1995), Towards Basic Education for All, that put closure to this history. The Jomtien and Dakar Declarations initiated a powerful movement towards EFA, beginning with the World Conference on EFA, along with the Convention on the Rights of the Child, and the conviction that access to preschool education was a legal right. It is the Jomtien decade that succeeded in placing ECCE on the global agenda as a necessary component for future economic and social development in developing countries. Two aspects were particularly important: (1) increasing awareness of the importance of the early years for subsequent child development and learning; and, (2) the expansion of the supply of programmes to stimulate and support economic and social development.

In the developed countries, the demand for ECCE has been driven by high and continued rising of female participation in the labour force and the need for childcare while mothers carry out their work outside the home. In the developing countries, mothers are assumed to be at home, or if at work, usually work in the informal sector, in agriculture, or selling agricultural goods in the market. The growing urbanisation and increase in maternal employment outside the home has emerged the issue of childcare which needs to be addressed. This finally laid the seeds for the introduction of the concept of organised Preschool Education/ECCE. Before, we shall discuss all the issues related to ECCE, it is necessary to conceptualise ECCE.

**Concept of ECCE**

There are various ways to conceptualise ECCE. The 1991 report of the findings of the 1988 Survey states that ECCE refers to "programs (programmes) intended to provide care and/or education for children from their birth until the ages of six or seven years… (They) are organised by government ministries or agencies concerned with the education, development, care, and welfare of children up to age 6 or 7 by non-governmental organisations" such as women's groups, religious institutions, or parent groups (Fisher 1991, Preface). Non-formal as well as formal educational facilities were included.

In India, the notion of ECCE is also found its place in the policy framework of the National Policy on Education (1986). In this document, ECCE was defined as an integrated and holistic concept of care and education of children between zero to six years from socially disadvantaged groups (GoI 1986). This provision was seen as facilitating to lay the child's foundation for life and also a support service for girls and working mothers. However, in practice, ECCE focuses only on pre-school education (e.g. nurseries, kindergartens, preparatory schools, pre-primary etc.) for three to six years olds. These do not have any health or nutrition component.

In fact, ECCE is divided into two stages: (i) services for children under age three are viewed as the responsibility of parents, and policy,

where it exists, is in the domain of health and/or social welfare; (ii) services for children aged three to six are the responsibility of the education sector. For the first stage of prenatal to three years, the developmental priority is ensuring health and nutritional well-being of the mother and child, since this is the vulnerable stage for growth faltering and is also critical for brain development. This stage requires more of home-targeted parent counseling in nutrition and health education and in 'early psychosocial stimulation'. In the second stage, the priority is given to early learning and all-round development through a more organised center-based ECCE programme (Kaul 2009: 6-7).

**Policy Framework**

There are several provisions in the Constitution of India in terms of fundamental rights and directive principle of state policy that has been used to promote ECCE services in the country. As a fundamental right, article 15 (3) of the Constitution of India empowers the state to practice protective discrimination favouring economically and educationally weaker groups, which includes special provisions for girls and children of disadvantaged social groups and children in difficult situations. The Indian Constitution committed to provision of 'free and compulsory education for children up to 14 years of age'. In the absence of a lower age limit, ECE services were also considered a part of the constitutional commitment. But, after passing the Right to Education Act (RTE), 2009 by the Indian Parliament, which made elementary education a Fundamental Right of children between 6–14 years, delinked ECCE from this commitment. This led to a number of protests from several professional and civil society organisations. As a compromise, ECCE has now been included as a Constitutional provision through the Article 45, which states that, "The State shall endeavour to provide early childhood care and education for all children until they complete the age of six years" (GoI 2007:23).

Constitutionally, child development and education are concurrent subjects, which imply a shared federal and state responsibility in ECCE service delivery. However, the actual provision of ECCE services governed by a number of policies and related action plans and programmes, beginning with the National Policy on Education (1986) which viewed ECCE as "an integral input in the Human Resource Strategy, a feeder and support programme for primary and a support service for working women" (GoI 1986). Recognising the crucial importance of ECE, the same policy recommended strengthening the ECCE programme not only as an essential component of human development but also as a support to the "universalisation of elementary education" (Gill, 1993). It indirectly enhances enrolment and retention rates of girls in primary schools by providing a substitute care facility for younger siblings. The various national policies envisage ECCE as a holistic experience fostering health, psychological and nutritional development of children along with school-related skills. The list of some

of the more prominent policies, which provide an enabling context for provision of ECCE services in India as follows:

1. National Nutrition Policy (1993) recognised that children below six years a high-risk groups to be given high priority.
2. National Policy on Empowerment of Women (2001), supported provision of childcare facilities, including crèches at work places.
3. India also ratified Convention on Rights of the Child in 1992 and reaffirmed its commitment to children, which resulted in formulation of policy framework to prepare a National Charter for Children. National Commission for Children has also been set up. The commission as visualised would protect/ safeguard the rights of children with a string legal base.
4. National Plan of Action for Children (2005) included universalisation of ECCE as one of the goals. It specified care, protection and development opportunities for children below three years and integrated care and development and pre-school learning opportunities for three to six years olds.
5. National Curriculum Framework (2005b) emphasised two years of pre-schooling and considered ECCE as significant for holistic development of the child, as a preparation for schooling and as a support service for women and girls. It advocated play-based developmentally appropriate curriculum (Kaul 2009: 16).

**Programmes and Initiatives of ECCE**

The history of ECCE in India dates back to the 1890s, when kindergartens were first started in the country (Rao 2005). However, the earliest formal documentation of preschool/ early childhood education, as an organised initiative in India, has been found in the latter half of the nineteenth century when Gijubahi Badheka and Tarabai Modak, among others, became the pioneers of this movement in the country. Influenced by Madame Montessori's visit to India, they established preschool education centre in Gujarat. In 1946, Madame Montessori met Mahatma Gandhi, who asked her to 'indianise' her method to make preschool education available to a large majority of children. That was the beginning of 'pre-basic education' in the rural parts of the country, largely through voluntary effort. Till India's Independence, voluntary agencies and private institutions primarily fulfilled the need for ECCE, particularly in the form of preschool education. The first government initiative in this area was the setting up of a Central Social Welfare Board in 1953, which started a grant-in-aid scheme for voluntary agencies. (Kaul 2009: 3). The Board sponsored voluntary agencies that would set up balwadis (kindergartens or child education centers) for the children of the less privileged. The objective of the programme was to shift the focus towards rural areas and the poor and to emphasise the holistic

development of the child rather than preschool education alone. In 1974, the Central government launched the Integrated Child Development Services (ICDS) programme, which has become the world's largest attempt in the field of ECCE by providing an integrated programme of health, nutrition and ECE. It includes services such as supplementary nutrition, immunisation, health check-up and referral services, non-formal pre-school education and community participation for children below six years, and to pregnant and nursing mothers. The programme concentrates on urban slums, tribal areas and the more remote and backward rural regions of the country. The scheme is funded by the central government.

Though ICDS is the major programme catering to the ECCE needs, several other schemes have also been initiated by the central and state governments mainly to supplement the ICDS provisions. For instance, 'Crèches and Day Care Centres Scheme' was started in 1975 to provide day care services for children below five years. It caters mainly to children of casual, migrant, agricultural and construction labourers. Similarly, 'ECE Scheme' was introduced as a distinct strategy to reduce the primary school dropout rate and to improve the rate of retention of children in primary schools. Under this scheme, central assistance is given to voluntary organisations for running pre-school education centers.

While the major responsibility for ECCE for children from prenatal to six years currently rests with the Ministry of Women and Child Development (MWCD), various other ministries, like Ministry of Health and Family Welfare (MH & FW), Ministry of Human Resource Development (MHRD), Ministry of Social Justice and Empowerment (MSJ & E), are also involved in one way or the other, due to its integrated nature. In terms of provisioning of ECCE services each bears its respective sectoral responsibility in the delivery of nutritional, health and educational components. There are, in fact, approximately 130 programmes in operation under various departments and ministries for ECCE which are briefly discussed below (Ibid: 18).

### *Integrated Child Development Services (ICDS)*

The Government of India has identified the universalisation of ICDS as its primary strategy to achieve the first goal of ECCE under EFA. This is also imperative for achieving the Millennium Development Goal related to malnutrition. The ICDS was initiated on a pilot basis in 1975. Over the last three decades, this scheme has expanded to 5659 sanctioned projects and 7,48,059 *Anganwadi centres*[1], in all the 35 states/union territories in the country as on 30th Sep. 2006 (Ibid: 18-19). Each project covers a block which is the smallest administrative

[1] The focal point for the delivery of services is the anganwadi (courtyard garden), a term borrowed from the simple child care centre which could be run in the courtyard of any village home. An Anganwadi centre is generally run by two local women—one is an instructor and other is a worker, who can cook food and take care school children.

unit. The programme mainly covers rural and tribal population, with a smaller urban component of 523 ICDS projects in slums and underdeveloped areas. Thus, although the share of urban population in the country is approximately 27.78 per cent, only about 13 per cent of all ICDS projects are located in urban areas, thereby limiting services to the urban poor. The ICDS offers a package of health, nutrition and pre-school education services to children, from prenatal stage to the age of six years and to pregnant and lactating mothers, following a life cycle approach. Some ICDS centres have been extended to include crèches for the younger children, but the number of these crèches is insignificant. A study conducted by NIPCCD (2004) found that these crèches are for the most part custodial in nature and tend to miss out on the early stimulation and psycho-social interaction that is important for the children under three years (Ibid: 18-19).

The ICDS has also received a significant increase in the budgetary allocations, with the Supreme Court's ruling that it shoould be universalised to reach all children in the country. The ICDS has also benefited from external assistance from multilateral and bilateral agencies through a series of projects over the years. While overall, ICDS has made some impact on incidence of malnutrition, the problem of moderate and mild malnutrition continues to be rampant among children in the country (UNESCO 2006). Some factors identified for this limited impact include: (a) while the critical stage for ensuring nutritional well-being of children is in the programme has been on the 3-6 years olds; (b) the focus has been more on the feeding aspect rather than on promoting behaviour change in child care practices in the community, which is likely to be more sustainable. Possibly, communication and behaviour change are much more complex to institute and achieve, while feeding children is much simpler. The single Anganwadi worker who is expected to do it all is also often not very well educated and may not have the required skills to take on this complex challenge. There are, however, wide state-wise differences in quality and impact with the southern states performing better. This may be largely due to the higher rate of literacy and a better governance environment; (c) With six sectoral services to be delivered through one community based service provider, the Anganwadi worker, for all children from pre-natal to six years the ICDS service delivery is indeed a tall order. A commonly observed outcome of this is that among the six services preschool education is one that is most 'time and effort' intensive if done well, and is therefore in many cases not also given due attention (Kaul 2009: 18-19).

The next stage of ICDS is ICDS-IV project which is running under Ministry of Women and Child Development (MWCD), Government of India in collaboration with the World Bank and International Development Association (IDA) support, in 158 high-burden districts from eight states, which have been identified for implementation of the project based on the low nutritional status of children under 72 months and anemia level among pregnant women of age 15–44 years (a technical mapping study was

conducted by the World Bank to identify high burden states/districts) and good practices experience (GoI 2007).

***Other Schemes with MWCD***

In addition to the ICDS, in the past, there were two other schemes which provided ECCE facility. These were the ECCE Scheme and the Scheme of Assistance to Voluntary Organisations for running crèches for children of working and ailing mothers. The ECE scheme was started in 1982 by the Department of Education, and then transferred to MWCD in 1987-88. It was conceptualised as a distinct strategy to improve retention of children in primary schools essentially provided grant-in-aid to voluntary organisations to run pre-school education centres in nine educationally backward states in the areas not covered by ICDS. This scheme was discontinued in 2001 in view of universalization of ICDS. A new crèche scheme named Rajiv Gandhi National Crèche Scheme was launched for the children of working mothers. The scheme was designed by merging the existing two of assistance to voluntary organisations for running crèches for children of working and ailing mothers. The services being provided under this scheme include sleeping facilities, health care, supplementary nutrition and immunisation, pre-school education, etc. for children. Every crèche unit would provide these services for 25 children for eight hours, i.e. from 9.00 a.m. to 5.00 p.m. Currently 22038 crèches have been sanctioned to run across the country, especially for yet uncovered districts/ tribal areas. The challenge here is to ensure that the crèches do not provide merely custodial care but also cater to children's psycho-social development (Kaul 2009: 20).

***ECCE under DPEP***

Taking cognisance of the importance of ECCE as an important factor in promoting retention of children in primary schooling, this component was included in the design of the externally funded series of District Primary Education Programme (DPEP) projects by the Department of Education in the early 1990s'. The approach under DPEP was one of the convergences with ICDS. Programmatic linkages were also attempted between pre-school and primary school under DPEP, by introducing the component of school readiness as an initial part of the primary curriculum and by continuing the play-based methodology in grades one and two. The benefits of ECCE were seen in terms of not only the children's own preparation for primary schooling, but also as a service for releasing girls from the burden of sibling care to attend school. It thus provided for strengthening of existing provisions for ECCE centres and strengthening their linkage with primary schools. An evaluation of DPEP indicates that girls' enrolment and school attendance was found to be higher in DPEP states with ECCE centres than those without these centres (Rao & Sharma 2002). The evaluation also observed that the DPEP school-based model for ECCE is more effective in providing the children a stimulating educational environment and creating a sense of 'bonding' with the school which can go a long way in promoting retention (Kaul,2009: 21).

