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NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

CONTENTS

EDITOR'S NOTE

Our country is celebrating year 2012 as National Mathematics Year. It is celebrated as a tribute to the genius mathematician Srinivas Ramanujan who was born on 22 December 1887 and whose 125th birthday was on 22 December 2012.

Mathematics education in India compulsorily starts from class I in schools. In this context, the position paper of the National Focus Group on Teaching of Mathematics (NCERT, 2006) clearly states, "Universalisation of schooling has important implications for mathematics curriculum. Mathematics being a compulsory subject of study, access to quality mathematics education is every child's right. We want mathematics education that is affordable to every child, and at the same time, enjoyable." Presently, in the area of mathematics teaching-learning, the emphasis is on the mathematisation of the child's thinking. In the words of David Wheeler, it is "more useful to know how to mathematise than to know lot of mathematics" (NFG on Teaching of Mathematics, NCERT, 2006). Translation of this perspective into implementation has been taking place gradually.

Celebration of National Mathematics Year may work as a catalyst for the efforts of various organisations, institutions and individuals in the area of mathematics teaching-learning.

This volume of JIE also joins the whole country in the celebration of 2012 as Mathematics Year and presents three contemporary writings contributed by individual authors and institutions. The opening research article written by Kaushal Kumar Bhagat presents findings of his study on the "Barriers and Challenges Teachers Face with Integrating ICT in Mathematics Teaching". The position paper of the National Focus Group on Teaching of Mathematics discusses the present scenario of mathematics teaching in school education and recommends various improvements in mathematics teaching so that every child can enjoy mathematics learning.

As a follow up of the *National Curriculum Framework-2005* (NCF-2005) and the *National Curriculum Framework for Teacher Education 2009* which was brought out by the National Council of Teacher Education incorporating NCF-2005 perspectives on the reforms in teacher education, the NCERT has reformulated its two-year pre-service teacher education course offered in its four Regional Institutes of Education at Ajmer, Bhopal, Bhubaneswar and Mysore. Further, the

Council also decided to initially bring out B.Ed. textbooks to provide appropriate study material to students pursuing their Secondary Teacher Education course. In this series, the NCERT has recently published a textbook on 'Pedagogy of Mathematics'. A chapter on 'Learning Resources in Mathematics' drawn from this book is reproduced here to provide our readers a vision of learning resources that can be used in mathematics teaching-learning to make it interesting and easy to comprehend for all children.

This volume also includes articles and research papers reflecting upon other concerns and issues such as Girl's Education contributed by Savita Kaushal; Inclusive Education contributed by Ajay Kumar Das; Teacher Eligibility Test by Ajay Prakash Tiwari and Sujata Raghuvansh and Emotional Turbulance in Adolescents written by Ranjana Bhatia; Meenakshi Singh presents details about a short term course being introduced in Banaras Hindu University on Personal Development and Soft Skills for students and teachers. Gursharan Kaur Joneja highlights the contribution of NCERT in the area of Guidance and Counselling over the last fifty years.

The findings of a research study conducted by Mudasir Basu revealed a significant difference between effective and ineffective educational administrators on various dimensions of job activity. The present issue also contains review done by Astha Saxena of a book entitled *Philosophy and Sociology of Science: An Introduction* written by Stewart Richards.

We convey our good wishes for National Mathematics year 2012 to all who are concerned with the education of children in our country. On this occasion we also remember contributions of our great Indian mathematicians over hundreds of years to nurture knowledge related to mathematics as a discipline.

Last but not the least, we want our readers and contributors, especially teachers to make efforts to create such an environment which helps develop our children to see mathematics as something to talk about, to communicate through, to discuss among themselves so that they learn to enjoy mathematics rather than fear it.

Academic Editor

Barriers and Challenges Teachers Face with Integrating ICT in Mathematics Teaching

Kaushal Kumar Bhagat*

Abstract

The purpose of this study is to explore the barriers preventing the integration and adoption of Information and Communication Technology (ICT) in teaching mathematics. The data were collected by means of questionnaires from secondary school mathematics teachers of Bhubaneswar. Major barriers were identified: lack of time in the school schedule for projects involving ICT, insufficient teacher training opportunities for ICT projects, inadequate technical support for these projects, lack of knowledge about ways to integrate ICT to enhance the curriculum, difficulty in integrating and using different ICT tools in a single lesson, and unavailability of resources at home for the students to access the necessary educational materials. To overcome some of these barriers, this paper proposes an e-portal which is a collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics. Based on these findings, I propose the use of several strategies that should enhance successful ICT integration.

Introduction

Information and Communication Technology (ICT) has changed our daily activities in many ways. One of the goals for integrating ICT in education is to enhance teaching and learning practices, thereby improving quality of education (Higgins, 2003). However, in most developing countries like India, the potential of ICT to support pedagogy is yet to be fully realised. Since these changes are more evident among younger members of our society and considering that ICT plays an increasingly important role in society, especially if we take into account social, economic and cultural role of computers and the Internet, it is clear that the time has come for the actual entry of ICT in the field of education. The combination of ICT and the Internet certainly opens many

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opportunities not only for creativity and innovation, but also for carrying the teaching material to current generation of students. Researchers argued that with the introduction of technology, it is possible to de-emphasise algorithmic skills; and the resulting void may be filled by an increased emphasis on the development of mathematical concepts. Technology saves time and gives students access to powerful new ways to explore concepts at a depth that has not been possible in the past. ICT enhances efficiency of mathematical thought, enables learners to make conjectures, and immediately test them in non-threatening environment (Laborde, 2001). Abramovich's (1999) use of spreadsheets in generalising Pythagorean Theorem demonstrates how computers may be used to learn concepts in geometry and algebra. Meanwhile researchers (Balacheff and Kaput, 1996; Kilpatrick and Davis, 1993) have discussed the impact of technological forces on learning and teaching mathematics. Internet is increasingly being used to enhance collaborative and interactive learning (Cazes, Gueudet, Hersant and Vandebrouck, 2006; Cress and Kimmerle, 2008; Resta and Rafferriere, 2007) also (Lavy and Leron, 2004). As the study and practice of facilitating learning and improving performance (Januszewski and Molenda, 2008), the field of educational technology attempts to overcome challenges by developing new approaches and frameworks. In this context, Information and Communication Technologies (ICTs)

represent a new approach for enhancing the dissemination of information and helping to meet these challenges. For a successful integration of ICT into the mathematics curriculum, it is essential to have knowledge of the existing software that is used by mathematics teachers. A survey carried out by Forgasz and Prince (2002) found that 61 per cent of the respondents (teachers) used spreadsheets, 45 per cent used word processing and 30 per cent used Internet browsers. In a separate study, Jones (2004) found that seven barriers existed while integrating ICT into lessons. These barriers were (i) lack of confidence among teachers during integration(21.2 per cent responses), (ii) lack of access to resources (20.8 per cent), (iii) lack of time for integration(16.4 per cent), (iv) lack of effective training (15.0 per cent), (v) facing technical problems while the software is in use (13.3 per cent), (vi) lack of personal access during lesson preparation (4.9 per cent) and (vii) the age of the teachers (1.8 per cent).

Methodology

This research deployed a survey method to investigate the barriers of integrating ICT into the teaching of mathematics. A total of 50 responses were received and they were analysed using the SPSS statistical package. A questionnaire was adapted from the Teacher Technology Survey by the American Institute for Research (AIR, 1998). The questionnaire was divided into five areas, i.e., (A) the teacher's profile, (B) how teachers use ICT, (C) the teacher's ICT experience, (D) the barriers faced by teachers and (E) the proposed solution.

Results and Discussions

ICT Applications in General

In general, a total of 74.3% of the respondents used computers on a regular basis. Table 1 depicts the percentage of usage by teachers in the various ICT applications: word processing packages (76.8%), spreadsheets (50.3%), Internet activity (67.2%), search engines (56.5%) and multimedia (11.2%). These percentages show that the computer literacy rate among secondary school mathematics teachers has been high.

8.6 per cent used it in discussion forums and 4.5 per cent for other purposes. 6.9 per cent respondents did not use the Internet.

Professional Development and Training Needs

A total of 40.3 per cent respondents indicated that they had received ICT training. 60.2 per cent of the respondents demonstrated that they had found the training to be generally useful while 64.9 per cent said that they had not received training on how to integrate ICT

Table 1: Common ICT Applications by Teachers

NA – Not Available; NR – No Response

Application	Daily (%)	Weekly (%)	Monthly (%)	1 or 2 times a year (%)	Never (%)	NA (%)	NR (%)
Computers in general	22.3	25.2	26.8	12.5	6.2	4.2	2.8
Word processing packages	20.4	26.3	30.1	13.6	5.8	1.3	2.5
Spreadsheets	9.6	15.4	25.3	22.5	6.3	12.5	8.4
Any Internet activity	20.8	22.5	23.9	28.6	1.2	1.3	1.7
Search engines for Internet	14.4	19.8	22.3	26.9	11.5	3.6	1.5
Multimedia	2.5	3.6	5.1	15.8	40.1	19.5	13.4

Uses of Internet

The Internet was used for various purposes. 65.5 per cent respondents

into mathematics teaching. According to 46.3 per cent of the respondents, mathematics teachers require training

Table 2: Use of Internet by Teachers

Activity	Browsing	e-mail	IRC	Discussion forums	Chat rooms	Others	None
Response (%)	65.5	42.3	5.5	8.6	6.3	4.5	6.9

used it for browsing, 42.3 per cent used the e-mail facility, 5.5 per cent used IRC (Internet Relay Chat), 6.3 per cent used chat rooms, and

Table 3: ICT Training Needs

ICT training needs	General use	Integrate ICT into teaching	Use of Internet	Combination of needs
Response (%)	10.1	64.9	5.5	59.5

on how to integrate ICT into their teaching, while 59.5 per cent of them stated that they needed a combination of various types of training.

Barriers faced by Teachers During Integration

The six major barriers identified were lack of time in the school schedule for projects involving ICT (50.3 per cent), lack of knowledge about ways to integrate ICT to enhance the curriculum (49.5 per cent), lack of adequate technical support for ICT projects (41.9 per cent), inadequate teacher training opportunities for ICT projects (41.2 per cent), integrating and using different ICT tools in a single lesson (34.8 per cent) and the absence of access to the necessary technology at the homes of students (31.0 per cent).