### *The Sarva Shiksha Abhiyan (SSA)*

The Government of India launched the National Programme for Education of Girls at Elementary Level (NPEGEL) under the umbrella scheme of SSA for especially backward administrative blocks. Provision has been made under this programme for opening of childcare centres at the cluster level to facilitate girls' participation in elementary education (Ibid: 21-22).

### *The Mahila Samkhya Programme*

It is a programme for the education and empowerment of women in rural areas, particularly women from socially and economically marginalised groups. Under this programme, ECCE activities are being taken up in villages on a need-based criteria. Resource persons are providing training for childcare workers with the help of specific modules developed by the Department of Human Development and Family Studies, MS University of Vadodara (GOI 2003).

### Data Analysis on Access

An analysis of available secondary data indicates that there are almost one million institutions providing ECCE for three to six years olds in the country. The number of ICDS centres has increased remarkably from 546 thousand centres (approx.) in 2002 to 767 thousands centres in 2006. On the basis of a facility mapping exercise, it was seen that in 2006, for every 100 sq. km there are hardly 30 ECCE centres and for every 1000 population, even less than 12 ECCE centres (Kaul 2009: 25). Of the one million, 7,66,681 centres are under ICDS, while 2,22,243 are with primary schools; 93.8 per cent are in the public domain; and only 6.2 are in the private domain (IMRB 2007). The large number in the public domain is contributed by ICDS. In terms of urban-rural dichotomy, 96.3 per cent are in rural areas and only 3.7 per cent are in urban, again highlighting the need for an urban strategy for all programmes for children, including ICDS (Kaul 2009: 26). So as far as enrolment of children is concerned, the number of three to six years old attending preschool education at Anganwadi Centres under ICDS scheme in India has increased from 20 million in 2003-04 to 30 million in 2006-07 (Ibid: 25). The date on various programmes and the number of centres has been given below.

| *Programmes* | *Number of Centres* | *Beneficiaries Coverage* |
|---|---|---|
| ICDS | 766,681 | 23 million |
| Rajiv Gandhi National Crèche Scheme for the Children of Working Mothers | 22036 α | 0.55 million @ |
| Schools with Pre-primary | 222,243 μ | (1,94,000) approximately 0.2 million |
| NGO Services for ECCE | | Varying from 3–20 million* |
| Non ICDS Balwadis in EEB | | 1.74 million |
| Private Initiatives | 60, 969 μ | 10 million approximately (2002)* |

*Source: IMRB (2007)*
** Early Childhood Care and Education-An Overview (GoI 2003)*
** Seventh All India Educational Survey, as on Sep 2002 (NCERT, 2005a)*
*μ Mehta (2007)*

**Evaluation of ECCE in India**

Evaluation studies have found some positive trend of ECCE in general and in India in particular. According to the EFA, Global Monitoring Report (2005), the driving factor in increasing the demand for ECCE programmes in many developing countries is the evidence that these programmes lead to enhanced school performance including better school attendance, lower rates of class repetition, lower dropout rates, and stronger literacy and numeracy skills. The demand is also growing as more women are moving away from working in the informal sector (from agriculture to manufacturing and services) and out of unpaid family work to wage employment (Choi, 2002). On the other, there are huge variations in the quantity and quality of ECCE programmes. Many children in poor families or underdeveloped communities are unable to access quality ECCE services. Traditionally, as throughout Asia, caring for children in India has been the responsibility of the family and organised provision of ECCE services is very recent. Even after first established, subsequent development was very slow as reported by Gill (1993) and Rao (2005).

It is also found that, despite some unevenness in the quality of services, the ICDS programme has had a positive impact on the survival, growth, and development of young children. For example, a study conducted in rural areas of three southern states (Tamil Nadu, Andhra Pradesh and Karnataka) found that the programme had a significant impact on the psycho-social development of children, for both boys and girls. The study also showed that undernourished ICDS beneficiaries attained higher developmental scores than well-nourished children who were not enrolled in the programme (Kamerman 2006). A national study conducted in 1992 by the National Institute of Public Cooperation and Child Development confirmed the positive impact of ICDS. Where the programme was operating, there were lower per centages of low-birth-weight babies, lower infant mortality rates, higher immunisation coverage, higher utilisation rates for health services, and better child nutrition. Further, the per centage of severely malnourished children declined, the positive effects of preschool were evident, and a larger percentage of mothers were getting their children medically examined (NIPCCD 1992). Over the last three decades, ICDS has demonstrated its effectiveness.

**Conclusion**

All innovative initiatives, including policies and programmes, have demonstrated some good practices in ECCE, especially through strengthening coordination with the ICDS, MWCD, Sarva Shiksha Abhiyan and Mahila Samkhya programme. In fact, ICDS has been found to be more facilitative and effective at both the levels of ECCE, i.e. children from prenatal to three to six years. But, at the same time, it can not be denied that despite an early start, ECCE activities remained scattered, concentrated in urban settings, restricted to certain regions in the country, and confined

to those who could afford such services. It is also found that the factors leading to the neglect of ECCE developments include historical and cultural realities, the caste system, childrearing beliefs and practices, and the low status of women. However, the Government of India has continuously been renewing its commitment to making the programme universally available in order to achieve equality of opportunity for all Indian children.

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# Effectiveness of Self-study Material for Teaching General Science to School Students

B.C.Das*

**Abstract**

*In this quasi-experimental study, the traditional method adopted for teaching general science to Class IX students was compared with teaching through self-study material (SSM) for teaching general science to same students. The basic purpose of the study was to study the effectiveness of the developed SSM in comparison to the traditional teaching method for teaching general science to Class IX students. In order to accomplish these, two groups were formed, namely experimental and control. Experimental group was taught through the SSM developed by the investigator and control group was taught through the traditional method on the same curricula. Both the groups were pretested and post-tested on the three criterion variables such as criterion test, scientific reasoning, and scientific attitude. The decision regarding the comparative effectiveness of the two methods of teaching science was arrived at by comparing gain scores on the three criterion variables.*

**Need for the Study**

One important front for improving the quality of teaching in any subject is the provision of an effective teaching-learning material. There are many methods, models and techniques which can be used to make an instructional process effective. SSM is one of them. Use of SSM makes the teachers' job easy and can solve some of the problems of present classrooms. It has the potential to improve the quality of teaching. Research studies conducted in India and abroad reveal that SSM is significantly better than traditional face to face teaching. The most obvious justification for self instruction is that there are circumstances where there is no alternative or where any alternative involves the learner in unacceptable

* *Associate Professor,* Department of Education, North-Eastern Hill University, Meghalaya-794002

personal sacrifice. Thus the learner may live at a considerable distance from an appropriate institution, the learners' job may not allow him the free time or the time at the right part of the week to attend classes or the learner may be disabled and unable to attend classes. The learner's learning need may not fit with the available courses in various ways, the learner may require a particular competence in a relatively short time, the learner may need to learn bits of the subject which are underemphasized or not touched upon by most courses. This calls for a flexible approach to learning in the form of SSM.

The second reason for advocating SSM is that it is a way of coping up with various sort of differences among learners. Some learners learn more quickly than others. They differ in their performances in learning, e.g. some cannot remember anything unless they write it down, and others have very good oral memories and so on. All learners manifest certain preferred learning strategies and learning is likely to be most effective if the learner is prevented from learning in the ways he prefers.

Importance of these differences has long been recognised in learning and is the main justification for the thrust towards individualised learning.

Self-learning encourages learners to take on greater responsibility for their own learning. Thus learners are encouraged to consider their own learning needs and in some cases to undertake substantial analysis of them. In this way, the learners become aware of possible goals, stages, and sequences in learning the subjects. They are encouraged to select relevant goals and subgoals at wish to aim, monitor, and assess their achievements through various self-assessment techniques. SSM seeks to give to the learner as much responsibility for his learning as he can cope up without any particular time. Here the learner retains responsibility for the aim and objective of the course. He monitors the development of the course and its continuing relevance to his own objectives. The learner is aware of how well he achieves the learning task and has a reasonable idea of his level of proficiency. The learner has the opportunity to negotiate the course and so he becomes a participant in decision-making rather than a passive object to which things are done.

Further, affective factors merit a special importance in learning. A self-instructional mode can help to control affective factors. For instance, empathy may be developed within a group of learners by reducing the centrality of the teacher so that his role becomes more than a consultant. This is likely to increase the empathy between the teacher and learners. Rogers (1969) argues that where the teacher is empathetic, liking and affection are more evenly diffused around the group; and every student tends to feel liked by all the others to have a more positive attitude towards him and towards school. Individualisation reduces competition by making a better attempt than lockstep modes to match objectives and materials to individual learners' need and level. Autonomy grows through, inter alias,

individuals being given practice in taking decisions and so accepting responsibility for their own learning, through cooperating with others in groups to work on problems and to produce a mutual solution, through exchanging ideas and opinions with others; and through discovering about authority figures and autonomous individuals through reading, then there are great opportunities for the development of autonomy in teaching/ learning. SSM provides autonomy and freedom to carry on self-directed learning.

There are economic, social and individual pressures on the educational system to provide continuing education. The rate of change in modern society through technological developments, economic and commercial development and political groupings, may strain the ability of educational system to cope. With the increase of knowledge and associated developments in technology, there are changes in equipments and process which require a parallel development in specialists' skills together with new patterns of work involving higher degree of collaboration among specialists. The strain on the agencies presently providing continuing education can be reduced by the adoption of some form of self-instructional mode. In addition, the clients of continuing education frequently are those who are unable to fit into the normal schedules of educational institutions and so a self-instructional mode may help to provide the learning opportunities required.

Research says that there is a relationship between self-learning and motivation. Self learning is concerned with helping learners to develop their own motivation. Within a self instructional teaching mode there is a higher degree of likelihood that the learner will be aware of his needs and goals. This may be because he has special needs for the subject or it may be because the teacher has discussed needs and goals with the learners as part of the process of facilitating self instruction. The learners' involvement in decision-making has a positive effect on motivation. First, there is evidence (Brown, 1964) that involvement in decision-making tends to result in increase productivity through increase motivation to perform effectively. Second, such involvement may have the effect of building or at least maintaining the learners' self-esteem. The degree of freedom has to use preferred learning technique also likely to have an effect on motivation. Research conducted elsewhere reveals that any technique sincerely adopted by a learner as a way of coping is more likely to help than not on the ground that the personal assumption by the learners of responsibility for his own learning is a fundamental prerequisite for success in learning. By contrast, if the learner is prevented from using his favoured techniques, this is likely to reduce his learning effectiveness and so be demotivating.

In the light of the above considerations, it is hypothesised that SSM will prove to be more academically viable than traditional face to face teaching-learning approach. This hypothesis is theoretically substantiated by the fact that SSM

designed as self-contained course will prove to be academically viable for students because it would provide them opportunities to learn according to their own pace, encourage learners to take on greater responsibility for their own learning by experiencing the study work on their own which is felt to develop independence and lead to greater autonomy than traditional teaching method. It will prove to be more economically viable because SSM can be used as a distance-learning material and would offer the following economic advantages which distance education offers in general:

i. The applicability of distance to large group of learners as a kind of mass communication.

ii. The economy of both the large group approach and of the fact that the need for residential teaching is eliminated and diminished and that the study can take place during any time and anywhere when students feel the need;

iii. The feasibility for large scale projects to enlist the services of the very best subject teachers and educationists. For example they can be utilised to write the course materials.

Besides, there are empirical and psychological considerations that show that learning and retention is enhanced through the study of written materials produced on the basis of certain psycho-educational theories. For instance, influential works of Ausubel (1968) on meaningful verbal learning and the notion of Mathemagenic behaviour introduced by Roth Kopf (1965). Although Ausubel's work drew attention to meaningful text learning, it was Roth Kopf, according to Faw and Waller (1974), who showed how investigations should be carried out in this field. He suggested that subjects, when studying written materials not only learn this specific content but also acquire some general facilitative skills namely inspection behaviours which he later called Mathemagenic Behavoiurs. This reminds researchers that what the student does in the learning situation is an important key to how much he will retain. Based on these conditions, the investigator in the present study has attempted to determine whether the deliberate use of self-instructional material developed by utilizing the above psychological foundations could influence learning positively amongst school students. Further the setting chosen for the study was not a laboratory but a real teaching situation.

It is therefore expected that the SSM which makes use of auto-instructional strategy would result in positive transfer to new situation and deeper cognitive processing and hence better learning than traditional face-to-face teaching. Further better learning and positive transfer of this learning to new similar situations is expected to result in significant gain in scientific reasoning and scientific attitudes among students. To support this, research studies conducted in India and abroad by Desai (1966), Taveggia (1976), Mc Carney and Bullock (1977), Johnston and Pennypacher (1977), Otto (1981), Edelman (1983), Grant

(1983), Mathur (1983), Shah (1984), Rabindradas (1984), Neuberger (1984), Vatanvigkit (1985), Desai (1986), Singh (1988), Aranha (1988), Das (1990), Siddiqi (1991), and Agarwal (1995), reveal that SSM is significantly better than traditional face-to-face teaching in terms of academic achievements and reaction of the learners towards it. Similarly, the economic viability of SSM over traditional face-to-face teaching and traditional textbook reading has been established beyond doubt (Holmberg, 1973).

**Statement of the Problem**

In the light of the above background and justification, the title of the study was stated as "Effectiveness of Self-study Material for Teaching General Science to Class IX students of Assam State" with a view to realising the following objectives:

**Objectives of the Study**

The study aimed at achieving the following objectives:

1. To study the effectiveness of self-study material in terms of criterion test and reaction towards it.
2. To compare the mean performance scores of students taught through the developed SSM with those taught through the traditional method taking intelligence as a covariate.
3. To compare the mean scientific reasoning scores of students taught through the developed SSM with those taught through the traditional method taking intelligence as a covariate.
4. To compare the scientific attitude scores of students taught through the developed SSM with those taught through the traditional method taking intelligence as a covariate.
5. To compare the reactions of male and female students towards the developed SSM.
6. To study the reactions of students towards the developed SSM.

**Hypotheses**

The following hypotheses stated in null form were subjected to empirical verification;

Ho1. There will be no significant difference between the mean performance scores of the students taught through the developed SSM with those taught through the traditional method when intelligence will be taken as a covariate.

Ho2. There will be no significant difference between mean scientific reasoning scores of students taught through developed SSM with those taught through traditional method when intelligence will be taken as a covariate.

Ho3. There will be no significant difference between scientific attitude scores of students taught through developed SSM with those taught through traditional method when intelligence will be taken as a covariate.

Ho4. There will be no significant difference between the reactions

of male and female students towards the developed SSM.

**Sample**

Present study has been conducted at two stages. In stage one, the empirical validity of the developed SSM was established through small group tryout. For this, ten students were selected. In stage two for the final study another group of 58 students was selected. In this way two samples were used for the study. Details of both the samples are given hereunder.

**Sample for Small Group Tryout**

Purposive sampling technique was employed to select the sample for small group tryout. The sample comprised of ten students of Class IX of the session 2010. Out of the 10 students five were male and five female. The age of the students ranged from 13 to 15 years.

**Sample for Final Study**

Keeping in view the feasibility to conduct the experiment, all the 58 students of Class IX were selected for the study. Thus the intact group, i.e. the pre-existing group was selected purposively for the experimental and control purposes. The sample size in the experimental and control group was comprised of equal number of 29 students in each group. However, experimental treatment was assigned to the experimental group by random procedure. Age of the students ranged from 13 to 15 years.

**Design**

In this study, random assignment of subjects to the experimental and control groups was not possible because there were administrative difficulties in distributing the students without interfering normal classroom setting of the school. Further, it was also not permitted by the Head master of the school selected in the study. Hence the quasi- experimental design Number 10 suggested by Campbell and Stanley (1966) was found to be suitable and employed to study the effectiveness of the developed SSM as compared to the traditional method. There were only two groups: experimental and control. The subjects of the study were 58 Class IX students. They were divided into two equal groups. The students of experimental group were treated with developed SSM. The investigator was a guide to the students and was available throughout the experiment. The group which received instruction through traditional method was named as control group. Four units selected from general science as prescribed by SEBA were taught to both the experimental and control groups. Both the groups received instruction thrice a week in regular periods. Some periods were taken to hold discussions and perform other activities like assignments and library references. However, treatments to the experimental group were assigned by following random procedure.

Studies conducted in India and abroad report that there is a positive relationship between intelligence and students achievements. Hence in order to control intelligence statistically it was taken as a covariate in this study. The dependent variables in the study were achievement, reaction of the students, reasoning ability in science and scientific attitude. The independent

variables were treatments on SSM, traditional method and gender.

**Tools**

The following tools were used for data collection in the study:

1. Intelligence Test: Developed by Asthana and Verma (1989). The reliability and validity of the test was found to be 0.82 and 0.74, respectively.
2. Scientific Reasoning Test: Developed by Mohapatra (1993). The reliability and validity of the test was found to be 0.76 and 0.40, respectively.
3. Scientific Attitude Scale: Developed by Srivastava (1997).
4. Criterion Test: Four criterion tests on four units of general science were developed and used in the study by the investigator
5. A Reaction Scale: Developed by the investigator was used in the study.

**Procedure of Data Collection**

The procedure of data collection from both experimental and control groups is described below.

***i. Data Collection from the Experimental Group***

As stated above, 29 students of class IX received treatments on the SSM and formed the experimental group. Before conducting the experiment, the group was pre-tested for their performance in general science on selected four units, scientific reasoning ability and scientific attitude by administering criterion tests, scientific reasoning test, and scientific attitude scale. After that proper instruction and orientations were given to the students of this group. Then the group was treated with the developed SSM on the selected four units, namely, accurate measurement, motion, work, power and energy; and heat in general science for at least 40 minutes per day and thrice in a week. After the end of the period, SSM was collected from the students. The treatment on these four units was completed in six, fourteen, eight and six periods of 40 minutes, respectively. The entire process of treatment was completed in thirty four periods. After receiving treatment on the SSM, four to five minutes were provided for interaction with the teacher. Library references were given to the students to help them in doing the assignments. After completing a unit, criterion test was administered. In the same way, remaining three units were completed. Side by side, intelligence test was administered. After the completion of the treatment on all the four units, scientific reasoning test, scientific attitude scale, and reaction scale were administered.

***ii. Data Collection from the Control Group***

Twenty nine students were selected in the control group. The students of control group were also pre-tested for their performance in general science on selected four units, reasoning ability in science and scientific attitude by administering the same criterion tests, scientific reasoning test, and scientific attitude scale, respectively, as done in the experimental group. After giving proper orientation they

were also taught the same syllabus as taught to the experimental group. This group did not receive any special treatment. Each of the unit was taught by the investigator through the traditional chalk and talk method. After accomplishment of each unit same criterion test was administered to the students of control group. In this way all the four criterion tests were administered. Side by side intelligence test was administered. After the completion of giving treatment on all the four units, scientific reasoning test, and scientific attitude scale were administered.

**Statistical Techniques Used**

t-test, percentiles, percentage, chi-square values, and analysis of covariance were used for analysis of data.

**Self-study Material**

Selection of units was the first step for developing SSM. In this study, units were selected from general science syllabus of Class IX, prescribed by Board of Secondary Education, Assam. Selected units were: i Accurate Measurement, ii. Motion, iii. Work, Power, and Energy, and iv. Heat.

Before developing the SSM the investigator consulted with the formats adopted by selected institutions in India, viz. IGNOU, DAV Institutes of Distance Education and the NCERT. It was found that there are three basic parts in the entire format: introduction to the unit which appears before presentation of the content, main body of the content, and the concluding part which appears after the presentation of the main body of the content. Further, from the review of literature with respect to various steps followed for developing SSM by different organisations and scholars, it is seen that the steps namely, i. content analysis, ii. specification of objectives, iii. development test items, iv. development of draft lessons, / units, v. tryout and modification are almost common. Steps like description of target group, entry behaviour, and selection of media are not found to be common. Taking into consideration the above five common steps along with the variations, seven steps were followed by the investigator for developing the SSM. The steps followed were:

i. Description of the target group;
ii. content analysis;
iii. specification of objectives;
iv. development of test items;
v. identification of entry behaviour;
vi. development of draft lessons/ units; and
vii. tryout and modification.

**Analysis and Interpretation**

This section attempts to study the effectiveness of SSM in terms of criterion test and reactions of the students.

The effectiveness of the SSM in terms of performance of students on criterion test was studied on four units of general science taught to the students of Class IX. To obtain the performance of students, four criterion tests developed by the investigator on selected units were administered to the students of experimental group before instruction (pretest) and after

instruction (post–test). After that average scores of each student on pretest and post-test was found out. Effectiveness of the SSM was studied by comparing mean pre-test performance with mean post-test performance. Further, effectiveness of the SSM was studied in terms of performance of students on different criterion tests and performance as a whole. To compare the pretest performance and post-test performance of students,'t' value was calculated. Table 1 shows the't' value and the result of analysis done.

The results of analysis in Table-1 indicate that't' value of performance is 4.87 which is significant at .01 level of significance. This means that significant gains occur in students' performance on criterion test. Further, in order to verify the effectiveness of the SSM in terms of performance on criterion test, post-test scores of the students were analysed by computing percentiles. The results are given below in Table 2

The results presented in Table 2 indicate that more than 70 per cent students secured above 30 per cent

**Table-1: Pretest and Post-test Comparison of Performance of Students on Criterion Test**

| *Variable* | *Pretest* | | *Post-test* | | *rxy* | *'t' value* |
|---|---|---|---|---|---|---|
| | Mean (Mx) | S.D | Mean (My) | SD | | |
| Criterion Test | 40.69 | 5.06 | 27.62 | 29.91 | 0.91 | 4.87 |

**Table 2: Scores Obtained by Students on Different Criterion Tests**

| | **Criterion Tests** | | | | |
|---|---|---|---|---|---|
| *Percentiles* | *Unit I* | *Unit II* | *Unit III* | *Unit IV* | *Mean Performance* |
| P90 | 79.83 | 78.00 | 85.70 | 86.33 | 83.17 |
| P80 | 70.17 | 73.17 | 79.90 | 81.50 | 75.90 |
| P70 | 65.00 | 68.10 | 72.75 | 73.83 | 70.10 |
| P60 | 60.17 | 62.30 | 61.50 | 64.17 | 63.00 |
| P50 | 47.80 | 52.00 | 53.25 | 54.50 | 54.50 |
| P40 | 38.50 | 48.17 | 46.00 | 46.00 | 46.00 |
| P30 | 31.25 | 38.50 | 38.50 | 43.75 | 38.50 |
| P20 | 25.10 | 28.80 | 29.17 | 36.50 | 29.17 |
| P10 | 19.17 | 19.17 | 24.33 | 25.30 | 24.33 |

marks, 60 per cent students secured above 45 per cent marks except criterion test 1, 40 per cent students secured more than 60 per cent marks on all the criterion tests, and more than 10 per cent students secured above 80 per cent marks on different criterion tests. Hence the results indicate satisfactory students' performance on criterion tests. It means that the developed SSM was found to be effective in terms of performance of the

students on criterion tests. Students' reactions towards the SSM were obtained by administering a reaction scale developed by the investigator. The obtained data were analysed by using percentage and chi-square test. The reaction scale consisted of fifty items covering five aspects of the SSM. There were ten items in each aspect and five options against each item. Students were asked to put a tick mark on one of the options.

First aspect of the reaction scale elicited reactions from the students with respect to their liking/ disliking towards the developed SSM. It was found that 82.76 per cent of students reacted that subject matter presented through the SSM is very easy to follow. 10.34 per cent students were not in a position to react towards this item. Only 6.90 per cent students were not agreed on this item. 75.87 per cent students were of the opinion that the SSM helps to understand the content without much external support, 6.90 per cent students were unable to decide their responses on this item, whereas 17.24 per cent students were not agreed on this item. 72.41 and 93.10 per cent students agreed that the atmosphere of learning through SSM is healthy in terms of distracting stimuli and it is very interesting to learn through the SSM, respectively. Only 10.35 per cent students disagreed with the former and no one disagreed with the later. However, 17.24 and 6.90 per cent students could not say anything about these two items.

89.66 per cent students were of the opinion that the SSM could not be used to facilitate learning, 6.90 per cent students were not in a position to react towards this item and only 3.45 per cent students disagreed with this. 82.76 per cent students reacted that they remain motivated through the learning process, 6.90 per cent students could not say anything whether they were motivated or not, whereas 10.35 per cent students showed their disagreement on this item. 79.31 per cent students wanted to learn other subjects with the help of the SSM, 13.79 per cent students were not able to react towards this item and only 6.90 per cent students were not agreed with this item.

There were three negative items in the reaction scale, such as sometimes it is boring to learn through the SSM, there is wastage of time in learning through the SSM, and it is very difficult to interact with the SSM. 62.07 to 72.14 per cent students disagreed with these items, 10.34to 17.24 per cent students did not react to these items, and 17.24 to 20.68 per cent students showed their disagreement on them. On the other hand, all the chi-square values were significant except the item: sometimes it is boring to learn through the SSM. It means that the deviation of observed reactions from expectation might be a matter of chance. Results in terms of percentage indicate that students reacted favourably towards the SSM with regard to instruction through the SSM.

Second aspect of the reaction scale was about the presentation of the content. There were eight positive items in this aspect, such as the subject matter presented in small steps is easy to understand, help of the teacher

is sufficient to learn, the linkage of different concepts are well done, the content presented in conversational style is friendly to learn, provision of different examples and explanations for a concept help to learn effectively, there are sufficient illustrations to explain the content, explanation of technical words helps in learning, and integration of different illustrations and examples with the content was quite good. 89.66, 96.55, 75.86, 89.65, 86.20, 65.52, 72.41, and 75.86 per cent students respectively reacted favourably towards these items. 3.45 to 31.03 per cent students were not able to react towards these items and only 3.45 to 17.24 per cent students disagreed with these items. There were two negative items such as there should be compulsion to learn in same sequence and explanation of technical words not necessary. 65.52 and 62.07 per cent students respectively disagreed with these items. 10.34 per cent students were not in a position to react to the former and 31.03 per cent were not in a position to react to the latter. Only 30.13 per cent students agreed with the former and 6.90 per cent on the later. The chi-square values with respect to presentation of content were significant. This reflects that the students liked the presentation of the content.

Third aspect of reaction scale was about the technical facilities available. 13.79 per cent students were not in position to react towards this, whereas 13.80 per cent students disagreed with this. 79. 31 per cent students were of the opinion that highlight of the main and important points helped them to learn the concept. 10.34 per cent students did not react towards this item, whereas 10.35 per cent students were not agreed with this. 62.06 per cent students reacted that presentation of the content was quite motivating, 17.24 per cent students were not able to give response towards this item and only 26.69 per cent students disagreed with this. 93.10 per cent to 72.41 per cent students were of the opinion that graphics help to understand the concepts, adequate selection of learning material save time in learning, in-built mechanism for shifting one step to another helps in learning, 3.45 per cent to 13.79 per cent students could not be able to determine responses towards these items, whereas 3.45 to 13.79 per cent students were disagreed with these items. There were three negative items in this aspect, such as instructional facilities are not sufficient in each step, animation and graphics have no use in learning, and in-built flexibility of the SSM hinders learning. 58.62 to 86.21 per cent students disagreed with these items. Only 24.13 per cent to 13.79 per cent students agreed with the same. All the chi-square values were significant in this aspect and hence the students favoured the technical facilities available in the SSM.