Perception of Mathematics Teachers Toward the Proposed Solution

There is a very strong positive response to the proposed solution to develop a mathematics portal for teaching mathematics, which is a collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics. 70.2 per cent

Table 4: Barriers Faced by Teachers

Barriers	% Response as		
	not a barrier	minor	major
Not enough teacher training opportunities for ICT projects	18.7	40.1	41.2
Lack of knowledge about ways to integrate ICT to enhance curriculum	10.2	40.3	49.5
ICT integration is not a school priority	31.4	45.2	23.4
Students do not have access to the necessary technology at home	22.8	46.2	31.0
Teachers do not have access to the necessary technology at home	24.9	55.2	19.9
Integrating and using different ICT tools in a single lesson	16.5	48.7	34.8

Table 5: Perceptions towards the proposed solution

	% response as very useful and helpful	% response as useful and helpful	% response as not so useful and helpful	% response as not at all
Proposed solution to develop a mathematics portal for teaching	70.2	27.3	2.5	0

of the respondents considered it to be very useful and helpful and 27.3 per cent viewed it as useful and helpful. Only 2.5 per cent of the respondents considered that the portal would not be very useful and helpful.

Findings

From this study, the following findings were found:

1. The most popular application packages used by mathematics teachers were word processing packages (76.8 percent), spread-sheets (50.3 per cent), Internet activity (67.2 per cent), and search engines (56.5 per cent). However, it must be noted that the packages that have not been positively considered by the respondents may not be necessarily useless. Mathematics teachers need more time to learn to use them — programmes like specific Java applets, Flash presentations, graphical applications and simulation programmes have great potential for the teaching of mathematics because they encourage explorations and higher order thinking.

2. It is encouraging to learn that 65.5 per cent of the respondents used the browser to gather information. It is time that educators encourage mathematics teachers to use the Internet for online demonstrations like using Java applets on mathematics that are only available online.

3. A large proportion (64.9 per cent) did not have any training on how to integrate ICT into mathematics teaching. Such training should be an integral part of professional training. Moreover, 46.3 per cent of the respondents requested to have training on how to integrate ICT into teaching.

4. Some major barriers hindering the implementation of ICT in mathematics teaching were found to be: lack of time in the school schedule for projects involving ICT; insufficient teacher training opportunities for ICT projects; inadequate technical support for these projects; lack of knowledge about ways to integrate ICT to enhance the curriculum; difficulty in integrating and using different ICT tools in a single lesson; and unavailability of resources at home for the students to access the necessary educational materials. Therefore, funding for new ICT resources should be increased in order to provide adequate ICT equipment and resources. It is also recommended that the contents of the subject be reduced so as to integrate ICT. Teachers consider that inadequate time is a factor against teaching and learning effectiveness.

5. Therefore, to encourage more teachers to integrate ICT into mathematics lessons, the devised programme must be user friendly. The e-portal proposed for this purpose is geared towards fulfilling such needs. This e-portal will be a collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics.

Use of ICT in Teaching-Learning Process

ICT has the potential to make a significant contribution to pupil's learning in mathematics by helping them to:

(i) practise and consolidate learning skills by using software to revise and give rapid assessment feedback.

(ii) develop skills of mathematical modelling through exploration, interpretation and explanation of data, by choosing appropriate graphical representations for displaying information from a data-set; by experimenting with forms of equations in trying to produce graphs which are good fits for data-plots; by using a motion sensor to produce distance time graphs corresponding to pupils own movements.

(iii) experiment with, make hypothesis from, and discuss or explain relationships and behaviour in shape and space, and their links with algebra, by using software to

   (a) automate geometric construction

   (b) carry out specified geometric transformations

   (c) perform operations on coordinates or draw loci.

(iv) develop logical thinking and modify strategies and assumptions through immediate feedback by planning a procedure as a sequence of instructions in a programming language or a sequence of geometrical constructions in geometry software or a set of manipulations in a spreadsheet.

(v) make connections within and across the areas of mathematics, for example, to relate a symbolic function, a set of values computed from it, and a graph generated by it to a mathematical or physical situation, such as the pressure and volume of a gas, which it models.

(vi) work with realistic and large sets of data.

For example, carrying out experiments using large random samples generated through simulations.

(vii) explore, describe and explain patterns and relationships in sequences and tables of numbers, by entering a formula in algebraic notation to generate values in an attempt to match a given set of numbers.

(vii) learn and memorise by manipulating graphic images. For example, the way the graph of a function such as $y = x^2$ is transformed by the addition or multiplication by a constant.

ICT also has the potential to offer valuable support to the mathematics teachers by:

(a) helping them to prepare teaching materials.

For example, downloading materials for classroom use from the Internet, such as mathematics problems for pupils to solve with accompanying teachers' notes, software for computers and reviews of published resources.

(b) providing a flexible and time-saving resource that can be used in different ways and at different times without repetition of the teachers' input by enlarging fonts, adding diagrams or illustrations, adapting parameters used in problems.

(c) providing a means by which subject and pedagogic knowledge can be improved and kept up-to-date by accessing the virtual teacher centre to obtain practical advice, to exchange ideas with peers and 'experts' outside school.

(d) aiding record-keeping and reporting by storing and regularly updating formative records which can form the basis of a subsequent report.*

Conclusion

To create an environment of effective ICT integration, hence improving the quality of education for the youth in the province, teacher education programmes must focus on eliminating barriers. Based on the findings and discussions presented here, the following recommendations are suggested for practitioners.

1. Technology plans for implementing ICT should be prepared and implemented.

2. Training in ICTs for teacher educators should be improved in both quantity and quality.

3. Every classroom should have at least one computer with Internet access and an LCD projector.

4. Course content should be redesigned to acquire more benefit from ICT.

5. More ICT-related courses for prospective teachers should be offered.

6. Teacher educators and prospective teachers should be aware of the benefits of ICTs.

7. An e-portal, collection of mathematical tools, a question bank and other resources in digital form that can be used for teaching and learning mathematics should be constructed.

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Teaching of Mathematics[*]

Abstract

As a part of the development of the National Curriculum Framework–2005, *twenty one National Focus Groups (NFGs) were constituted to reflect upon diverse themes drawn from the area of school education. Each NFG brought out a research-based position paper. For our readers, we present here the text of the position paper on "Teaching of Mathematics". While enlisting the main goal of mathematics education in schools on the mathematisation of the child's thinking, the paper proposes a shift from mathematics content to mathematics learning environment offering a multiplicity of approaches, procedures and solutions. Such learning environment helps in removing fear of mathematics from children's minds and is crucial for liberating school mathematics from the tyranny of the one right answer. The vision of excellent mathematical education, as recommended by the position paper, is based on the twin premises that all students can learn mathematics and that students need to learn mathematics.*

1. Goals of Mathematics Education

What are the main goals of mathematics education in schools? Simply stated, there is one main goal— the mathematisation of the child's thought processes. In the words of David Wheeler, it is "more useful to know how to mathematise than to know a lot of mathematics".

According to George Polya, we can think of two kinds of aims for school education: a good and narrow aim, which of turning out employable adults who (eventually) contribute to social and economic development; and a higher aim, that of developing the inner resources of the growing child2. With regard to school mathematics, the former aim specifically relates to numeracy. Primary schools teach numbers and operations on them, measurement of quantities, fractions, percentages and ratios, all these are important for numeracy.

What about the higher aim? In developing a child's inner resources, the role that mathematics plays is mostly about thinking. Clarity of thought and pursuing assumptions to logical conclusions is central to the mathematical enterprise. There are many ways of thinking, and the kind of thinking one learns in mathematics is an ability to handle abstractions.

Even more importantly, what mathematics offers is a way of doing

things: to be able to solve mathematical problems, and more generally, to have the right attitude for problem solving and to be able to attack all kinds of problems in a systematic manner.

This calls for a curriculum that is ambitious, coherent and teaches important mathematics. It should be ambitious in the sense that it seeks to achieve the higher aim mentioned above, rather than (only) the narrower aim. It should be coherent in the sense that the variety of methods and skills available piecemeal (in arithmetic, algebra, geometry) cohere into an ability to address problems that come from science and social studies in high school. It should be important in the sense that students feel the need to solve such problems, that teachers and students find it worth their time and energy addressing these problems and those mathematicians consider it an activity that is mathematically worthwhile. Note that such importance is not a given thing, and curriculum can help shape it. An important consequence of such requirements is that school mathematics must be activity-oriented.

In the Indian context, there is a centrality of concern which has an impact on all areas of school education, namely that of universalisation of schooling. This has two important implications for the discussion on curriculum, especially mathematics. Firstly, schooling is a legal right, and mathematics being a compulsory subject of study, access to quality mathematics education is every child's right. Keeping in mind the Indian reality, where few children have access to expensive material, we want mathematics education that is affordable to every child, and at the same time, enjoyable. This implies that the mathematics taught is situated in the child's lived reality, and that for the system, it is not the subject that matters more than the child, but the other way about.

Secondly, in a country where nearly half the children drop out of school during the elementary stage, mathematics curricula cannot be grounded only on preparation for higher secondary and university education. Even if we achieve our targeted universalisation goals, during the next decade, we will still have a substantial proportion of children exiting the system after Class VIII. It is then fair to ask what eight years of school mathematics offers for such children in terms of the challenges they will face afterwards.

Much has been written about *life skills* and linkage of school education to livelihood. It is certainly true that most of the skills taught at the primary stage are useful in everyday life. However, a reorientation of the curriculum towards addressing the 'higher aims' mentioned above, will make better use of the time children spend in schools in terms of the problem solving and analytical skills it builds in children, and prepare them better to encounter a wide variety of problems in life.

Our reflections on the place of mathematics teaching in the curricular framework are positioned on these twin concerns: what mathematics education can do to engage the mind of every student, and how it can strengthen the student's resources. We describe our vision of mathematics in school, attempt to delineate the core areas of concern,

and offer recommendations that address the concerns, based on these twin perspectives.

Many of our considerations in what follows have been shaped by discussions of Mathematics Curriculum in NCTM, USA[3], and the New Jersey Mathematics Coalition[4], the Mathematics academic content standards of the California State Board of Education[5], the Singapore Mathematics Curriculum[6], the Mathematics Learning Area statements of Australia and New Zealand[7], and the national curricula of France, Hungary[8] and the United Kingdom[9]. Ferrini-Mundi et al (eds.) offer an interesting discussion comparing national curriculum and teaching practice in mathematics in France with that of Brazil, Egypt, Japan, Kenya, Sweden and the USA10.