Fourth aspect of the reaction scale was about evaluation and feedback. 82.76 per cent students reacted favourably towards the item, i.e. sufficient explanations are given for the answer of the questions. 6.90 per cent students were not in a position to react towards this item, whereas 10.35 per cent of them disagreed with the same.

89.66 per cent students reacted that questions are relevant to the content, whereas 6.90 per cent students did not find them relevant and 3.45 per cent students were not able to react to this item. 65.52 per cent to 86.21 per cent students were of the opinion that questions are quite helpful in developing higher mental abilities, there is a sufficient scope to evaluate the learning outcomes, only multiple choice items are not sufficient to develop understanding and expression, explanation of wrong answers helps to learn more clearly, sometimes prompts are useful to draw the information, immediate confirmation of the answers helps to understand the concept, I like this in-built evaluation facilities and suggestions given after committing mistakes and correct answer helps to learn more clearly. 3.45 per cent to 20.69 per cent students were not able to react towards these items, whereas 3.45 to 20.69 per cent students were not agreed with these items. All the chi-square values are found to be significant. This reflects that the group really favoured the evaluation and feedback facilities of the SSM. The fifth aspect of reaction scale was about follow-up activities. In respect to this, it was found that 93.11 per cent students reacted favourably towards the item: integration of activities with the SSM helps the students very much. 6.90 per cent students could not find their responses and no one disagreed with this item. 75.86 per cent to 89.65 per cent students reacted favourably towards the items , such as assignments create the opportunity for discussion, discussion on main points helps the students to consolidate learning, hints should be incorporated with assignments, and reacting with others are necessary for clarifying doubts. 6.90 per cent students were not able to react towards the later three items and only 3.45 per cent to 17.24 per cent students disagreed with these items. 82.76 per cent students reacted that reasoning based assignments are feedback for the students. 6.90 per cent students could not find their responses towards this item, whereas 10.35 per cent students were not agreed with this item. 72.42 and 75.86 per cent students reacted favourably towards the items, such as clarifying doubts through discussion is helpful for the students' and knowing each other through discussion is new experience for me, respectively. 10.34 per cent to 20.69 per cent students could not find their responses towards these items, whereas 17.24 per cent students disagreed with the former and 3.45 per cent students disagreed with the later. There were two negative items in this aspect, such as assignments do not help us to test the knowledge gained and sometimes assignments are not found in given reference books. 68.97 and 51.73 per cent students were not agreed with these two items. 17.24 and 31.03 per cent students were not able to give their responses towards these two items, whereas 13.79 per cent students were agreed with the former and 17.24 agreed with the later. All the chi-square values were found to be significant with respect to follow-up activities. This reflects that students liked the follow-up activities provided by the investigator right after

the treatment on SSM. On the whole, majority of students reacted favourably towards the reaction scale. Hence, it can be concluded that the developed SSM was found to be effective in terms of students' reaction towards it.

### Comparison of the SSM with Traditional Method in terms of Performance of Students

In this study, as mentioned above, four criterion tests were administered to both experimental and control groups before and after instruction to get pretest and posttest scores. After this, performance scores of each student was found out by subtracting the pretest score from post-test score in each of the criterion test. Thereafter, mean performance scores of the students on four criterion tests, both experimental and control groups were found out. The obtained data were analysed by using Analysis of Covariance (ANCOVA) taking intelligence as a covariate. The results are presented in Table 3 and 4. From the Table 3, it can be seen that F value of mean performance for two groups is 37.94 which is significant at .01 levels with df 1/55. It shows that the adjusted mean performance score of the students taught through the developed SSM is significantly different from those taught through traditional method when intelligence is taken as a covariate.

**Table 3: Summary of ANCOVA for Mean Performance by Taking Intelligence as a Covariate**

| *Sources of Variance* | *df* | *SSy.x* | *MSSy.x* | *Fy.x* |
|---|---|---|---|---|
| Among Means | 1 | 641.92 | 641.92 | |
| Within Groups | 55 | 930.83 | 16.92 | 37.94 |
| Total | 56 | | | |

**Table 4: Adjusted Mean Performance Scores of Experimental and Control Groups**

| *Group* | *N* | *Mx* | *My* | *My.x* |
|---|---|---|---|---|
| Experimental | 1 | 641.92 | 641.92 | |
| Control | 29 | 22.14 | 17.38 | 16.82 |

From Table 4, it is seen that the adjusted mean performance of the students taught through the developed SSM was significantly higher than the students taught through traditional method. Thus, the null hypothesis 'there will be no significant difference between the mean performance scores of the students taught through the developed SSM and those taught through the traditional method when intelligence will be taken as a covariate' is rejected. It is therefore concluded that the developed SSM is significantly better than the traditional method.

### Comparison of the SSM with Traditional Method in Terms of Scientific Reasoning

The scores of scientific reasoning were obtained by administering Reasoning Ability Test in Science (RATS) to the students of both the groups, such as experimental and control. Thereafter, the gain scores of both the groups were found out by subtracting the pretest scores from the post-test scores. Then the mean gain scores of the students taught through the SSM was compared with mean gain scores

of students taught through traditional method. The data were analysed by using ANCOVA taking intelligence as a covariate. The results are presented in Table 5 and 6.

**Table 5: Summary of ANCOVA for Scientific Reasoning Taking Intelligence as a Covariate**

| *Sources of Variance* | *df* | *SSy.x* | *MSSy.x* | *Fy.x* |
|---|---|---|---|---|
| Among Means | 1 | 141.34 | 141.34 | |
| Within Groups | 55 | 139.35 | 2.53 | 55.87 |
| Total | 56 | | | |

From Table 5 it can be seen that the F value of scientific reasoning ability for the two groups is 55.87 which is significant at .01 levels with df 1/55.

**Table 6: Adjusted Mean Performance Scores of Experimental and Control Group**

| *Group* | *N* | *Mx* | *My* | *My.x* |
|---|---|---|---|---|
| Experimental | 29 | 20.62 | 5.38 | 5.41 |
| Control | 29 | 22.14 | 2.31 | 2.28 |

Table 6 shows that the adjusted mean scientific reasoning score of the students taught through the developed SSM is significantly different from those taught through the traditional method taking intelligence as a covariate. Thus the null hypothesis 'there will be no significant difference between the mean scientific reasoning scores of students taught through the developed SSM with those students taught through the traditional method when intelligence will be taken as a covariate' is rejected. The scientific reasoning score of the students taught through the developed SSM was significantly higher than those taught through the traditional method. It is therefore concluded that the developed SSM induced more scientific reasoning ability among the students than the tradional method of teaching.

### Comparison of SSM with Traditional Method in Terms of Scientific Attitude

The scores on scientific attitude were obtained by administering the scientific attitude scale developed by Srivastava (1997). The test was administered on both the groups: experimental and control. After that the gain scores of the students taught through both the approaches were found out by subtracting the pretest scores from the post-test scores on scientific attitude. Thereafter, the mean gain scores of the students taught through the SSM were compared with mean gain scores of students taught through the traditional method. This comparison was done by using ANCOVA. The details are presented in Table 7 and 8.

From Table 7, it can be seen that the F value of scientific attitude for the two groups is 0.21 which is not significant at .01 levels with df 1/55.

**Table 7: Summary of ANCOVA for Scientific Attitude Taking Intelligence as a Covariate**

| *Sources of Variance* | *df* | *SSy.x* | *MSSy.x* | *Fy.x* |
|---|---|---|---|---|
| Among Means | 1 | 0.30 | 0.30 | |
| Within Groups | 55 | 80.36 | 1.46 | 55.87 |
| Total | 56 | | | |

**Table 8 : Adjusted Mean Scientific Attitude Scores of Experimental and Control Groups**

| Group | N | Mx | My | My.x |
|---|---|---|---|---|
| Experimental | 29 | 20.62 | 1.93 | 1.95 |
| Control | 29 | 22.14 | 2.10 | 2.08 |

Table 8 shows that the adjusted scientific attitude score of the students taught through the developed SSM is not significantly different from those taught through the traditional method when intelligence is taken as a covariate. Thus the null hypothesis 'there will be no significant difference between the scientific attitude scores of the students taught through the developed SSM with those taught through the traditional method when intelligence will be taken as a covariate' is not rejected. This means that the alternative research hypothesis is accepted and it is concluded that the SSM does not have any significant influence on the scientific attitude of the students.

**Findings**

Based on the interpretation of results, the following are the findings of the study:

1. Developed SSM was found to be effective in terms of performance of the students on criterion tests and reaction towards it. More than 70 per cent of students secured more than 30 per cent marks and reaction of the students towards different aspects of the SSM and material as whole was found to be favourable.
2. The performance of students taught through the developed SSM was found to be significantly better than those taught through the traditional method when students overall performance scores were adjusted with respect to intelligence.
3. The developed SSM was found significantly better than the traditional method in terms of development of reasoning ability of students in science when their mean scores were adjusted with respect to intelligence
4. The developed SSM was not found to have any significant positive effect on scientific attitude scores of the students when compared with the traditional method taking intelligence as a covariate.
5. There was no significant difference in the reactions of male and female students towards the developed SSM, as the chi-square values are not found significant in all the items given in the reaction scale. Thus the null hypothesis 'there will be no significant difference between the reactions of male and female students towards the developed SSM' is not rejected. Hence the alternative research hypothesis is accepted and it is concluded that the SSM does not have any significant influence on the reaction of the male and female students.

**Conclusion**

Teaching through SSM is significantly better than the traditional talk and chalk method for teaching General Science to Class IX students. Moreover,

the SSM has induced better scientific reasoning abilities among the students than the traditional method. But there is no significant difference between the students taught through the SSM and those taught through the traditional method in terms of scientific attitude. Students' reaction towards the developed SSM for teaching General Science has been found to be positive. Hence, the SSM could be effectively used as a viable teaching strategy for teaching General Science to the students of Class IX.

**Implications of the Study**

The developed SSM was used for teaching General Science and was found to be effective than the traditional method of teaching. It has brought about significant changes in the scientific reasoning abilities of the students. This implies that the science teachers can take the help of such material and procedures involved in it and make their classroom teaching effective. By following the principles of developing the material, science teachers can develop SSM for teaching. By collecting available materials not only for teaching science but also for teaching other subjects and using such material as a support system, the teacher can improve his teaching efficiency and fulfill the present requirements of classroom teaching.

To cope up with the present changing society, the teacher should have sufficient knowledge in each and every field which is impossible in the present classroom setting having wide variety of students, and a single teacher following a single teaching method. The material developed and used in the present study has proved to be effective for students in learning in terms of learning on their own. Therefore, SSM could be used for effective self-learning by the students. Besides, it could be used to develop awareness among the students about the use of SSM in learning situations and provide training in the use of such material.

In order to use the SSM to its maximum level, it is essential to train more teachers in its development and use. Training of teachers in SSM could be done by the teacher training institutes for both pre-service as well as in-service programmes. They should try to introduce a paper at their teacher training programmes to create trained manpower in the area of SSM. The teacher educators can also start conducting researches in the area of self- instruction. The present study is a guideline for them.

The study opens up a new path for the administrators, principals/ headmasters, directors, educational officers in the sense that they should cultivate positive attitude towards the development and use of SSM from economic point of view. They should try to modify the curriculum and encourage both teachers and students for the use of the SSM.

The development of SSM for the instructional processes requires two things, viz. mastery over the subject matter and adequate knowledge of developing SSM. Generally, the subject experts have the mastery over the

subject but they may not have sufficient knowledge about how to analyse the content following psychological principles, what principles and steps to be followed in developing SSM and how to use different strategies in the package for achieving the educational goals. The developed material in the study is a guideline to those who are engaged in developing SSM.

Present study has also an implication for the textbook writers. They can use all the principles and steps involved in developing SSM in preparing textbooks. They can also incorporate the self evaluation facility in the textbooks and assignments for the development of higher mental abilities among the school children.

In the light of the conclusion that teaching through SSM is significantly better than the traditional face-to-face approach to teach General Science to Class IX students, the important implications for the practitioners and planners is that they might consider teaching General Science to Class IX students through distance mode.

Though on the basis of this micro study no theory can be built , yet as an empirical study in the area of self-learning strategy, the findings of this study do add to the already existing findings that lend support to the theory of autonomy and independence (Wedmeyer,1977) and self-direction (Moore,1983) in learning. Besides, the empirical evidence produced by this study can be considered as a small addition towards establishing the effectiveness of the SSM over traditional teaching method. In this way, the findings of this study are a small contribution in the process of generalisation in this area.

**Suggestions for Further Research**

(i) The present study has been conducted only on a segment of general science syllabus of SEBA. More studies maybe conducted on different population and larger portions of the total curriculum before making any generalisation regarding the effectiveness of SSM.

(ii) SSM should be developed on other disciplines, like language, social science, mathematics, and the effect of different instructional materials on learning should be studied.

(iii) In the present study, the SSM is compared with traditional method. It may-be compared with other teaching materials/methods. It can also be used with other techniques.

(iv) The effectiveness of SSM could be studied on other relevant variables such as age, personality, and school climate.

(v) As the sample of the study consisted of only 58 school students, it is not enough to produce dependable knowledge in a generalised way. Hence this study can be replicated on a relatively larger sample for establishing the correctness of the results in order to arrive at more dependable knowledge.

(vi) The economic viability of SSM against traditional method adopted for teaching General Science to Class IX students could also be studied.