2. A Vision Statement

In our vision, school mathematics takes place in a situation where:

- Children learn to *enjoy mathematics*: This is an important goal, based on the premise that mathematics can be both used and enjoyed life-long, and hence that school is best placed to create such a taste for mathematics. On the other hand, creating (or not removing) a fear of mathematics can deprive children of an important faculty for life.

- Children learn *important mathematics*: Equating mathe-matics with formulas and mechanical procedures does great harm. Understanding when and how a mathematical technique is to be used is always more important than recalling the technique from memory (which may easily be done using a book), and the school needs to create such understanding.

- Children see mathematics as something to talk about, to communicate, to discuss among themselves, to work together on. Making mathematics *a part of children's life experience* is the best mathematics education possible.

- Children pose and solve *meaningful problems*: In school, mathematics is the domain which formally addresses problem solving as a skill. Considering that this is an ability of use in all of one's life, techniques and approaches learnt in school have great value. Mathematics also provides an opportunity to make up interesting problems, and create new dialogues thereby.

- Children use abstractions to perceive relationships, to see structure, to reason about things, to argue the truth or falsity of statements. *Logical thinking* is a great gift mathematics can offer us, and inculcating such habits of thought and communication in children is a principal goal of teaching mathematics.

- Children understand the basic *structure of mathematics*: Arithmetic, algebra, geometry and trigonometry, the basic content areas of school mathematics, all offer a methodology for abstraction, structuration and generalisation. Appreciating the scope and power of mathematics refines our instincts in a unique manner.

- Teachers expect to engage every child in class: Settling for anything less can only act towards systematic

exclusion, in the long run. Adequately challenging the talented even while ensuring the participation of all children is a challenge, and offering teachers means and resources to do this is essential for the health of the system.

Such a vision is based on a diagnosis of what we consider to be the central problems afflicting school mathematics education in the country today, as also on what we perceive can be done, and ought to be done.

Before we present the vision, a quick look at the history of mathematics curricular framework is in order.

3. A Brief History

Etymologically, the term 'curriculum' which has been derived from the Latin root means 'race course'. The word race is suggestive of time and course - the path. Obviously, curriculum was seen as the prescribed course of study to be covered in a prescribed time frame. But, evolution of curriculum as a field of study began in 1890's only, albeit of the fact that thinkers of education were interested in exploring the field for centuries. Johann Friedrich Herbart (1776-1841), a German thinker, is generally associated with the evolution of curriculum-field. Herbart had emphasised the importance of 'selection' and 'organisation' of content in his theories of teaching/learning. The first book devoted to the theme of curriculum entitled, The Curriculum was published in 1918 by Franklin Bobbitt followed by another book How to make Curriculum in 1924. In 1926, the National society for the study of education in America published the year book devoted to the

theme of curriculum-The Foundation and Technique of Curriculum Construction. This way the curriculum development movement, from its beginning in 1890s, started becoming a vigorous educational movement across the world.

School systems are a relatively new phenomenon in historical terms, having developed only during the past two hundred years or so. Before then, there existed schools in parts of the West, as an appendage to religious organisations. The purpose of these schools was to produce an educated cleric. Interest in mathematics was rudimentary- 'the different kinds of numbers and the various shapes and sufficient astronomy to help to determine the dates of religious rituals'. However, in India the practice of education was a well established phenomenon. Arithmetic and astronomy were core components of the course of study. Astronomy was considered essential for determining auspicious times for performing religious rituals and sacrifices. Geometry was taught because it was required for the construction of sacrificial altars and 'havan kunds' of various shapes and sizes. With the arrival of the British, the system of education underwent a major change. Western system of education was introduced to educate Indians on western lines for the smooth functioning of the Empire.

However, much of the curriculum development in mathematics has taken place during the past thirty/forty years. This is because of the new technological revolution which has an impact on society as great as the industrial revolution. Modern technology is, therefore, causing, and will increasingly

cause educational aims to be rethought, making curriculum development a dynamic process. To a scanning eye, mathematics itself is being directly affected by the modern technology as new branches are developed in response to new technological needs, leaving some 'time-hallowed' techniques redundant. In addition, teaching of mathematics also gets affected in order to keep pace with new developments in technology. Moreover, there exists a strong similarity of mathematics syllabi all over the world, with the result that any change which comes from the curriculum developers elsewhere is often copied or tried by others. India, for example, got swayed with the wave of new mathematics. Later, following the trends in other countries, new mathematics also receded here. To conclude, the various trends in curriculum development we observe no longer remain a static process, but a dynamic one. Its focus from 'selection' and 'organisation' of the informational material shifts to the development of a curriculum that 'manifests life in its reality'.

In 1937, when Gandhiji propounded the idea of basic education, the Zakir Hussain committee was appointed to elaborate on this idea. It recommended: 'Knowledge of mathematics is an essential part of any curriculum. Every child is expected to work out the ordinary calculations required in the course of his craft work or his personal and community concerns and activities.' The Secondary Education Commission appointed in 1952 also emphasised the need for mathematics as a compulsory subject in the schools.

In line with the recommendations of the National Policy on Education, 1968, when the NCERT published its "Curriculum for the Ten Year School", it remarked that the 'advent of automation and cybernatics in this century marks the beginning of the new scientific industrial revolution and makes it all the more imperative to devote special attention to the study of mathematics'. It stressed on an 'investigatory approach' in the teaching of mathematics.

The National Policy on Education 1986 went further

Mathematics should be visualised as the vehicle to train a child to think, reason, analyse and to articulate logically. Apart from being a specific subject, it should be treated as a concomitant to any subject involving analysis and reasoning.

The National Curriculum Framework for School Education (NCFSE) 2000 document echoes such sentiments as well. Yet, despite this history of exhortations, mathematics education has remained pretty much the same, focussed on narrow aims.

4. Problems In Teaching And Learning of Mathematics

Any analysis of mathematics education in our schools will identify a range of issues as problematic. We structure our understanding of these issues around the following four problems which we deem to be the core areas of concern:

1. A sense of fear and failure regarding mathematics among a majority of children,
2. A curriculum that disappoints both a talented minority as well as the

non-participating majority at the same time,

3. Crude methods of assessment that encourage perception of mathematics as mechanical computation, and

4. Lack of teacher preparation and support in the teaching of mathematics.

Each of these can and need to be expanded on, since they concern the curricular framework in essential ways.

4.1 Fear and Failure

If any subject area of study evokes wide emotional comment, it is mathematics. While no one educated in Tamil would profess (or at the least, not without a sense of shame) ignorance of any Tirukkural, it is quite the social norm for anyone to proudly declare that (She) he never could learn mathematics. While these may be adult attitudes, among children (who are compelled to pass mathematics examinations) there is often fear and anxiety. Mathematics anxiety and 'math phobia' are terms that are used in popular literature.

In the Indian context, there is a special dimension to such anxiety. With the universalisation of elementary education made a national priority, and elementary education a legal right, at this historic juncture, a serious attempt must be made to look into every aspect that alienates children in school and contributes towards their non-participation, eventually leading to their dropping out of the system. If any subject taught in school plays a significant role in alienating children and causing them to stop attending

school, perhaps mathematics, which inspires so much dread, must take a big part of the blame.

Such fear is closely linked to a sense of failure. By Class III or IV, many children start seeing themselves as unable to cope with the demands made by mathematics. In high school, among children who fail only in one or two subjects in year-end examinations, and hence, are detained, the maximum numbers fail in mathematics. This statistic pursues us right through to Class X, which is when the Indian state issues a certificate of education to a student. The largest numbers of Board Exam failures also happen in mathematics.

There are many perceptive studies and analyses on what causes fear of mathematics in schools. Central among them is the cumulative nature of mathematics. If you struggle with decimals, then you will struggle with percentages; if you struggle with percentages, then you will struggle with algebra and other mathematics subjects as well. The other principal reason is said to be the predomin-ance of symbolic language. When symbols are manipulated without understanding, after a point, boredom and bewilderment dominate many children, and dissociation develops.

Failure in mathematics could be read through social indicators as well. Structural problems in Indian education, reflecting structures of social discrimination, by way of class, caste and gender, contribute further to failure (and perceived failure) in mathematics education as well. Prevalent social attitudes which see girls as incapable

of mathematics, or which, for centuries, have associated formal computational abilities with the upper castes, deepen such failure by way of creating self-fulfilling expectations.

A special mention must be made of problems created by the language used in textbooks, especially at the elementary level. For a vast majority of Indian children, the language of mathematics learnt in school is far removed from their everyday speech, and especially forbidding. This becomes a major force of alienation in its own right.

4.2 Disappointing Curriculum

Any mathematics curriculum that emphasises procedure and knowledge of formulas over understanding is bound to enhance anxiety. The prevalent practice of school mathematics goes further: a silent majority gives up early on, remaining content to fail in mathematics, or at best, to see it through, maintaining a minimal level of achievement. For these children, what the curriculum offers is a store of mathematical facts, borrowed temporarily while preparing for tests.

On the other hand, it is widely acknowledged that more than in any other content discipline, mathematics is the subject that also sees great motivation and talent even at an early age in a small number of children12. These are children who take to quantisation and algebra easily, and carry on with great facility.

What the curriculum offers for such children is also intense disappointment. By not offering conceptual depth, by not challenging them, the curriculum settles for minimal use of their motivation. Learning procedures may be easy for them, but their understanding and capacity for reasoning remain under-exercised.

4.3 Crude Assessment

We talked of fear and failure. While what happens in class may alienate, it never evokes panic, as does the examination. Most of the problems cited above relate to the tyranny of procedure and memorization of formulas in school mathematics, and the central reason for the ascendancy of procedure is the nature of assessment and evaluation. Tests are designed (only) for assessing a student's knowledge of procedure and memory of formulas and facts, and given the criticality of examination performance in school life, concept learning is replaced by procedural memory. Those children who cannot do such replacement successfully experience panic, and suffer failure.