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# A Study of Awareness of 'Open Book Examination' System

Mandira Sikdar*
Swati Amraotkar**

## Abstract

*Very few issues are likely to have a crucial impact on the future as the training and education of 'human resources'. The quality of education imparted assumes extraordinary significance in this context–What are the goals of education today and are our current educational practices in conformity to the same? Today, Education, while not losing sight of its traditional goals (reading, writing, arithmetic), will also have to equip individuals to live effectively in the 'knowledge society', i.e. acquire relevant knowledge and inculcate and interpret new values that will in turn guarantee them the ability to keep pace with the evolution of their environment. Our schools and educational institutions must conform to this emerging reality-via the designing of appropriate instructional processes and evaluation systems that gauge the intellectual growth of students and not merely their ability to memorise information and regurgitate. Unfortunately, our Educational practices and systems of examination have not been able to keep pace with the changing context-they still highlight the importance of rote memorisation, fail to test higher order skills like critical thinking, reasoning, etc., and are largely inflexible with no allowance made for different learners. What is needed urgently is examination reform wherein there is a shift in emphasis to testing competencies, understanding of concepts taught, and development of creative and critical thinking abilities. Although efforts towards reforming examination system are started, i.e, continuous comprehensive evaluation and making examination optional at secondary grade. However, some more innovations/alternatives need to be tried in Indian Education System which caters to tremendous diversity of the country. In view of the aforementioned, Open Book Examination (OBE) could be a significant alternative assessment system that could be implemented keeping in mind*

* *Assistant. Professor,* B.Sc. B.Ed. Programme, Navrachana University, Vadodara.
** M.Ed. Student, Navrachana College of Education, Navrachana University, Vadodara.

*its several benefits and this Study was conducted to study the awareness regarding the (OBE) system and the barriers to its implementation. The study concluded that while OBE was considered a necessity, implementation of the same could only be a long-term vision keeping in mind the preparatory measures that would be needed for its effective implementation.*

**Introduction**

Very few issues are likely to have a crucial impact on the future as the training and education of 'human resources'. The quality of education imparted assumes extraordinary significance in this context–What are the goals of education today and are our current educational practices in conforming to the same? As educationists, should our objective be the development of skills, creating new knowledge or disseminating existing knowledge? Should education emphasize the dissolving of differences for a stronger sense of nationhood or should education focus on the shaping of sensibilities and values of future global citizens?

The world is changing rapidly; there are new and emerging priorities and we are grappling with the 'proper' role of Education. In the present context, Education, while not losing sight of its traditional goals (reading, writing, arithmetic) will also have to equip individuals to live effectively in the 'knowledge society' i.e. acquire relevant knowledge and inculcate and interpret new values that will in turn guarantee them the ability to keep pace with the evolution of their environment (NCF-2000).

Our schools and Educational Institutions must conform to this emerging reality-via the designing of appropriate instructional processes and evaluation systems that gauge the intellectual growth of students and not merely their ability to memorise information and regurgitate.

Education must encourage students to analyse and evaluate experiences, to doubt, to question, to investigate, to be inquisitive and think independently. Unfortunately, what is presented and transmitted as knowledge in schools leaves out vital constituents of man's epistemic enterprise and most schools promote a regime of thought which discourages thinking and precludes new and surprising insights. To add to this situation, our systems of examination too unfortunately have not been able to keep pace with changing times. They still highlight the importance of rote memorisation, fail to test higher order skills like critical thinking, reasoning, etc., and are largely inflexible with no allowance made for different learners (NCF-2005).

The aim of examination should be all-round development of the students but the present system of examinations does not fulfil this objective. Until quite recently, memorisation occupied a dominant place in all written examinations, which almost completely overlooked the testing of higher objectives like understanding, and the application of knowledge and skills. This, in turn, reflected on the instructional programmes where the

development of these higher abilities on the part of the students also was invariably overlooked.

The Secondary Education Commission (1953) had stated that the crippling effect of external examination on quality of Instruction was so great that examination reform had become crucial to all progress and would have to go hand in hand with improvements in teaching (National Focus Group, 2006). The major goal of examination reform should be to improve the reliability and validity of examinations and to make evaluation a continuous process, aimed at helping the student to improve his level of achievement rather than merely 'certifying' the quality of his performance at a given moment of time (NPE, 1968).

Two main things have therefore to be done if the existing examination system has to be reformed. First, its domination over the educational system has to be minimised and secondly, the quality of examinations has to be improved. What is needed urgently is examination reform wherein there is a shift in emphasis to testing competencies and away from memory which would certainly reduce stress, in addition to aiding the validity of exams.

It is in view of the above that a long-term move towards open-book exams can be envisaged. In an Open Book Examination, the focus shifts from mere reproduction of information to the processing of information—the ability to apply a theory, test a theory, propose an explanation, interpret meaning, infer predictions, design an experiment, find logical inconsistencies and so on. Such an examination simultaneously tests the students' understanding of concepts taught, development of their creative and decision-making abilities. It is ideally suited to teaching programmes that especially aim at developing the skills of critical and creative thinking (Mohanan, 1997).

The Open Book Examination is increasingly becoming an essential evaluation tool in education, as it is able to evaluate skills such as conceptualising, problem-solving and reasoning (Bisse, 1993), (Feller, 1994), (Ioannidou, 1997), (Theophilides et al, 1996). Students preparing for Open Book Exams interrelate various information and work creatively (Theophilides & Koutselini, 2000), (Verma,2002). Such an examination will eventually eliminate rote memorisation done with the goal of simply reproducing what is memorised, not memorisation that enhances the efficiency and speed of thinking in a given domain.

Tussing (1951) posited that the Open-Book Examination "removes much of the fear and emotional block encountered by students during examination, while, at the same time, it emphasizes practical problems and reasoning rather than mere recall of facts".

However, research has also proved that while the transition from the traditional pattern of examination to new pattern such as the Open Book Exam may ensure creative use of the knowledge gained and reduce examination stress, (Theophilides & Dionysiou, 1996), (Boniface,1985), (Krarup, Naeraa & Olsen, 1974), (Weber,

Mcbee & Krebs,1983), it will require an adaptation period both for examiners and the examinees (Gupta, 2007). Studies conducted on examination anxiety showed lower anxiety level for Open Book examinations compared to the closed book exam pattern (Vyas & Vyas, 2009) using knowledge in creative ways and facing examination with optimism (Dwivedy, 2010). Many researchers have also concluded that not all courses are suitable for Open Book Examination.

Summarising the above, Open Book Examination could be a significant alternative assessment system that could be implemented keeping in mind its several benefits and a survey was conducted to study the opinion of practitioners and administrators regarding the Open Book Examination System titled ' A Study of Awareness of 'Open Book Examination System.'

The primary objective was to study awareness regarding the Open Book Examination and barriers to its implementation.

The Specific Objectives of the study were -

1. To study awareness about Open Book Examination among
   (a) School teachers
   (b) School principals
   (c) Government officials.
2. To study barriers to the implementation of Open Book Examination.
   (a) School teachers
   (b) School principals
   (c) Government officials.

**Methodology and Design of the Study**

The survey method had been used for the collection of data in accordance with the nature of the present study. The study was conducted in Vadodara City, an important cultural and educational part of Gujarat State. There are variations in the management of education in Vadodara City–namely, Private Aided, Private Unaided, Municipal School Board Schools, Central and State Board schools, State and Private Universities/Institutions that cater to the varied educational needs of its citizens from Pre-primary to Higher Education.

Secondary schools affiliated to GSHSEB (Gujarat Secondary and Higher Secondary Education Board) in Vadodara are categorised into different clusters (Shala Vikas Sankul) in the rural and urban areas for ease of administration. A total of 66 English medium schools affiliated to Gujarat Secondary and Higher Secondary Education Board are located in Vadodara District and city-out of these 66, 60 English medium secondary schools of (GSHSEB) are in Vadodara city and are categorised under cluster (Shala Vikas Sankul) five to eight.

The population of the study comprised school teachers and principals of English Medium Schools (Secondary Sections) of Vadodara City; Government Officials of District Education Office, Vadodara. The sample schools from these were selected randomly and a total number of 30 schools out of 60 belonging to the four different clusters (SVS-numbers 5–8) of Vadodara city were covered.

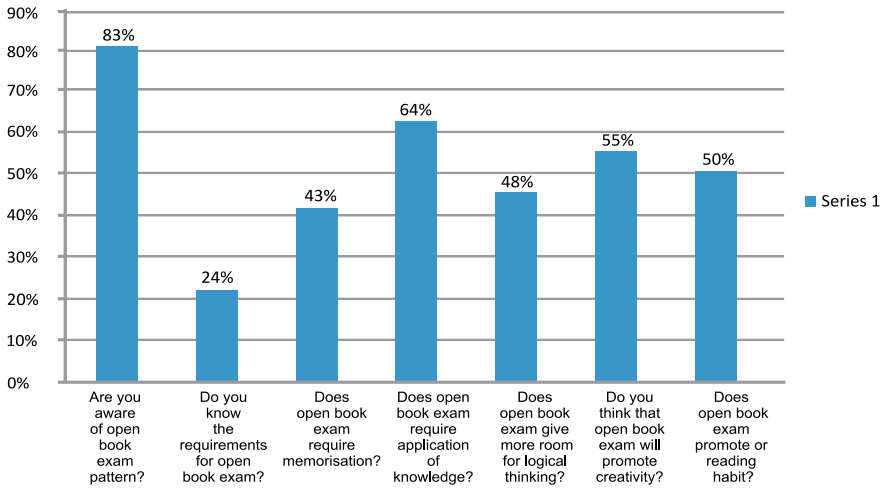


**Fig.1 (Ques. 1-7): To Study awareness of open book examination among teachers.**

A representative sample was thus selected by the process of stratified random sampling.

Different tools were prepared for data collection, namely questionnaire for school teachers; semi structured interview for school principals and government officials. The questionnaire comprised two sections. The first section dealt with study of awareness of Open Book Examination among school teachers while the second section dealt with study of barriers in the implementation of Open Book Examination.

The survey was conducted with 320 school teachers, 41 school principals and three officials from District Education Office Vadodara. There were a total of 364 respondents.

## Data Analysis and Interpretation

The first objective to study awareness about open book examination among schools teachers was analysed as follows–

The data analysis revealed that a majority of teachers were aware of the OBE pattern of examination (83%) and only very small percentages were not aware (11%). There were a significantly large group of respondents who highlighted the advantages of OBE— 64 per cent opined that it would enable application of knowledge; 48 per cent responded that OBE would give more room for logical thinking; 55 per cent opined that OBE would promote creativity and 50 per cent responded that OBE would promote serious reading habits. Significantly, 62 per cent responded that OBE would be less stressful than the traditional examinations; 43 per cent responded that OBE required memorisation of facts for application in unique situations.

Fifty one per cent teachers responded that OBE would indeed be a good option to assess core subjects like Social Studies, Science and Maths. Interestingly, there were a group of

**Table 1: Awareness of Open Book Examination among teachers**

| *Questions* | *Yes* | *No* | *Not Sure* |
|---|---|---|---|
| Is the Open Book Exam appropriate for language group English, Gujarati, Sanskrit or Hindi? | 34% | 49% | 17% |
| Is the Open Book Exam appropriate for core subjects Social Studies, Science or Maths? | 51% | 35% | 14% |
| Are you aware of the mode of assessment for Open Book Exam? | 15% | 68% | 17% |
| Do you think that Open Book Exams at school level are required to be supervised? | 60% | 30% | 10% |
| Are Open Book Exam less stressful than traditional pattern? | 62% | 20% | 18% |
| Are you trained for conducting Open Book Exam? | 08% | 87% | 05% |
| Have your students been exposed to Open Book Exam? | 18% | 73% | 09% |
| Is your school ready for Open Book Examination pattern? | 09% | 36% | 55% |
| Are you aware of schools of Vadodara city who implemented Open Book Exam on experimental basis? | 10% | 75% | 15% |

teachers who responded that they had been exposed to the OBE pattern (18%) and were aware of the mode of assessment for OBE (15%). There were a group of teachers who responded that they were aware of schools that had implemented OBE on experimental basis (10%).

The positive and encouraging fact that emerged from this was that looking to its potential benefits, an initiative towards the OBE had been taken by a very small percentage of schools.

The following table is an analysis of the barriers perceived to the implementation of OBE in schools, by the functionaries themselves:

Some of the barriers like emerged were that these exams would be more difficult to design (60%); OBE will be

**Table 2: Barriers to Implementation of Open Book Examination**

| *Sr. No* | *Questions* | *Yes* | *No* | *Not Sure* |
|---|---|---|---|---|
| 1 | Are Open Book Examinations more difficult to design? | 60% | 24% | 16% |
| 2 | Is thorough understanding of subject required to frame Open Book Exam questions? | 81% | 12% | 07% |
| 3 | Do Open Book Exams require students to critically study the material? | 70% | 16% | 14% |

| | | | | |
|---|---|---|---|---|
| 4 | Do you think that Open Book Exams will be more challenging for students? | 52% | 37% | 11% |
| 4.5 | Do you think students will take time to adapt to the system as they are not familiar with it? | 69% | 15% | 16% |
| 5 | Do you think Open Book Examination will not be suitable for average student? | 41% | 41% | 18% |
| 6 | Are Open Book Examinations more time consuming? | 68% | 18% | 14% |
| 7 | Do you think that the students will have to be oriented for Open Book Exam? | 80% | 09% | 11% |
| 8 | Do you think teachers will have to be trained to conduct Open Book Exams? | 79% | 11% | 10% |
| 9 | Would it be difficult for students to get admission in different States if they pass through Open Book Exams? | 40% | 18% | 42% |
| 10 | Is it a difficult task to introduce Open Book Examination system? | 43% | 31% | 26% |

more challenging for students (52%) ; students would take time to adjust with this system (69%); these exams would be more time-consuming (68%) and that teachers would have to undergo specific training to conduct OBE (79%). Interestingly, one barrier to implementation was that thorough understanding of subject would be required to design OBE (81%)! Also, 43per cent responded that it would be difficult to introduce OBE almost indicating a resistance to innovative practices!