While mathematics is the major ground for formal problem solving in school, it is also the only arena where children see little room for play in answering questions. Every question in mathematics is seen to have one unique answer, and either you know it or you don't. In Language, Social Studies, or even in Science, you may try and demonstrate partial knowledge, but (as the students see it), there is no scope for doing so in mathematics. Obviously, such a perception is easily coupled to anxiety.

Amazingly, while there has been a great deal of research in mathematics education and some of it has led to changes in pedagogy and curriculum,

the area that has seen little change in our schools over a hundred years or more is evaluation procedures in mathematics. It is not accidental that even a quarterly examination in Class VII is not very different in style from a Board examination in Class X, and the same pattern dominates even the end-of-chapter exercises given in textbooks. It is always application of some piece of information given in the text to solve a specific problem that tests use of formalism. Such antiquated and crude methods of assessment have to be thoroughly overhauled if any basic change is to be brought about.

4.4 Inadequate Teacher Preparation

More so than any other content discipline, mathematics education relies very heavily on the preparation that the teacher has, in her own understanding of mathematics, of the nature of mathematics, and in her bag of pedagogic techniques. Textbook-centred pedagogy dulls the teacher's own mathematics activity.

At two ends of the spectrum, mathematics teaching poses special problems. At the primary level, most teachers assume that they know all the mathematics needed, and in the absence of any specific pedagogic training, simply try and uncritically reproduce the techniques they experienced in their school days. Often this ends up perpetuating problems across time and space.

At the secondary and higher secondary level, some teachers face a different situation. The syllabi have considerably changed since their school days, and in the absence of systematic and continuing education programmes for teachers, their fundamentals in many concept areas are not strong. This encourages reliance on 'notes' available in the market, offering little breadth or depth for the students.

While inadequate teacher preparation and support act negatively on all of school mathematics, at the primary stage, its main consequence is this: mathematics pedagogy rarely resonates with the findings of children's psychology. At the upper primary stage, when the language of abstractions is formalised in algebra, inadequate teacher preparation reflects as inability to link formal mathematics with experiential learning. Later on, it reflects as incapacity to offer connections within mathematics or across subject areas to applications in the sciences, thus depriving students of important motivation and appreciation.

4.5 Other Systemic Problems

We wish to briefly mention a few other systemic sources of problems as well. One major problem is that of **compartmentalisation**: there is very little systematic communication between primary school and high school teachers of mathematics, and none at all between high school and college teachers of mathematics. Most school teachers have never even seen, let alone interacted with or consulted, research mathematicians. Those involved in teacher education are again typically outside the realm of college or research mathematics.

Another important problem is that of curricular acceleration: a generation ago, calculus was first encountered by a student in college. Another generation earlier, analytical geometry

was considered college mathematics. But these are all part of school curriculum now. Such acceleration has naturally meant pruning of some topics: there is far less solid geometry or spherical geometry now. One reason for the narrowing is that calculus and differential equations are critically important in undergraduate sciences, technology and engineering, and hence, it is felt that early introduction of these topics helps students proceeding further on these lines. Whatever the logic, the shape of mathematics education has become taller and more spindly, rather than broad and rounded.

While we have mentioned gender as a systemic issue, it is worth understanding the problem in some detail. Mathematics tends to be regarded as a 'masculine domain'. This perception is aided by the complete lack of references in textbooks to women mathematicians, the absence of social concerns in the designing of curricula, which would enable children questioning received gender ideologies, and the absence of reference to women's lives in problems. A study of mathematics textbooks found that in the problem sums, not a single reference was made to women's clothing, although several problems referred to the buying of cloth, etc.[13]

Classroom research also indicates a fairly systematic devaluation of girls as incapable of 'mastering' mathematics, even when they perform reasonably well at verbal as well as cognitive tasks in mathematics. It has been seen that teachers tend to address boys more than girls, which feeds into the construction of the normative mathematics learner as male. Also, when instructional decisions are in teachers' hands, their gendered constructions colour the mathematical learning strategies of girls and boys, with the latter using more invented strategies for problem-solving, which reflects greater conceptual understanding.[14] Studies have shown that teachers tend to attribute boys' mathematical 'success' more to ability, and girls' success more to effort.[15] Classroom discourses also give some indication of how the 'masculinising' of mathematics occurs, and the profound influence of gender ideologies in patterning notions of academic competence in school.[16] With performance in mathematics signifying school 'success', girls are clearly at the losing end.

5. Recommendations

While the litany of problems and challenges magnifies the distance we need to travel to arrive at the vision articulated above, it also offers hope by way of pointing us where we need to go and what steps we may/must take.

We summarise what we believe to be the central directions for action towards our stated vision. We group them again into four central themes:

1. Shifting the focus of mathematics education from achieving 'narrow' goals to 'higher' goals,
2. Engaging every student with a sense of success, while at the same time offering conceptual challenges to the emerging mathematician,
3. Changing modes of assessment to examine students' mathematisation abilities rather than procedural knowledge,
4. Enriching teachers with a variety of mathematical resources.

There is some need for elaboration. How can the advocated shift to 'higher' goals remove fear of mathematics in children? Is it indeed possible to simultaneously address the silent majority and the motivated minority? How indeed can we assess processes rather than knowledge? We briefly address these concerns below.

5.1 Towards the Higher Goals

The shift that we advocate, from 'narrow' goals to 'higher' goals, is best summarised as a shift in focus from mathematical content to mathematical learning environments.

The content areas of mathematics addressed in our schools do offer a solid foundation. While there can be disputes over what gets taught at which grade, and over the level of detail included in a specific theme, there is broad agreement that the content areas (arithmetic, algebra, geometry, mensuration, trigonometry, data analysis) cover essential ground.

What can be levelled as a major criticism against our extant curriculum and pedagogy is its failure with regard to mathematical processes. We mean a whole range of processes here: formal problem solving, use of heuristics, estimation and approximation, optimisation, use of patterns, visualisation, representation, reasoning and proof, making connections, mathematical communication. Giving importance to these processes constitutes the difference between doing mathematics and swallowing mathematics, between mathematisation of thinking and memorising formulas, between

trivial mathematics and important mathematics, between working towards the narrow aims and addressing the higher aims.

In school mathematics, certainly emphasis does need to be attached to factual knowledge, procedural fluency and conceptual understanding. New knowledge is to be constructed from experience and prior knowledge using conceptual elements. However, invariably, emphasis on procedure gains ascendancy at the cost of conceptual understanding as well as construction of knowledge based on experience. This can be seen as a central cause for the fear of mathematics in children.

On the other hand, the emphasis on exploratory problem solving, activities and the processes referred to above constitute learning environments that invite participation, engage children, and offer a sense of success. Transforming our classrooms in this manner, and designing mathematics curricula that enable such a transformation, is to be accorded the highest priority.

5.1.1 Processes

It is worth explaining the kind of processes we have referred to and their place in the curricular framework. Admittedly, such processes cut across subject areas, but we wish to insist that they are central to mathematics. This is to be seen in contrast with mathematics being equated to exact but abstruse knowledge with an all-or-nothing character.

Formal problem solving, at least in schools, exists only in the realm of mathematics. But for physics lessons in the secondary stage and after, there

are no other situations outside of mathematics where children address themselves to problem solving. Given this, and the fact that this is an important 'life skill' that a school can teach, mathematics education needs to be far more conscious of what tactics it can offer. As it stands, problem solving only amounts to doing exercises that illustrate specific definitions in the text. Worse, textbook problems reduce solutions to knowledge of specific tricks, of no validity outside the lesson where they are located.

On the other hand, many general tactics can indeed be taught, progressively during the stages of school. Techniques like abstraction, quantification, analogy, case analysis, reduction to simpler situations, even guess-and-verify, are useful in many problem contexts. Moreover, when children learn a variety of approaches (over time), their toolkit gets richer and they also learn which approach is best when.

This brings us to the use of heuristics, or rules of thumb. Unfortunately, mathematics is considered to be 'exact' where one uses 'the appropriate formula'. To find a property of some triangle, it is often useful to first investigate the special case when the triangle is right angled, and then look at the general case afterwards. Such heuristics do not always work, but when they do, they give answers to many other problems as well. Examples of heuristics abound when we apply mathematics in the sciences. Most scientists, engineers and mathematicians use a big bag of heuristics–a fact carefully hidden by our school textbooks.

Scientists regard estimation of quantities and approximating solutions, when exact ones are not available, to be absolutely essential skills. The physicist Fermi was famous for posing estimation problems based on everyday life and showing how they helped in nuclear physics. Indeed, when a farmer estimates the yield of a particular crop, considerable skills in estimation and approximation are used. School mathematics can play a significant role in developing and honing such useful skills, and it is a pity that this is almost entirely ignored.

Optimisation is never even recognised as a skill in schools. Yet, when we wish to decide on a set of goods to purchase, spending less than a fixed amount, we optimise Rs. 100 can buy us A and B or C, D and E in different quantities, and we decide. Two different routes can take us to the same destination and each has different advantages or disadvantages. Exact solutions to most optimisation problems are hard, but intelligent choice based on best use of available information is a mathematical skill that can be taught. Often, the numerical or geometrical facility needed is available at the upper primary stage. Developing a series of such situations and abilities can make school mathematics enjoyable as well as directly useful.

Visualisation and representation are again skills unaddressed outside mathematics curriculum, and hence, mathematics needs to develop these far more consciously than is done now. Modelling situations using quantities, shapes and forms is the best use of mathematics. Such representations aid visualisation and reasoning

clarify essentials, help us discard irrelevant information. Rather sadly, representations are taught as ends in themselves. For example, equations are taught, but the use of an equation to represent the relationship between force and acceleration is not examined. What we need are illustrations that show a multiplicity of representations so that the relative advantages can be understood. For example, a fraction can be written in the form p/q but can also be visualised as a point on the number line; both representations are useful, and appropriate in different contexts. Learning this about fractions is far more useful than arithmetic of fractions.

This also brings us to the need for making connections, within mathematics, and between mathematics and other subjects of study. Children learn to draw graphs of functional relationships between data, but fail to think of such a graph when encountering equations in physics or chemistry. That, algebra offers a language for succinct substitutable statements in science needs underlining and can serve as motivation for many children. Eugene Wigner once spoke of the unreasonable effectiveness of mathematics in the sciences. Our children need to appreciate the fact that mathematics is an effective instrument in science.