**Interpretation of the Semi-structured Interview of School Principals**

A large percentage of school principals (51%) were of opinion that Open Book Examination could be implemented initially on small scale. The said pattern would develop creativity among students and require them to study differently; whereas 43 per cent of Principals were of the opinion that it would be difficult to implement Open Book Examination at school level and they found it a difficult proposition.

However, (56 per cent) of the principals were of the opinion that implementation of Open Book Examination could be a long-term vision. Majority of principals (69%) were of the opinion that there was a need to admit changes in the existing system of examination to be able to introduce the Open Book Examination.

Also, changes were necessary in terms of changed teaching methodologies, training of teaching staff, library updation, appropriate teacher student ratio, etc. (sixty three per cent) of principals were of the opinion that students too would need to be oriented to the requirements of Open Book Examinations namely careful and critical study of content, developing self-learning habits, etc.

Fifty six per cent Principals were of opinion that they themselves played an important role in the implementation of the Open Book Examination in terms of ensuring a renewed role of teachers as guides and facilitators over being mere instructors, ensuring change in teaching methods and designing the requisite assessment mechanisms, etc. (56 per cent) Principals were of opinion that necessary training from government authorities i.e. State Education Board, would be required to be organised for the meaningful and successful implementation of Open Book Examination, etc.

**Interpretation of Interview with Government Officials**

Government officials felt that students and teachers would find the initial exercise difficult having practised the traditional pattern of examinations for such a long time. Nature of Open Book Exam would be totally different and thus a number of changes would be required to be admitted prior to implementation of open book exams at school level. Teachers would be required to be trained; students also would be required to be oriented for the new pattern as they were never exposed to this format.

**Conclusion**

The study on awareness about Open Book Examination format revealed that a significantly large number of secondary school teachers were aware of the format. It was generally accepted by them that Open Book Examinations would create an enriched learning environment, offer students an opportunity to better understand and apply higher order skills. Also, students' learning could be enhanced by implementing the Open Book Examination format as implementation of the same would necessitate critical thinking, reasoning and application of knowledge. Students would accomplish more from the implementation of the Open Book Exam in comparison to the traditional one.

However, a shift from traditional exams to Open Book Exams would necessitate additional time so as to permit both teachers and students to get adjusted with the format. A definite discipline would be imposed on the teachers to set questions which cannot simply be answered by recall of information.

The results of this study indicate that the Open Book Examination could be a reasonable alternative or an addition to traditional assessment methods. Benefits of Open Book Exam could not be ruled out but at the same time to put this format into practice would be both time-consuming and difficult keeping in mind the orientation, preparation and training that would be required before finally implementing it. It could definitely be a long-term vision.

The study revealed that a very large number of teachers were aware of the OBE pattern of examination. The teacher responses showed that they were aware of the benefits of the OBE and some students may have been exposed to the OBE. However, a very small population of teachers responded positively when asked whether their schools were ready for implementing this pattern of examination.

Interestingly, the questionnaire to barriers to implementation revealed that the major barrier to implementation was that thorough understanding of subject was required to implement OBE! And, also that teachers would need to be trained to conduct examinations of this pattern. Some of the other serious barriers were students getting oriented and these exams being very time-consuming. The administrators and officials despite all the barriers thought it could be a significant initiative although, as of now, a long-term vision only.

*"Trying to devise a good and effective Open Book Examination can be a challenge that we must try to take up in our curricular efforts at all levels of school. This would require teachers and examination setters to emphasise the interpretation and application of learning over the arguments and facts that can be located in the book. There have been successful demonstrations that such examinations can be carried out on a large scale, and that teachers can themselves be trusted with moderating the results of such examinations. In this way, the assessment of projects and lab work can also be made credible and sound. It is important that after receiving their corrected papers, children rewrite the answers and that these are again reviewed by teachers to ensure that children have learnt and gained something out of the ordeal."* (NCF 2005 p-74)

In conclusion, it emerges that we must develop 'assessment literacy' amongst teachers and others responsible for teaching-learning in schools and educational institutions. Assessment must be used constructively to measure learning outcomes and subsequently raise standards.A shift in emphasis is needed and for this to happen there has to be a fundamental shift of emphasis both at the levels of policy and practice. Policy makers will have to take the initiative to implement the powerful insights emerging from educational research and thereby establish new and required standards. Practitioners would have to discard the conventional and clichéd and embrace innovative and essential trends.

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# Corporal Punishment and Discipline: What Teachers of Secondary Schools of Kolkata and Durgapur of West Bengal Speak

NABA K MONDAL*
SUNAYNA PRASAD**

**Abstract**

*Corporal punishment is often justified as a necessary mean to create classroom discipline. This paper provides the views of government and private school teachers regarding use and role of corporal punishment maintaining discipline. Results revealed that the classroom condition play vital role in causing indiscipline among students and teachers take the path of corporal punishment to maintain discipline. Corporal punishment is favoured and supported by majority of teachers for disciplinary status. Use of corporal punishment does not depend upon gender of the child. Home and society in which a child grows has immense effect on his indisciplined behaviour.*

## Introduction

Every day, in India as elsewhere in the world, children are beaten in their schools as a mean of discipline. Corporal punishment means to inflict punishment on the body. It is to beat, hit, spank, swat, pinch or cane a child with belts, hands, sticks or any other tool. Such violence may be a deliberate act of punishment or simply the impulsive reaction of an irritated teacher, parent, adult or even an older child. No matter what form the violence, however, it is always a violation of children's fundamental human rights (Amnesty International, 1998). Behavioural problems in schools generally are and have been an area of concern for teachers, educational authorities, policy makers and the general public

*Assistant Professor* in Environmental Science, The University of Burdwan, West Bengal-713104, India.
** *Student,* Department of Education, The University of Burdwan, West Bengal-713104, India

for as long as one can remember. In the classroom or in a learning situation or during a 'valued activity', the intended outcomes of teachers and learners may not be achieved if there is a lack of discipline from participants. Actions that are or can be linked to any anti-social behaviour, laziness or acts of violence, are always associated with lack of discipline. Even learners themselves in coming to the classroom with learning goals to achieve, expect their classmates to be well-disciplined or display behaviour that will not interrupt their own learning or that of their classmates. They should adhere to Wilson's view (1974) that discipline is a kind of 'moral compulsion' that one should submit to. Learners therefore need to subject themselves to discipline without which it would be difficult to engage themselves in any 'valued activity'. Instilling discipline in schools, teachers argue, is problematic. The topic of discipline without the use of corporal punishment in school is important, and needs to be addressed as a matter of urgency because of fast deteriorating situations with respect to behaviour. 'Today we have a culture of disrespect, defiance of authority, truancy and arrogance. Ill-discipline abounds and respect and morality have declined' (Sunday Times, 18 July 2004). Although the disciplinary matter can originate from various points of view. According to Robertson (1999), some children at schools can be disruptive because 'they have been subject to distorted or inadequate care throughout childhood due to a variety of family and economic difficulties'. It is because of that neglect that they are now demanding attention in the classroom. In addition, he says that school failures to identify the behavioural problems that may have their origin on home background are strongly associated. When children with similar problems are not doing well in their learning areas or subjects, they have a tendency to disrupt the attentive and concentrating learners. Again big numbers of learners that teachers have to deal with in one classroom are a 'daunting and intimidating prospect' (Fontana 1985). People who take

Interest in the education of children are aware of this problem. 'Teachers agree that once the class size rises above 35, it is impossible to maintain discipline, or even an acceptable low noise in the classroom' (Daily Dispatch, 16 June 2004). Keeping in mind the above problem the present work was formulated to know the views of secondary school teachers of few selected areas of Kolkata and Durgapur of West Bengal, regarding interdependence between corporal punishments and maintaining discipline among school children.

**Objectives of the Study**

- To find out the views of different categories of teachers like male and female teachers of government and Private school regarding role of classroom condition to cause indiscipline which lead to use of corporal punishment.
- To find out the views of different categories of teachers regarding maintenance of discipline through use of corporal punishment

- To find out the views of different category of teachers regarding use of corporal punishment to girls and boys students for their indiscipline behavior in school.
- To find out the views of different categories of teachers regarding the role of home and society in causing indiscipline among children that leads to corporal punishment.
- To find out the views of different categories of teachers regarding the impact of corporal punishment on children to maintain discipline in the school.

**Hypotheses**

**$H_1^0$** There is no difference in the views of government and private and male and female school teachers regarding the classroom conditions to play vital role in discipline maintenance through corporal punishment.

**$H_2^0$** There is no difference in the views of male and female teachers of government and private schools regarding the use of corporal punishment to maintain discipline.

**$H_3^0$** There is no difference in the views of male and female teachers of government and private school regarding views of corporal punishment to boys and girls students to maintain discipline.

**$H_4^0$** There is no difference in the views of male and female school teachers of government and private school regarding the role of home and society in children's indiscipline act which leads corporal punishment to them.

**$H_5^0$** There is no difference in the views of male and female school teachers of government and private school regarding the impact of corporal punishment to maintain discipline.

**Research Methodology**

Methodology refers to the choice and use of particular strategies and tools for data gathering and analysis. Some methodologies embrace both data gathering and analysis, such as content analysis, ethnography and semiotic analysis. Here methodology is presented under following sub-points:

**Population of the Study**

It comprises of few subject teachers both male and female working in some government or private school situated in urban areas of Kolkata and Durgapur where they usually come across situations that they indulge themselves in giving corporal punishment to the child to maintain discipline.

**Sample and Sampling Procedures**

There are 49 school teachers (government and private) from the above mentioned population selected randomly to collect their views regarding the topic mentioned. There are ten schools, five from government and another five from Privates situated in Kolkata and Durgapur area of Kolkata and Burdwan districts. Here purposive sampling technique is used. Sample description is given on the next page.

| *Category* | *Government Teachers* | *Private Teachers* | *Total* |
|---|---|---|---|
| Category I | 22 | 27 | 49 |
| | Male Teachers | Female Teachers | Total |
| Category II | 14 | 35 | 49 |

**Tools Used**

Self-made structured questionnaire was prepared considering five dimensions: 1. Classroom condition, 2.Corporal Punishment as a means of discipline maintenance 3. Use of corporal punishment to male and female child. 4. Role of home and society.5. Impact of corporal punishment on children. Every dimension comprise of five relevant questions having 5 categories of options to respond. Whole questionnaire was validated by expert teachers of this filed. As a whole, tool consist of 26 questions which were put before each respondent who were different subject teachers belonging to different schools, age and sex. So, these were total 26 questions belonging to five dimensions where each dimension consisted five relevant questions except dimension five which carried six questions. Respondent has to answer in five point scale which has options like:

SA Strongly Agree, A Agree, N Neutral, DA Disagree, SDA Strongly Disagree

**Scoring Procedure**

Scoring is done on the basis of responses made by different teachers on five point scale as per the values assigned to each category: Strongly Agree: 1, Agree: 2, Neutral: 3, Disagree: 4, Strongly Disagree: 5 and other category is Strongly Agree: 5, Agree: 4, Neutral: 3, Disagree: 2, Strongly Disagree: 1. There are some items which do not follow the normal trends of marking.

To measure views of different categories of teachers' Likert's method was used. In this method, a number of statements are developed related to the topic of study to measure the views of the respondent regarding above mentioned purpose. The respondent is asked to indicate the degree of agreement towards each item on a five point scale which are strongly agree, agree, neutral, disagree and strongly disagree.

**Statistical Technique Used**

All the collected data were statistically calculated on the basis of basic statistics (mean, standard deviation). Paired t-test was done for comparison between two groups (Male and female, government and private school teachers). Reliability of the tool (self-made questionnaire) was verified by Split-half method.

**Administration of the Tool and Data Collection**

Randomly chosen teachers of different subjects, gender, ages and types of school are served the structured

questionnnaire and given the time of one week to fill up their responses. After this, questionnaires were collected for data analysis and interpretation.

**Results And Discussions**

By considering dimension I, classroom conditions that deals with finding out how far classroom condition is responsible for indiscipline which leads to corporal punishment by teachers to maintain discipline in different schools, it has been found that there is no difference in views of teachers belonging to male and female, and government and private categories, all of them considered that improper school environment, unscientific building constructions, over crowdedness, poor student teacher relationship, improper method of teaching are responsible for causing indiscipline inside the classroom that make them to handle the children by using corporal punishment as results shows difference in views is non-significant at 5% level of significant (Table 1and 1A).

Although few teachers doesn't favour the above conditions fully. In the same time few teachers favour counseling and value education to develop sense of self-discipline.

In most of the private schools and in some government schools it has been found that building construction is not proper and thus not fit for smooth running of the classes and automatically give rise to indiscipline amongst children.

Again by considering dimension II, Discipline maintenance through punishment which intends to find out how far teacher lobby prefer to punish the child hard to keep the discipline of their school in line. It has been found that there is significant difference in views of male and female teachers belonging to different schools regarding this issue, as t-value is 2.066 that is significant ($p < 0.05$) but there is no difference in views of government and private teachers regarding this issue as t-value is 0.943 which is non-significant at 5 per cent level of significant and therefore this hypothesis is retained (Table 2 and 2A).