The importance of systematic reasoning in mathematics cannot be overemphasised, and is intimately tied to notions of aesthetics and elegance dear to mathematicians. Proof is important, but equating proof with deduction, as done in schools, does violence to the notion. Sometimes, a picture suffices

as a proof, a construction proves a claim rigorously. The social notion of proof as a process that convinces a sceptical adversary is important for the practice of mathematics. Therefore, school mathematics should encourage proof as a systematic way of argumentation. The aim should be to develop arguments, evaluate arguments, make and investigate conjectures, and understand that there are various methods of reasoning.

Another important element of process is mathematical communication. Precise and unambiguous use of language and rigour in formulation are important characteristics of mathematical treatment, and these constitute values to be imparted by way of mathematics education. The use of jargon in mathematics is deliberate, conscious and stylised. Mathematicians discuss what appro-priate notation is, since, good notation is held to aid thought. As children grow older, they should be taught to appreciate the significance of such conventions and their use. For instance, this means that setting up of equations should get as much coverage as solving them.

In discussing many of these skills and processes, we have repeatedly referred to offering a *multiplicity* of approaches, procedures, solutions. We see this as crucial for liberating school mathematics from the tyranny of the one right answer, found by applying the one algorithm taught. When many ways are available, one can compare them, decide which is appropriate when, and in the process gain insight. And such a multiplicity is available for most mathematical contexts, all through

school, starting from the primary stage. For instance, when we wish to divide 102 by 8, we could do long division, or try 10 first, then 15, and decide that the answer lies in between and work at narrowing the gap.

It is important to acknowledge that mathematical competence is situated and shaped by the social situations and the activities in which learning occurs. Hence, school mathematics has to be in close relation to the social worlds of children where they are engaged in mathematical activities as a part of daily life. Open-ended problems, involving multiple approaches and not solely based on arriving at a final, unitary, correct answer are important so that an external source of validation (the teacher, textbooks, guidebooks) is not habitually sought for mathematical claims. The unitary approach acts to disadvantage all learners, but often acts to disadvantage girls in particular.

5.1.2 Mathematics that people use

An emphasis on the processes discussed above also enables children to appreciate the relevance of mathematics to people's lives. In Indian villages, it is commonly seen that people who are not formally educated use many modes of mental mathematics. What may be called folk algorithms exist for not only mentally performing number operations, but also for measurement, estimation, understanding of shapes and aesthetics. Appreciating the richness of these methods can enrich the child's perception of mathematics. Many children are immersed in situations where they see and learn the use of these methods, and relating such knowledge to what is formally learnt as mathematics can be inspiring and additionally motivating.

For instance, in Southern India, *kolams* (complex figures drawn on the floor using a white powder, similar to rangoli in the north, but ordinarily without colour) are seen in front of houses. A new *kolam* is created each day and a great variety of them are used. Typically women draw *kolams*, and many even participate in competitions. The grammar of these *kolams*, the classes of closed curves they use, the symmetries that they exploit - these are matters that mathematics education in schools can address, to the great benefit of students. Similarly, art, architecture and music offer intricate examples that help children appreciate the cultural grounding of mathematics.

5.1.3 Use of technology

Technology can greatly aid the process of mathematical exploration, and clever use of such aids can help engage students. Calculators are typically seen as aiding arithmetical operations; while this is true, calculators are of much greater pedagogic value. Indeed, if one asks whether calculators should be permitted in examinations, the answer is that it is quite unnecessary for examiners to raise questions that necessitate the use of calculators. On the contrary, in a non-threatening atmosphere, children can use calculators to study iteration of many algebraic functions. For instance, starting with an arbitrary large number and repeatedly finding the square root to see how soon the sequence converges to 1, is illuminating. Even phenomena like chaos can be easily comprehended with such iterators.

If ordinary calculators can offer such possibilities, the potential of graphing calculators and computers for mathematical exploration is far higher. However, these are expensive, and in a country where the vast majority of children cannot afford more than one notebook, such use is luxurious. It is here that governmental action, to provide appropriate alternative low-cost technology, may be appropriate. Research in this direction will be greatly beneficial to school education.

It must be understood that there is a spectrum of technology use in mathematics education, and calculators or computers are at one end of the spectrum. While notebooks and blackboards are the other end, use of graph paper, geo boards, abacus, geometry boxes etc. is crucial. Innovations in the design and use of such material must be encouraged so that their use makes school mathematics enjoyable and meaningful.

5.2 Mathematics for All

A systemic goal that needs to be underlined and internalised in the entire system is universal inclusion. This means acknowledging that forms of social discrimination work in the context of mathematics education as well and addressing means for redress. For instance, gendered attitudes which consider mathematics to be unimportant for girls, have to be systematically challenged in school. In India, even caste based discrimination manifests in such terms, and the system cannot afford to treat such attitudes by default.

Inclusion is a fundamental principle. Children With Special Needs, especially children with physical and mental disabilities, have as much right as every other child to learn mathematics, and their needs (in terms of pedagogy, learning material etc.) have to be addressed seriously. The conceptual world of mathematics can bring great joy to these children, and it is our responsibility not to deprive them of such education.

One important implication in taking Mathematics for all seriously is that even the language used in our textbooks must be sensitive to language uses of all children. This is critical for primary education, and this may be achievable only by a multiplicity of textbooks.

While the emphasised shift towards learning environments is essential for engaging the currently non-participating majority in our classrooms, it does not in any way mean dilution of standards. We are not advising here that the mathematics class, rather than boring the majority, ends up boring the already motivated minority. On the other hand, a case can be made that such open problem situations offer greater gradations in challenges, and hence, offer more for these few children as well.

It is widely acknowledged that mathematical talent can be detected early, in a way that is not observable in more complex fields such as literature and history. That is, it is possible to present challenging tasks to highly talented youngsters. The history of the task may be ignored; the necessary machinery is minimal; and the manner in which such youngsters express their insights does not require elaboration in order to generate mathematical inquiry.

All this is to say that challenging all children according to their mathematical taste is indeed possible. But this calls for systemic mechanisms, especially in textbooks. In India, few children have access to any mathematical material outside their mathematics textbooks, and hence, structuring textbooks to offer such a variety of content is important.

In addition, we also need to consider mechanisms for identification and nurturing of such talent, especially in rural areas, by means of support outside main school hours. Every district needs at least a few centres accessible to children where such mathematical activity is undertaken periodically. Networking such talent is another way of strengthening it.

5.2.1 Assessment

Given that mathematics is a compulsory subject in all school years, all summative evaluation must take into account the concerns of universalisation. Since the Board examination for Class X is for a certificate given by the State, implications of certified failure must be considered seriously. Given the reality of the educational scenario, the fact that Class X is a terminal point for many is relevant; applying the same single standard of assessment for these students as well as for rendering eligibility for the higher secondary stage seems indefensible. When we legally bind all children to complete ten years of schooling, the SSLC certificate of passing that the State issues should be seen as a basic requirement rather than a certificate of competence or expertise.

Keeping these considerations in mind, and given the high failure rate in mathematics, we suggest that the Board examinations be restructured. They must ensure that all numerate citizens pass and become eligible for a State certificate. (What constitutes numeracy in a citizen may be a matter of social policy.) Nearly half the content of the examination may be geared towards this.

However, the rest of the examination needs to challenge students far more than it does now, emphasising competence and expertise rather than memory. Evaluating conceptual understanding rather than fast computational ability in the Board examinations will send a signal of intent to the entire system, and over a period of time, cause a shift in pedagogy as well.

These remarks pertain to all forms of summative examinations at the school level as well. Multiple modes of assessment, rather than the unique test pattern, need to be encouraged. This calls for a great deal of research and a wide variety of assessment models to be created and widely disseminated.

5.3 Teacher Support

The systemic changes that we have advocated require substantial investments of time, energy and support on the part of teachers. Professional development, affecting the beliefs, attitudes, knowledge and practices of teachers in the school, is central to achieving this change. In order for the vision described in this paper to become a reality, it is critical that professional development focuses on mathematics specifically. Generic 'teacher training' does not provide the understanding of content, of instructional techniques,

and of critical issues in mathematics education that is needed by classroom teachers.

There are many mechanisms that need to be ensured to offer better teacher support and professional development, but the essential and central requirement is that of a large treasury of resource material which teachers can access freely as well as contribute to. Further, networking of teachers so that expertise and experience can be shared is important. In addition, identifying and nurturing resource teachers can greatly help the process. Regional mathematics libraries may be built to act as resource centres.

An important area of concern is the teacher's own perception of what mathematics is, and what constitutes the goals of mathematics education. Many of the processes we have outlined above are not considered to be central by most mathematics teachers, mainly because of the way they were taught, and a lack of any later training on such processes.

Offering a range of material to teachers that enriches their understanding of the subject, provides insights into the conceptual and historical development of the subject and helps them innovate in their classrooms is the best means of teacher support. For this, providing channels of communication with college teachers and research mathematicians will be of great help. When teachers network among themselves and link up with teachers in universities, their pedagogic competence will be strengthened immensely. Such systematic sharing of experience and expertise can be of great help.

6. Curricular choices

Acknowledging the existence of choices in curriculum is an important step in the institutionalisation of education. Hence, when we speak of shifting the focus from content to learning environments, we are offering criteria by which a curriculum designer may resolve choices. For instance, visualisation and geometric reasoning are important processes to be ensured, and this has implications for teaching algebra. Students who 'blindly' manipulate equations without being able to visualise and understand the underlying geometric picture cannot be said to have understood. If this means greater coverage for geometric reasoning (in terms of lessons, pages in textbook), it has to be ensured. Again, if such expansion can only be achieved by reducing other (largely computational) content, such content reduction is implied.

Below, while discussing stage-wise content, we offer many such inclusion /exclusion criteria for the curriculum designer, emphasising again that the recommendation is not to dilute content, but to give importance to a variety of processes. Moreover, we suggest a principle of postponement: in general, if a theme can be offered with better motivation and applications at a later stage, wait for introducing it at that stage, rather than go for technical preparation without due motivation. Such considerations are critical at the secondary and higher secondary stages where a conscious choice between breadth and depth is called for. Here, a quotation from William Thurston is appropriate:

The long-range objectives of mathematics education would be better served if the tall shape of mathematics were de-emphasised, by moving away from a standard sequence to a more diversified curriculum with more topics that start closer to the ground. There have been some trends in this direction, such as courses in finite mathematics and in probability, but there is room for much more.17

6.1 Primary Stage

Any curriculum for primary mathematics must incorporate the progression from the concrete to the abstract, and subsequently, a need to appreciate the importance of abstraction in mathematics. In the lowest classes, especially, it is important that activities with concrete objects form the first step in the classroom to enable the child to understand the connections between the logical functioning of their everyday lives to that of mathematical thinking.