**Table 1 : Paired t-test Between the Views of Government and Private School Teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t value* | *Level of Significance* |
|---|---|---|---|---|---|
| Government | 27 | 5.889 | 1.528 | 1.197 | Non-significant at 0.05 level |
| Private | 22 | 5.318 | 1.810 | | |

**Table1 A : Paired t-test between the Views of Male and Female Teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t value* | *Level of Significance* |
|---|---|---|---|---|---|
| Male | 14 | 12.50 | 2.594 | 1.398 | Non-significant at 0.05 level |
| Female | 35 | 11.429 | 1.914 | | |

**Table 2 : Paired t-test Between the Views of Government and Private School Teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t value* | *Level of Significance* |
|---|---|---|---|---|---|
| Government | 27 | 4.074 | 1.859 | 0. 942 | Non-significant at 0.05 level |
| Private | 22 | 4.636 | 2.237 | | |

**Table 2 A : Paired t-test Between the Views of Male and Female Teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t value* | *Level of Significance* |
|---|---|---|---|---|---|
| Male | 14 | 14.43 | 1.834 | 2.066 | significant at 0.05 level |
| Female | 35 | 15.486 | 2. 525 | | |

Moreover, it has been assessed from the data that most of the teachers prefer punishment for maintaining discipline though they do not consider corporal punishment as only means to be used for this purpose. They prefer that in Indian context at times corporal punishment becomes necessary but very few number of students fall under the purview of corporal punishment. Some of the teachers responded for banning of Corporal Punishment to uplift the disciplinary status of schools. Baumarind et al. (2002) argued that the negative effects of corporal punishment are only associated with the harsh, punitive discipline, which is acknowledged by all experts to be detrimental to children's well- being and ethically unacceptable.

By considering dimension 3, Gender based Discipline maintenance which deals with finding out whether female child is punished more than a male child and how hard punishment is given to male child in comparison to the female child, whether girls are more disciplined than boys etc. there is no difference in the views of male and female teachers but significant

**Table 3 : Paired t-test Between the Views of Government and Private School Teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t-value* | *Level of Significance* |
|---|---|---|---|---|---|
| Government | 27 | 3.556 | 2.423 | 4.207 | Significant at 0.01 level |
| Private | 22 | 5.682 | 2. 571 | | |

**Table 3 A : Paired t-test Between the Views of Male and Female Teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t-value* | *Level of Significance* |
|---|---|---|---|---|---|
| Male | 14 | 14.643 | 3.522 | 0.276 | Non significant at 0.05 level |
| Female | 35 | 14.943 | 3.199 | | |

different (p <0.01) was notd between government and private school teachers (Tables 3 and 3A).

So it is evident that neither extent of indiscipline is gender based nor the type of punishment is gender based, though it has been found that beating or emotional attack is preferred by most of the teacher for the female child and beating hard or suspension is preferred in case of male child. Accordingly it can be said that teachers have the opinion that indiscipline among the children does not depend upon the gender of the child though punishment may vary from gender-to-gender and extent of indiscipline.

By considering 4 dimension, role of Home and Society which deals with finding out how far home and society of a child is responsible for the developing indiscipline among children that eventually result into corporal punishment at home as well as in school to them by their parents and teachers. It has been found that there is no difference in views of male and female teachers and government and private school teachers regarding this issue as t-value in both pairs are 0.483 and0.296 respectively which is non-significant at 5 per cent level (Table 4 and 4A) of significance.

Teachers hold the view that the family background, economic status and technological developments, surrounding environment of the child have immense effect on child's behaviour and discipline. Although few teachers think that it should not be sole reason for indiscipline. It has been also found that some parents support use of corporal punishment by teachers to bring them in track and few teachers strongly disagree with the condition that they should solely render the responsibility of making a child disciplined. A qualitative study according to Russell (1996) of the views of New Zealand parents and parent-educators provides a graphic example of how family discipline can affect parent–child relationships. The study quotes a mother who made a conscious decision never to smack her own children: My parents were very strict. I assumed everyone was being brought up the same. You will do as you're told and you won't question. My mother would use the wooden spoon;

**Table 4 : Paired t-test Between the Views of Government and Private School Teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t-value* | *Level of Significance* |
|---|---|---|---|---|---|
| Government | 27 | 5.889 | 2.207 | 0.296 | Non-significant at 0.05 level |
| Private | 22 | 6.045 | 1.463 | | |

**Table 4 A : Paired t-test Between the Views of Male and Female teachers**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t-value* | *Level of Significance* |
|---|---|---|---|---|---|
| Male | 14 | 12.143 | 2.033 | 0.482 | Non-significant at 0.05 level |
| Female | 35 | 12.457 | 2.119 | | |

my father was more into bare hands. There were other things: go to your room, miss out on something. If you were naughty, they almost took it as a personal affront; they just seemed so offended by it, like you were insulting them. I was basically very good and I was hit frequently. I'm sure through being smacked it made me do so silly things without thinking. It made me go out and do the same thing again, what I'd been smacked for. The message I got from them when they hit me was not "what you're doing is bad, don't do it again". The message I got was "we don't love you". (Russell 1996:69)

punishment work as an effective means in discipline maintenance, it has been found that there is no difference in views of male and female teachers and government and private school teachers regarding this issue as t-value of each pairs are 1.228 and 0.7384 respectively which are non significant at 5 per cent level (Table 5 and5A) l.

Teachers can consider the corporal punishment if it is necessary to uplift the disciplinary status of a school and it should be made the means for discipline maintenance but norms, rules and limits should be set by law

**Table 5 : Paired t-test Between the Views of Government and Private School Teachers.**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t-value* | *Level of Significance* |
|---|---|---|---|---|---|
| Government | 27 | 4.815 | 2.237 | 0.738 | Non significant at 0.05 level |
| Private | 22 | 5.318 | 2.476 | | |

**Table 5 A : Paired t-test Between the Views of Male and Female Teachers.**

| *Types of Samples* | *No. of Samples* | *Mean* | *Standard Deviation* | *t-value* | *Level of Significance* |
|---|---|---|---|---|---|
| Male | 14 | 18.643 | 2.305 | 1.228 | Non significant at 0.05 level |
| Female | 35 | 17.657 | 3.038 | | |

So home and society of a child play an important role for child's disciplined behaviour as child spends six to seven hours in school and rest of the hours at home or society. Therefore, teacher should not be blamed for not performing the duties of inculcating the discipline amongst the children.

By considering dimension 5 which deals with the impact of corporal punishment on discipline which deals with finding out that how far corporal

and jurisdiction so that teachers as well as student remain safe, though few teachers believe that it has a negative impact and behavioural change cannot be brought by use of corporal punishment. They are not in favour of making corporal punishment as means of discipline. In different school in Indian context. " Save the children" survey of children in South Africa found that regular beating resulted in a loss of interest in studies and a

dropout in academics performance. A statistical study of public education in Alabama found a correlation linking corporal punishment in schools to dropout rates.

**Major Findings**

Teachers consider that the classroom condition plays a vital role in causing indiscipline among students and teachers take the path of corporal punishment to maintain discipline.

Forms of discipline such as corporal punishment and verbal and non-verbal abuse of children, continue to feature in many schools, and are used to humiliate children in front of their peers. Yet many teachers and ever parents still believe that such punishment is important, unaware of the immediate and long-term detrimental effects of these practices. It is important for teachers to reflect on the rationale that underlies the rules and conventions that govern schools, and whether these are consistent with our aims of education. For instance, rules such as the length of socks and the whiteness of sports shoes are of no educationally defensible importance. Rules regarding maintaining silence in classrooms, answering 'one at a time' and answering only if you know the right answer, can undermine the values of equality and equal opportunity. Such rules may also discourage processes that are integral to children's learning, the development of a sense of community among peers, though they may make the class 'easy to manage' for the teacher and facilitate 'covering the syllabus.' (NCF-2005: 87).

Corporal punishment is favoured and supported by majority of teachers for disciplinary status. Use of corporal punishment does not depend upon gender of the child as intensity of indiscipline among both genders is almost same.

Home and society in which a child grows has an immense effect on his indiscipline behaviour. Corporal punishment is necessary to uplift and to keep up the disciplinary status of the school in indian context and at the same time some norms should be fixed.

**Educational Implication**

In indian context, corporal punishment is one of the most frequently used means to maintain discipline in schools. Although most of the teachers are not in favour of using it, they usually come across such situation where they are compelled to use it. In this study so many reasons are found significant and favorable for encouraging corporal punishment. Most of these factors or reasons can be controlled if proper attention could be given and government as well as society should take the responsibility to rationalise this issue. Significance of corporal punishment for uplifting disciplinary status of a school is also highlighted. This study will help in doing further research at broader level to make it more useful.

**Suggestion for Further Study**

Present status regarding corporal punishment in the secondary schools of West Bengal is that it is totally banned by law and no teacher is supposed

to use any physical or psychological punishment to the child. But from the present study it has come up that teachers prefer to retain this. So from this study it can be recommended that there should be not corporal punishment in true sense instead we need to have pedagogy suited to the learning needs of children which keep them engaged and inculcate among them self- discipline. Although it was also felt that some kind of punishment is required to improve social-personal behaviour of students but this view points out lack of exposure of teachers to emerging curricular vision which keeps child at the centre of learning activities with challenging engagements which help the child in developing self-discipline. Moreover the study results also revealed that reliability is too low, therefore for further study restructuring of questionnaire should be necessary.

**Delimitation of the Study**

It is not possible to undertake the research on all areas of the problem in view of time and resources. To come up at a valuable decision, detailed and comprehensive study is necessary. To delimit the area of the problem for convenience work has been confined to following areas:

- Study is confined to secondary school only;
- It is confined to the role of corporal punishment in the area of discipline;
- It is confined in government and private schools situated in urban areas;
- It is confined to the study of teachers view only regarding the issue of using corporal punishment in school.

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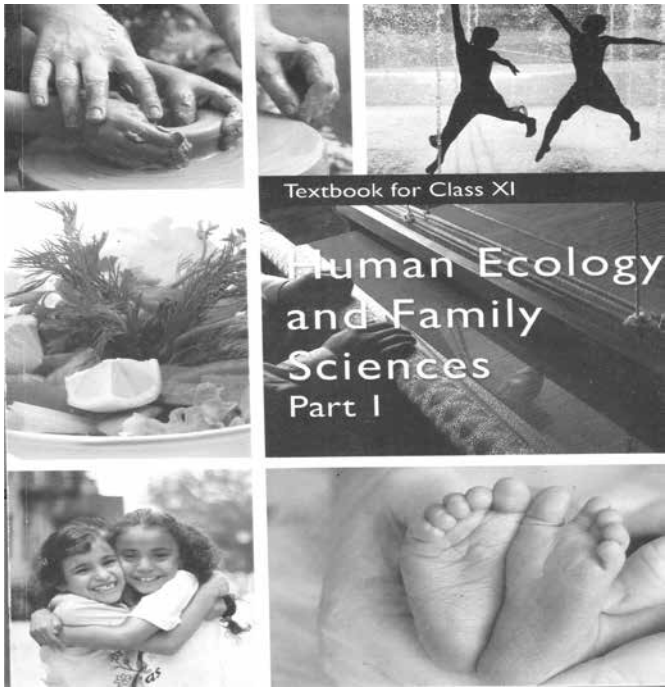
**REPORTAGE**

# Human Ecology and Family Sciences: NCERT's Initiative towards an Innovative Curriculum–A Brief Report

SUSHMA JAIRETH*




## Introduction

Human Ecology and Family Sciences (HEFS) will certainly be remembered as an innovative curriculum by NCERT for its initiative in recasting the subject of Home-Science in modern and contemporary perspectives.

Home Science as a discipline has always had the distinction of having gender bias and gender stereotyping. The

**Professor*, Department of Women's Studies, NCERT, New Delhi-110016.

conventionally defined subject of Home Science lacked the so called women's perspective in its very title, content and methodology. "Home-Science syndrome" as mentioned by Hansa Mehta in her report of the committee on Differentiation of Curricula between Boys and Girls (1962-64) says it all.

*In the democratic and socialistic pattern of society which we visualise,*


Nature Walk


Painting

*education will be related to capacities, aptitudes and interest which are not strictly related to sex. There would, therefore, be no need in such a society to differentiate curricula on the basis of sex. In the transitional phase in which we are at present certain psychological difference between men and women as well as certain divisions of social functions based on them will have to be accepted as a matter of fact and as a practical basis for building up the curricula for boys and girls. While doing so, however, care should be taken to see that values and attitudes which are essential in the long run are increasingly built up in men and women and that no step is taken which will tend to perpetuate or intensify the existing differences* (Hansa Mehta Committee report 1962-64).

As a discipline the subject of Home Science needed a facelift which was long overdue due to the concerns of professional outlook, gender identity and gender dignity. These concerns have been very effectively taken up in the position paper of Focus Group on Gender Issues in education (2006). NCERT as an apex body took the responsibility of reflecting the radical change in this discipline of Home Science for creating a new system of knowledge as has been done in other subjects. The curriculum of Human Ecology and Family Sciences, formerly known as Home Science, has been reframed adhering to the principles and guidelines of National Curriculum Framework-2005. The new nomenclature is based on the uniqueness and professionalism of the course, one that reflects gender equality and would attract both boys and girls towards the discipline. The curriculum of Human Ecology and Family Sciences has attempted to break away from the conventional framework of the discipline of Home Science in significant ways. In the new conceptualisation the

boundaries between different areas of the subject have been dissolved. This has been done to enable students to develop a holistic understanding of life in the home and society.