Mathematical games, puzzles and stories involving numbers are useful to enable children to make these connections and to build upon their everyday understandings. Games – not to be confused with open-ended play - provide non-didactic feedback to the child, with a minimum amount of teacher intervention[18]. They promote processes of anticipation, planning and strategy.

6.1.1 Mathematics is not just arithmetic

While addressing number and number operations, due place must be given to non-number areas of mathematics. These include shapes, spatial understanding, patterns, measurement

and data handling. It is not enough to deal with shapes and their properties as a prelude to geometry in the higher classes. It is important also to build up a vocabulary of relational words which extend the child's understanding of space. The identification of patterns is central to mathematics. Starting with simple patterns of repeating shapes, the child can move on to more complex patterns involving shapes as well as numbers. This lays the base for a mode of thinking that can be called algebraic. A primary curriculum that is rich in such activities can arguably make the transition to algebra easier in the middle grades[19]. Data handling, which forms the base for statistics in the higher classes, is another neglected area of school mathematics and can be introduced right from Class I.

6.1.2 Number and number operations

Children come equipped with a set of intuitive and cultural ideas about number and simple operations at the point of entry into school. These should be used to make linkages and connections to number understanding rather than treating the child as a *tabula rasa*. To learn to think in mathematical ways, children need to be logical and to understand logical rules, but they also need to learn conventions needed for the mastery of mathematical techniques such as the use of a base ten system. Activities as basic as counting and understanding numeration systems involve logical understandings for which children need time and practice if they are to attain mastery, and then to be able to use them as tools for thinking and for mathematical problem solving[20].

Working with limited quantities and smaller numbers prevents overloading the child's cognitive capacity which can be better used for mastering the logical skills at these early stages.

Operations on natural numbers usually form a major part of primary mathematics syllabi. However, the standard algorithms of addition, subtraction, multiplication and division of whole numbers in the curriculum have tended to occupy a dominant role in these. This tends to happen at the expense of development of number sense and skills of estimation and approximation. The result frequently is that students, when faced with word problems, ask "Should I add or subtract?, Should I multiply or divide?" This lack of a conceptual base continues to haunt the child in later classes. All this strongly suggests that operations should be introduced contextually. This should be followed by the development of language and symbolic notation, with the standard algorithms coming at the end rather than the beginning of the treatment.

6.1.3 Fractions and decimals

Fractions and decimals constitute another major problem area. There is some evidence that the introduction of operations on fractions coincides with the beginnings of fear of mathematics. The content in these areas needs careful reconsideration. Everyday contexts in which fractions appear, and in which arithmetical operations need to be done on them, have largely disappeared with the introduction of metric units and decimal currency. At present, the child is presented with a number of contrived situations in which operations have to be performed on fractions. Moreover, these operations have to be done using a set of rules which appear arbitrary (often, even to the teacher), and have to be memorised - this at a time when the child is still grappling with the rules for operating on whole numbers. While the importance of fractions in the conceptual structure of mathematics is undeniable, the above considerations seem to suggest that less emphasis on operations with fractions at the primary level is called for.

6.2 Upper Primary Stage

Mathematics is amazingly compressible: one may struggle a lot, work out something, perhaps by trying many methods. But once it is understood, and seen as a whole, it can be filed away, and used as just a step when needed. The insight that goes into this compression is one of the great joys of mathematics. A major goal of the upper primary stage is to introduce the student to this particular pleasure.

The compressed form lends itself to application and use in a variety of contexts. Thus, mathematics at this stage can address many problems from everyday life, and offer tools for addressing them. Indeed, the transition from arithmetic to algebra, at once both challenging and rewarding, is best seen in this light.

6.2.1 Arithmetic and Algebra

A consolidation of basic concepts and skills learnt at primary school is necessary from several points of view. For one thing, ensuring numeracy in all children is an important aspect of

universalisation of elementary education. Secondly, moving from number sense to number patterns, seeing relationships between numbers and looking for patterns in the relationships bring useful life skills to children. Ideas of prime numbers, odd and even numbers, tests of divisibility etc. offer scope for such exploration.

Algebraic notation, introduced at this stage, is best seen as a compact language, a means of succinct expression. Use of variables, setting up and solving linear equations, identities and factoring are means by which students gain fluency in using the new language.

The use of arithmetic and algebra in solving real problems of importance to daily life can be emphasised. However, engaging children's interest and offering a sense of success in solving such problems is essential.

6.2.2 Shape, Space and Measures

A variety of regular shapes are introduced to students at this stage: triangles, circles, quadrilaterals, they offer a rich new mathematical experience in at least four ways. Children start looking for such shapes in nature, all around them, and thereby discover much symmetry and acquire a sense of aesthetics. Secondly, they learn how many seemingly irregular shapes can be approximated by regular ones, which becomes an important technique in science. Thirdly, they start comprehending the idea of space: for instance, that a circle is a path or boundary which separates the space inside the circle from that outside it. Fourthly, they start associating numbers with shapes, like area, perimeter etc, and this technique of quantisation, or

arithmetisation, is of great importance. This also suggests that mensuration is best when integrated with geometry.

An informal introduction to geometry is possible using a range of activities like paper folding and dissection, and exploring ideas of symmetry and transformation. Observing geometrical properties and inferring geometrical truth is the main objective here. Formal proofs can wait for a later stage.

6.2.3 Visual Learning

Data handling, representation and visualisation are important mathematical skills which can be taught at this stage. They can be of immense use as 'life skills'. Students can learn to appreciate how railway time tables, directories and calendars organise information compactly.

Data handling should be suitably introduced as tools to understand process, represent and interpret day-to-day data. Use of graphical representations of data can be encouraged. Formal techniques for drawing linear graphs can be taught.

Visual Learning fosters under-standing, organisation and imagination. Instead of emphasising only two-column proofs, students should also be given opportunities to justify their own conclusions with less formal, but nonetheless convincing, arguments. Students' spatial reasoning and visualisation skills should be enhanced. The study of geometry should make full use of all available technology. A student when given visual scope to learning, remembers pictures, diagrams, flowcharts, formulas and procedures.

6.3 Secondary Stage

It is at this stage that Mathematics comes to the student as an academic discipline. In a sense, at the elementary stage, mathematics education is (or ought to be) guided more by the logic of children's psychology of learning rather than the logic of mathematics. But at the secondary stage, the student begins to perceive the structure of mathematics. For this, the notions of *argumentation* and proof become central to curriculum now.

Mathematical terminology is highly stylised, self-conscious and rigorous. The student begins to feel comfortable and at ease with the characteristics of mathematical communication: carefully defined terms and concepts, the use of symbols to represent them, precisely stated propositions using only terms defined earlier, and proofs justifying propositions. The student appreciates how an edifice is built up, arguments constructed using propositions justified earlier, to prove a theorem, which in turn is used in proving more.

For long, geometry and trigonometry have wisely been regarded as the arena wherein students can learn to appreciate this structure best. In the elementary stage, if students have learnt many shapes and know how to associate quantities and formulas with them, here they start reasoning about these shapes using the defined quantities and formulas.

Algebra, introduced earlier, is developed at some length at this stage. Facility with algebraic manipulation is essential, not only for applications of mathematics, but also internally in mathematics. Proofs in geometry and trigonometry show the usefulness of algebraic machinery. It is important to ensure that students learn to geometrically visualise what they accomplish algebraically.

A substantial part of the secondary mathematics curriculum can be devoted to consolidation. This can be and needs to be done in many ways. Firstly, the student needs to integrate the many techniques of mathematics she has learnt into a problem solving ability. For instance, this implies a need for posing problems to students which involve more than one content area: algebra and trigonometry, geometry and mensuration, and so on. Secondly, mathematics is used in the physical and social sciences, and making the connections explicit can inspire students immensely. Thirdly, mathematical modelling, data analysis and interpretation, taught at this stage, can consolidate a high level of literacy. For instance, consider an environment-related project, where the student has to set up a simple linear approximation and model a phenomenon, solve it, visualise the solution, and deduce a property of the modelled system. The consolidated learning from such an activity builds a responsible citizen, who can later intuitively analyse information available in the media and contribute to democratic decision making.

At the secondary stage, a special emphasis on experimentation and exploration may be worthwhile. *Mathematics laboratories* are a recent phenomenon, which hopefully will expand considerably in future[22]. Activities in practical mathematics help students immensely in visualisation.

Indeed, Singh, Avtar and Singh offer excellent suggestions for activities at all stages. Periodic systematic evaluation of the impact of such laboratories and activities[23] will help in planning strategies for scaling up these attempts.

6.4 Higher Secondary Stage

Principally, the higher secondary stage is the launching pad from which the student is guided towards career choices, whether they imply university education or otherwise. By this time, the student's interests and aptitude have been largely determined, and mathematics education in these two years can help in sharpening her abilities.

The most difficult curricular choice to be made at this stage relates to that between breadth and depth. A case can be made for a broad based curriculum that offers exposure to a variety of subjects; equally well, we can argue for limiting the number of topics to a few and developing competence in the selected areas. While there are no formulaic answers to this question, we point to the Thurston remark quoted above once again.

Indeed, Thurston is in favour of breadth even as an alternative to remedial material which merely goes over the same material once more, handicapping enthusiasm and spontaneity.

Instead, there should be more courses available … which exploit some of the breadth of mathematics, to permit starting near the ground level, without a lot of repetition of topics that students have already heard.

When we choose breadth, we not only need to decide which themes to develop, but also how far we want to go in developing those themes. In this regard, we suggest that the decision be dictated by *mathematical considerations.* For instance, introd-ucing projective geometry can be more important for mathematics as a discipline than projectile motion (which can be well studied in physics). Similarly, the length of treatment should be dictated by whether *mathematical objectives* are met. For instance, if the objective of introducing complex numbers is to show that the enriched system allows for solutions to all polynomial equations, the theme should be developed until the student can at least get an idea of how this is possible. If there is no space for such a treatment, it is best that the theme not be introduced; showing operations on complex numbers and representations without any understanding of why such a study is relevant is unhelpful.

Currently, mathematics curriculum at the higher secondary stage tends to be dominated by differential and integral calculus, making for more than half the content in Class XII. Since Board examinations are conducted on Class XII syllabus, this subject acquires tremendous importance among students and teachers. Given the nature of Board examinations as well as other entrance examinations, the manipulative and computational aspects of calculus tend to dominate mathematics at this stage. This is a great pity, since many interesting topics (sets, relations, logic, sequences and series, linear inequalities, combinatorics) introduced to students in Class XI can give them good mathematical insight but these are typically given short shrift. Curriculum designers should address this problem

while considering the distribution of content between Classes XI and XII.

In many parts of the world, the desirability of having electives at this stage, offering different aspects of mathematics, has been acknowledged. However, implementation of a system of electives is dauntingly difficult, given the need for a variety of textbooks and more teachers, as well as the centralised nature of examinations. Yet, experimenting with ideas that offer a range of options to students will be worthwhile.

6.5 Mathematics and Mathematicians

At all stages of the curriculum, an element of humanising the curriculum is essential. The development of mathematics has many interesting stories to be told, and every student's daily life includes many experiences relevant to mathematics. Bringing these stories and accounts into the curriculum is essential for children to see mathematics in perspective. Lives of mathematicians and stories of mathematical insights are not only endearing, they can also be inspiring.

A specific case can be made for highlighting the contribution made by Indian mathematicians. An appreciation of such contributions will help students see the place of mathematics in our culture. Mathematics has been an important part of Indian history and culture, and students can be greatly inspired by understanding the seminal contributions made by Indian mathematicians in early periods of history.

Similarly, contributions by women mathematicians from all over the world are worth highlighting. This is important, mainly to break the prevalent myth that mathematics has been an essentially male domain, and also to invite more girls to the mathematical enterprise.

7. Conclusion

In a sense, all these are steps advocated by every mathematics educator over decades. The difference here is in emphasis, in achieving these actions by way of curricular choices. Perhaps the most compelling reason for the vision of mathematics education we have articulated is that our children will be better served by higher expectations, by curricula which go far beyond basic skills and include a variety of mathematical models, and by pedagogy which devotes a greater percentage of instructional time to problem solving and active learning. Many students respond to the current curriculum with boredom and discouragement, develop the perception that success in mathematics depends on some innate ability which they simply do not have, and feel that, in any case, mathematics will never be useful in their lives. Learning environments like the one described in the vision will help students to enjoy and appreciate the value of mathematics, to develop the tools they need for varied educational and career options, and to function effectively as citizens.

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Learning Resources in Mathematics*

Abstract

To disseminate the NCERT's initiatives of developing textbooks for two-year B.Ed. courses offered at Regional Institutes of Education, NCERT, this text on 'Learning Resources in Mathematics' taken from recently published textbook Pedagogy of Mathematics for two-year B.Ed. course by the NCERT is presented here for our readers. Readers may see the details of this book on the back page of this journal.

Introduction

A resource may be known as a source of aid or support that may be drawn upon when needed. Learning of a subject widely depends upon the availability of resources which plays a vital role in strengthening the understanding of the subject matter and hence, the fundamentals of the subject itself. While in life sciences and humanities, there are physical evidences available, viz., plants and animals in biology; people, laws, countries, social and cultural context in humanities, but in mathematics, evidences are normally invisible. Unlike other subjects, mathematics is basically based on logical reasoning and generalisation and deals with abstract concepts; thereafter their representations through symbols, etc. Further conceptual building on these abstract concepts brings greater vigour and complexity to its structure. So, there is a crucial need for learning resources in mathematics as they are not directly available.

Resources, here, are anything which may assist in understanding, strengthening or extending the subject content. Resource can also be understood as something that one uses to achieve an objective. In case of mathematics learning, these may be textbooks, handbooks, supplementary books, media, visual, audio, audio-visual, community, locality, school, infrastructure, mathematics laboratory, mathematics exhibitions, excursions, tours and trips, mentors, computer softwares, internet, web 2.0 tools etc. There is a basic need to explore more of these resources which may help in learning of mathematics, make it interesting, removing mathematics

phobia from minds of learners, and hence, achieving narrow aims as well as higher aims for school education as mentioned in Teaching of Mathematics Position Paper, NCF–2005. Pimm and Johnston (2005) mention that using learning resources in mathematics, pupils are engaged through stimulating curiosity, communicating enthusiasm, matching the approaches used to mathematics being taught, effective questioning, selecting and making good use of resources and exploiting opportunities to contribute to the quality of pupils' wider educational development. This is the need of the hour as far as mathematics learning is concerned, that equal importance should be given to urban as well as to rural area students. This will strengthen our way, as teachers, in achieving the twin premises of mathematics education, that all students can learn mathematics and all students need to learn mathematics (NCF– 2005). While talking about school mathematics, Romberg (1999) says, for learning of mathematics two problems are required to be dealt with. First, the content and structure of the curriculum should not operate to indoctrinate students with past values, but should be derived from visions of the future. All students should be taught to reason, to design models and to create and solve problems. Second, all children must be taught critical thinking skills. He/she emphasises to press the need for all citizens to become 'mathematically literate'. This can be achieved with the help of better learning resources in mathematics. Conducive to the spirit of mathematics, NPE (1986) reflects, "Mathematics is a vehicle to train a child to think, to reason and articulate logically." In view of making mathematics interesting and understood by all children, teachers/students need to know about plurality of learning resources.

The pluralistic and diverse nature of Indian society definitely makes a strong case for preparing a variety of not only textbooks but also other materials, so as to children's creativity, participation and interest, thereby enhancing their learning. No one textbook can cater to the diverse needs of different groups of students.

Textbook

The most common learning resource in mathematics is a 'textbook'.

Various people conceptualise textbook in various ways. Some of these are:

A textbook is a book used in schools or colleges for the formal study of a subject.

Another statement describes it as a book used as a standard *source of information on a particular subject.*

A textbook is a collection of series of texts on various concerns of a specific area, for example, a textbook on mathematics, will be consisting various topics in mathematics specific to a particular grade and comprising specific text on these topics. A textbook of Class X may differ in various aspects from a textbook at college level for the same subject. In Class X textbook, 'trigonometry' may be one of the several chapters while there may be a complete textbook on 'trigonometry' alone at college level.

Textbook may vary according to the subject, content, student's age level etc. It gives introduction of the content and then tries to inculcate the understanding of the content through various instances, fundamentals, examples, exercises, etc. A textbook should preferably have historical context too, as it sensitises learner to humanistic aspect of mathematics. As Lawrence (2006) reveals that the historical context offers a flexible framework within which it is possible to achieve good results. It may have story also to develop communication skills, empathy, understanding, and above all, the subject knowledge.

(i) Need and Importance

From the above discussion, it can be said that a textbook is a very important learning resource as it not only introduces the content, but also builds a platform on which the entire structure of the concept and content knowledge stands firmly. It also gives a framework of a particular area of a course of study. It may be made easily available to all students irrespective of their socio-economic background. Now a days, textbooks are available in hard as well as soft forms. It can be in the form of a paper book or an e-book.

(ii) Handbook and Reference Book

Apart from the textbook, there are other types of books, such as handbooks and reference books. A handbook is a complete book in concise form on a particular task, profession, or area of study etc. A reference book may consist of details or further explanation on a particular topic of a textbook, extension of the topic, further examples/problems and further suggestive texts. Such books may be used to supplement to any resource and also to expand and strengthen the content. As an example, the book 'The Mathematics of Egypt, Mesopotamia, China, India and Islam: A Sourcebook' edited by Victor J Katz (2007), can be used as a reference book to know historical development in mathematics. In continuation of handbooks and reference books, supplementary books, viz., 'Exemplar Problems in Mathematics' and 'Laboratory Manuals in Mathematics' by NCERT for various classes, may also be seen as good learning resources.

Audio-Visual Multimedia

Basically, there are five senses: to see, to hear, to smell, to taste and to touch. These are perceived with the help of different body parts like eye to see, ear to hear, nose to smell, tongue to taste and skin to touch. But for all these, a medium is must, for example, to hear 'a sound' should be there, to see 'some image' or picture should be there.

In case of teaching-learning process, we can talk of various media like picture, image, sound, still and moving clip art, silent and audible video. 'Multimedia' is the combined use of media, such as movie, music, lighting, CD-ROMs and the internet for education or entertainment.

So, *a multimedia can be understood as the combination of more than one type of media, for example, sound alongwith image. When we use audio as well as visual media simultaneously, it is called audio-visual multimedia. It can also be viewed as multimedia designed to aid in*

learning or teaching by making use of both hearing and sight, for example, a video clip with audio, a movie clip, a power point presentation with sound effects, a video film or a television programme. Multimedia is a form of Information and Communication Technology (ICT) (Cohen, Manion, Morrison, 2005). There are many ways in which ICT can be used to enhance the teaching-learning experience in mathematics. Some of the educationists are more concerned with the efficiency and attitude of mathematics teachers towards use of multimedia and ICT. Crisan, Lerman and Winbourne (2007) conducted a study and concluded two types of factors – firstly, factors pertaining to contextual nature, and secondly, factors pertaining to personal nature, if dealt and facilitated effectively, can help the integration of ICT into teaching of mathematics at secondary school level. Factors of contextual nature are school context, availability and accessibility to ICT tools and resources, teacher's ICT skills, department ethos and key persons' and teacher's ICT professional development. Factors of personal nature are ICT content conceptions, ICT curricular conceptions, conceptions in mathematics, pedagogical content, conceptions and teacher's own learning experiences with ICT.

(i) Why Multimedia?

When we use more than one media simultaneously, it helps in learning better than just one media. When audio-visual multimedia is used, two senses work together: to see as well as to hear. So, learning in this case is acquired through coordination of both the senses.

In this way, more than one sense can be activated to make effort to understand the content simultaneously. It may save time too than using single media at a time. Interaction of different senses help in linking of various information simultaneously and thereby stimulates the process of concept formation which is essential for the formation of an abstract concept, for example if a student observes a lion's picture (visual) along with its voice (audio) and if repeated a number of times, the student may recall either when presented one of the two. Similarly, when a student observes a five rupee note (visual) along with somebody pronouncing as five rupees (audio), she/he would learn better.