A special effort has been made in making the curriculum appropriate for both boys and girls, living in different contexts, including those who are homeless. It has been ensured that all the units address, in their content, the significant principles of equity, equality and inclusiveness. Sensitivity, understanding and critical analysis of issues of gender, diversity, plurality, inclusiveness, sociocultural heritage and indigenous knowledge as they impinge on quality of life of individuals and families have been interwoven through the entire course. The novel approach has made concerted efforts to integrate learning at school by building bridges with other subjects in the sciences and social sciences. The academic input in the new curriculum adequately reflects the interdisciplinary bridges and linkages with a strong component of vocationalisation as highlighted in the position paper of Focus Group on Work Education (2007).

AutoCAD Drawing of Kitchen

AutoCAD Drawing of Living Room

AutoCAD Drawing of Master Bedroom

**Significant Innovations**

The following innovations get reflected in the curriculum:

Developing entrepreneurial skills

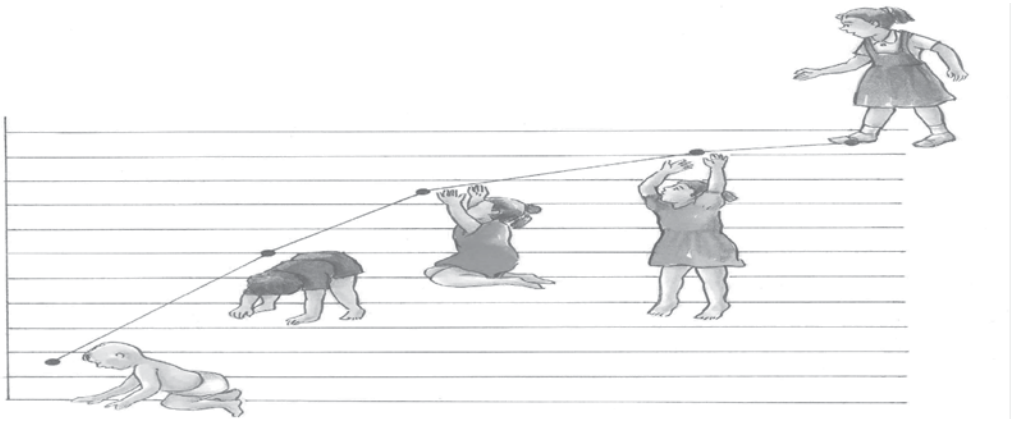
- The syllabus has been planned in a holistic fashion and not in the form of the existing areas of specialisation in Home Science,

namely, Food Science and Nutrition; Human Development/ Child Development; Textile Science and Apparel Designing; Extension, Education and Communication; and Resource Management and Consumer Science.

- The course has been evolved from the standpoint of the individual self, the adolescent, which would strengthen students' identification with the course. With the aim to enhance quality of life of individuals and families, the course has been focused on self in family in the micro context and society in the macro context.
- A two-fold perspective has been incorporated–one focusing on the life stages (childhood, adolescence and adulthood) and the other focusing on the developing self in context of family and society. The students, both boys and girls, would thus be able to get a retrospective as well as a prospective understanding of human development in context.

In view of the above, therefore, two papers for classes XI and XII respectively have been conceptualised.

- Paper I for Class XI focuses on self and family, which will enable students to understand development during childhood, adolescence and adulthood. The needs, challenges and concerns of each stage of development have been addressed along with the activities and resources necessary to enhance one's own and family's quality of life. The 'self and family' and the 'home' are focal points for understanding the dynamics of individual lives and social interaction. The rationale for using this approach will enable the adolescent student to understand herself/himself in the context of the family, which in turn is nested within the wider indian socio cultural milieu.
- The different units in Class XI textbook have been structured



AutoCAD Drawing of Master Bedroom

Skills for Social Sensitivity

along the life stages–childhood, adolescence and adulthood. Relevant elements from each area of specialisation (of Home Science) pertaining to 'self' and 'other' have been interwoven in each unit in the form of needs, challenges, concerns and resources.

- Paper II for Class XII focuses on the larger social context and encompasses issues of career and social and public responsibility as well as rights. This has strengthened the professional character of the course and enhanced its relevance to students' needs during their life stage. The needs, strengths and challenges of this phase of life have been addressed along with mechanisms to access resources with the ultimate goal to improve quality of life.
- The emphasis for class XII is on 'work and careers' through the

Craft of *kantha* Embroidery

life-span. The textbook has taken a holistic approach to address the pertinent issues related to work, employment and careers, keeping quality of life in perspective, individually and collectively. In this context, work is perceived as essential human activity that contributes to the development and sustenance of individuals, families and society. Its value is not linked only to its economic ramifications. The student will be helped to explore the significance of work, jobs and careers and their interrelationship. To understand this concept, the student will be imparted life skills and work skills in the respective areas of HEFS. This will facilitate the acquisition of basic skills and orientation

to advanced professional skills needed for specialisation in the selected fields discussed in the course. It is significant that these skills will be useful for the student in her/his personal—social life, as well as serve as a springboard for pursuing a career in the future.

- The practicals have an innovative and contemporary character and reflect the utilisation of new technology and applications that would strengthen critical engagement with the lived realities of people. The practicals have been designed to enable learners to gain insights and also have a bird's eye view of the tasks and challenges inherent in the various professional careers and avenues. Considerable emphasis is laid on 'construction of knowledge' through field exposure and first-hand experiences. The exercises and projects would help to encourage critical thinking, develop analytical and writing skills and eventually inculcate the 'passion to learn'. Many insights and 'seeds' of information have been 'sown'.

Warli Painting of Maharashtra

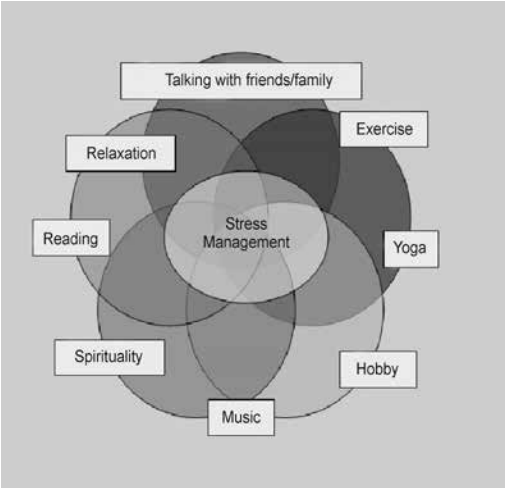
Puppetry Craft

- The first unit /chapter is focused on life skills for livelihood, attitudes to work, work challenges, creativity, performance and productivity, social responsibility and volunteerism. The other chapters/units describe the five salient domains of HEFS. Within each domain, there are several fields that offer ample professional opportunities and occupational avenues. The syllabus and textbook attempt to bring to focus the scope and significance of each domain in the present day scenario, with inputs on knowledge and skills to be acquired and honed in order to be a professional.

The possibilities of teaching and research careers is ever present at

Apparel Designs for adolescents

all levels of education, be it at school or college or university. To the professionals in the specialisation of Food and Nutrition, the spectrum of opportunities is wide ranging from the service sector as dietitians, health care consultants/counselors to the food industry, in catering and food service management/institutional management, in accordance with the thrust of their educational inputs and acquired interests, skills and competencies. For professionals in Human Development and Family Studies, job opportunities range from being at several cadres of functionaries in social development organisations for children, adolescents, women and families, in early childhood care and education programmes to being professionals in counseling settings at various levels and age groups. Those trained in Fabric and Apparel find their future careers in textile design, textile or fashion or garment industry, and entrepreneurship.




Simple Techniques to Cope with Stress

**Conclusion**

Overall, various techniques of pedagogy in pursuing the course make a part and parcel of the new curriculum. Students and teachers in partnership can explore, think about, discover and discuss a variety of topics and issues. Further learning is encouraged

through selected exercises and review questions at the end of each unit. Some of the issues of current concern that have been addressed could not only be thought-provoking, but also foster sensitivity and social responsibility in the users of the textbooks of HEFS. Exercises in understanding region-specific opportunities and available resources have been included to encourage students to understand, appraise and appreciate their own socio cultural ethos and locales.

This deliberate departure from the earlier convention is to dispel the misconception about the discipline being limited in focus and scope to domestic science and art and craft. It is also to create an interest in the field for its varied, multidisciplinary strengths, both in terms of quality education and potential for professional avenues.

Conscious effort has been made to move away from stereotyped gender roles thus making the experiences more inclusive and meaningful for both boys and girls.

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# Book Review

## Vulnerable India: A Geographical Study of Disasters

**Author :** Anu Kapur

**Publisher :** Sage Publications

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**Price :** ₹850

Environmental hazards have created crisis of varying dimensions and magnitude ranging from damages of local and regional levels to destruction of national and international levels through time.

The book Vulnerable India: A Geographical Study of Disasters authored by Anu Kapur, draws the attention of students of geography as well as layperson. This book runs into over 269 total pages organized into three sections, i.e. Fact, Response and Reality. There are in total eight chapters in the book.

In the first section, data from 1977 to 2002 are analysed as to how India is affected by 16 geophysical disasters like snowfall, cold wave, etc. The first chapter introduces the word disasterscape which is coined by the author herself. A disasters cape is described as a place where human life is lost or damaged, relationships ripped and livelihoods disrupted. In the book, several case studies have been supported by figures, illustrations and maps. In this section author makes a bold attempt to record the inadequacies in the system that has not only propelled natural disasters but has made several human-induced disasters to look 'natural'. No wonder, for a corrupt leadership, indifferent bureaucracy and a complacent civil society each disaster opens a fresh opportunity for appropriating generous relief supplies. It may not be an over statement that 'disaster' has indeed become an industry with its well-entrenched stakeholders at all levels. Presenting a national level enquiry, the three sections of the book called the Fact, Response, and Reality, spell a convincing argument for why disasters recur so frequently in India. She presents rich empirical data in support of her intensive research on disasters.

The second part deals with how people react to such happenings. Here the matter is not at all geographical but metaphysical. The author investigates the questions like what is purpose of life? Who created this world and why? Is there a God? How can disasters thrive in His domain when He is said to be benevolent and kind? But the question arises for the author, why not to take Him justified?

She goes over the entire Indian belief about how the universe originated and evolved, in addition to the concepts of Brahman, Sansara, Prakriti and Purusa. Then she focuses on the doctrine of Karma and the religio-cosmic causes for disaster. Nor does she discard traditional systems of forecast disasters. Many such beliefs, like forecasting drought by signs of divination such as jackals howling in the evening are enumerated in detail.

To provide a historical understanding of India's continued failure to adequately contained damage to life and property, the book unravels the perceptions of disasters in traditional, colonial and modern India. With the aid of exhaustive research, comparative statistical analyses and illustrative maps, it provides incisive insight into 16 different geophysical disasters across 593 districts of the country.

Disasters described in the book like floods, cyclones, hailstorms, cloudburst, heat and cold waves, snow avalanches, drought, sea erosion, thunder and lightning, landslide and mudflow, earthquakes, dam failures and dam bursts, mine fires, chemical and industrial accidents, fires, oil spills, major building collapses, bomb blasts, air, road and rail accidents, boat capsizes, biological disasters, epidemics, pest attacks, cattle epidemic and food poisoning have been taken into consideration. She has given details of geophysical and human-made disaster but perhaps she forgot to mention that in a country of about 121 crore populations where religious rituals are performed with utmost fervour, but often suffers from one disaster which is the most catastrophic in nature, i.e Stampede. It is often affected by geographical, social, political and economic negligence. Here also marginalised people especially children and women suffer more often.

In this section in chapter six titled Globalisation 1990 Onwards: Recognition Not Realisation on page 191 under the heading In A Curriculum she writes The National Council of Educational Research and Training (NCERT) was not to be left behind. It included disaster management in its syllabus in 2005, It would have been better if author would have mentioned the syllabus in which it has been included. The fact is that Disaster management has been included in Geography syllabus as a sub-topic under Natural Hazards and Disasters at higher secondary stage. Visuals and Case studies have been used in the Geography textbooks at all stages to sensitize students and teachers both towards the catastrophe of the disasters. The third and last section of the book, Reality, poses some uncomfortable questions: why is it that the disadvantaged people are the most vulnerable, be they female illiterates, marginal workers, agricultural labourers or scheduled caste/tribe population?

What stands out starkly is the disaster divide, be it between the developed nations and the underdeveloped ones, or between workers and owners of industry. Those who are least equipped to cope with a disaster are the most affected. Author shows forcefully that it is not 'nature'

but human resilience that dictates who are picked to be killed. It is condition of living which makes people vulnerable. They do not just die; they are 'killed' by the apathy of an insensitive India. She has raised this question that there is no single organisation engaged in the task of compiling a record of those killed and affected in a disaster. The bureaucracy, and even the relief agencies and media, treat each of these as an isolated event.

The book argues in support of an approach that positions socio economic vulnerability against the vagaries of natural disasters. Though slow paced in presenting a rather gloomy scenario, the book covers fresh ground for interdisciplinary studies to ascertain the hidden causes behind the recurrence of natural disasters in our country. The book shows that the rigour of academic work can pave the foundations for practical action to be taken by policy makers and decision-makers.

The book is written in a lucid language and supported with relevant case studies with perspective of intensity of disasters and success and failure of the efforts to mitigate the problem. Bibliography and some valuable appendices are included at the end of this book. Aesthetically designed and well printed, Vulnerable India is worth its price.

This book is good for students of geography, environmental studies, disaster management and for general readers. The author deserves compliments for this valuable work and drawing the attention of the Indian geographers' community to such a pertinent area of research.

**Aparna Pandey**
*Assistant Professor* of Geography
Department of Education in Social Sciences and Humanities
National Council of Educational Research and Training
New Delhi-110016