Traditionally, we are using materials like chalk, blackboard, simple paper charts, mathematical geometry box, etc. in teaching-learning of mathematics. Multimedia has opened a new window, as far as, teaching-learning aids are concerned. Use of multimedia in teaching stimulates our senses for better coordination and metacognitive processes. There are various advantages of using multimedia than that of traditional aids. 'CALtoonz2006' looks at it as follows:

Multimedia can
  (i)   animate the static,
  (ii) simulate the hazardous or costly experiment,
  (iii) capture reality,
  (iv) add movement to static concepts,
  (v)   add dimension to abstract concepts,

(vi) add an element of fun in sometimes boring situations,

(vii) include audio/video clips of the original person/ event, such as the speech of eminent mathematicians and educationists.

Multimedia can add effects, create virtual situations, arouse interest among learners, give concrete representation for learning of abstract concepts, use pictures, texts, images, audio, video, animations, etc. It adds beauty and variety to mathematical concepts. So, it can be easily concluded that use of multimedia can be highly advantageous for the learning of mathematics as it tries to transform its abstractness into sort of presentable concreteness. It helps in making mathematical concepts more real and accessible to learners.

(ii) Multimedia in Mathematics

There are various organisations and bodies which are producing audio-visual multimedia packages or video CDs in the field of mathematics, viz. Central Institute of Educational Technology (NCERT), Electronic Media Production Centre (IGNOU), and different Government Directorates/Departments of Education. For instance, CIET has produced multimedia packages like 'Mathematics for Secondary Classes: Locus' and 'Mathematics for Primary and Upper Primary Classes: Construction of Geometrical Shapes', etc. It has produced many audio and video programmes both for teachers and learners. There are some non-government organisations (NGOs) and private sector educational institutes too which produce and make available the audio-visual multimedia

for mathematics. It can be effectively used even in the absence of teacher, any number of times with a freedom to manage own time schedule. This ultimately enables learners to become independent learners.

(iii) How to Select a Multimedia?

Whatever is the content or whatever be the media, learner is always our main concern. So, while selecting any multimedia, the learner should be at the central place.

There are several aspects which should be kept in mind while selecting an appropriate multimedia:

1. *Pertaining to the learner*

   (i) Learner centeredness: It should be the learner who actively participates and takes decisions during execution of content through multimedia.

   (ii) Motivation and encouragement: Learner should get motivated and encouraged by the multimedia to be used.

   (iii) Readiness and mental set: Learner should be made ready and mentally prepared to learn from multimedia to be used.

2. *Pertaining to the multimedia material*

   (i) Usefulness: The content of multimedia should be useful for the learner.

   (ii) Cost effectiveness: Multimedia should be cost effective.

   (iii) Availability: Multimedia should be easily available to all.

   (iv) Relevance: Multimedia should be relevant to the subject and topic.

(v) Accessibility: Multimedia should be easily accessible to all.

(vi) Duration: The duration of multimedia should be appropriate with respect to need of content topic and learner. It should be neither too short nor so long.

3. *Pertaining to the formal and non-formal setting*

(i) Physical conditions: Physical environmental conditions should support the multimedia to be used.

(ii) Apparatus and equipments: Availability of apparatus and equipments for multimedia should be kept in mind.

(iii) Learner friendliness: The setting in which multimedia is to be used should be learner friendly.

(iv) How to Design a Multimedia?

Although there are varieties of multimedia resources available in the
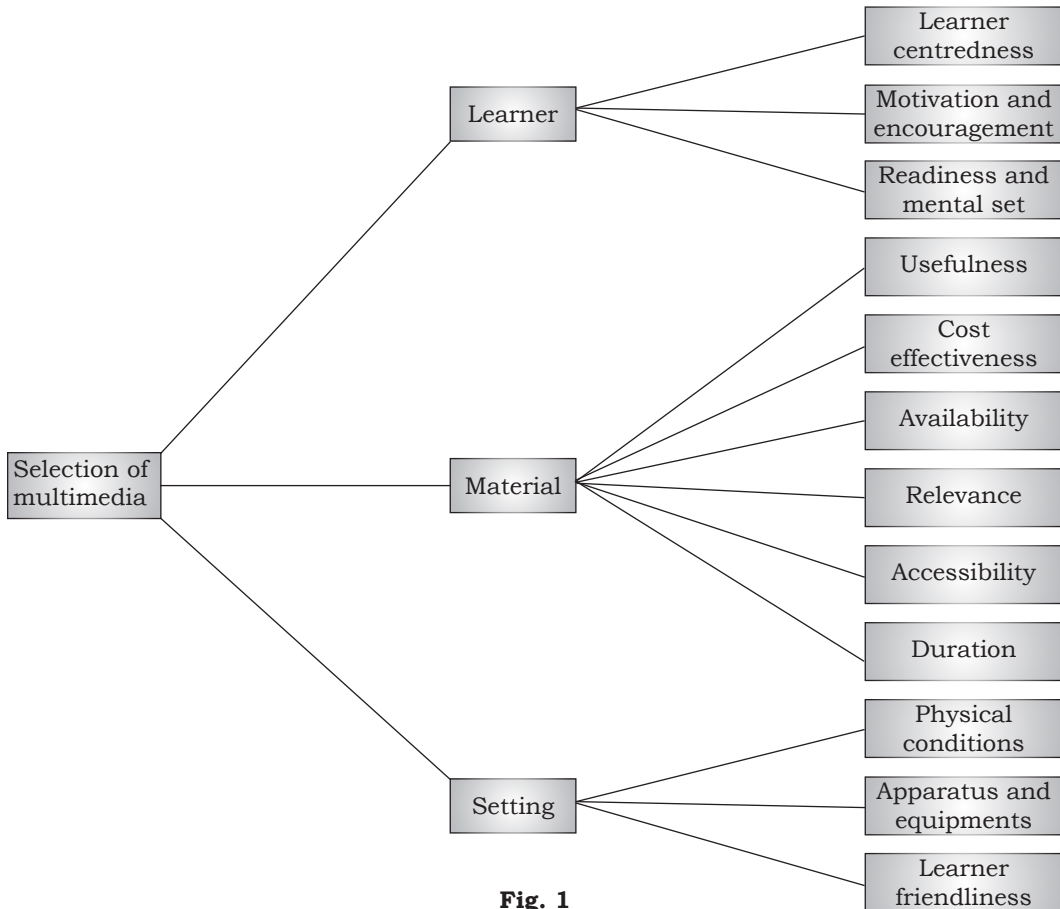
Fig. 1

market, it is always better if a teacher designs a multimedia resource keeping in mind the learning demands of the learners. Such individualised resources will have better impact and results. A multimedia can be designed through systematic steps, along with steps mentioned by various stakeholders, as follows:

  (i) Defining end point behaviour
 (ii) Assessing the learner or learner group
(iii) Defining specific objectives
(iv) Planning materials and objectives
 (v) Planning optimum utilisation of available resources and alternative arrangements
(vi) Planning teaching strategies and methods
(vii) Evaluation process and recycling

Directorate of Education, Government of National Capital Territory (NCT) of Delhi along with Earnst Young Foundation (EYF) launched a project 'CALtoonz2006' for preparing multimedia for school students. It gave a sequence of steps for multimedia content development as follows:

  (i) Defining the learning objectives
 (ii) Gathering information
(iii) Preparing information for steps of preparation
(iv) Preparation of material for guided and independent practice which includes:
    (a) Database of questions
    (b) Games
 (v) Art work and animation

 (vi) Voice over
(vii) Finishing touches
(viii) Review and field test
       These above mentioned steps can be used to design a good multimedia.

Community Resources

(i) What is Community?

Community, the term has evolved from the old French word etymologically 'communite' and classical Latin word 'communitas' or 'communis' which means common.

As revealed from various sources, *Community is a group of people sharing a common understanding who reveal themselves by using the same language, manners, tradition and law. It can be seen as the condition of having certain attitudes and interests in common.*

It can also be viewed as a particular locality, considered together with its inhabitants or a group of people within a society with a shared ethnic or cultural background, especially within a larger society. It also gives a sense of the people with common interests living in a particular area. So, as a whole it can be understood as a society in general.

National Curriculum Framework for Teacher Education (2009) emphas-ises upon the role of community knowledge in education. It says, "It is important for the development of concepts in children as well as the application of school knowledge in real life, that formal school knowledge is linked with community knowledge." Community knowledge, here, refers to the knowledge that people construct, develop and amass as a result of their everyday and ecological

experiences. So, indigenous and local knowledge should be given ample importance for the learning.

(ii) Mathematics Learning begins at Home

The best initial resources for mathematics learning can be found at home and immediate environment itself. The home, as first exposure of informal community to the child, provides ample opportunities where mathematical ideas are experienced, explored and learnt. There are various objects available at home and that too with ease, which can help in learning of mathematics. Currency notes can be used to develop the understanding of number system. These can be used to learn fundamental operations in mathematics. The walls, floor, ceiling, electrical wires, table, chair, utensils, etc. can be used to develop spatial understanding and formation of geometrical shapes. Wall and gate can be used to learn trigonometry. Playing cards and glass balls can help in learning of probability. Distribution of biscuits and chocolates, etc. can make the learner understand the basic operations in statistics like presenting information in terms of numbers and making a frequency table. Not only this, even rituals at home can be used as learning resources in mathematics. There are many books written by Qvarsell and Wulf (2003) mentioning how rituals can be used for learning.

(iii) What are Community Resources for Mathematics Learning?

Community in a generalised sense can be viewed as the society. The local context of the learner can be viewed as the best resource for learning. Community resources give an opportunity for better inquiry system for learning.

For developing and schematising concepts through various sources of evidence like reasoning, observation, representation, dialectic and ethical values, community resources can play a vital and facilitating role. Students are advised to explore more upon these sources of evidence.

At formal stage, school, block and the district, as parts of community, play significant role in shaping mathematical world of the learner. At all these levels, various resources are there which can help in learning of mathematics. At school level, these may be school premises and school buildings, corridors, verandahs, classrooms and walls, mathematics laboratory or corner, mathematics club or forum, group of mathematics teachers or mentors and mathematics exhibitions. Group coordination and cooperation among mathematics teachers can help better teaching-learning of mathematics and improve performance in mathematics as revealed by Horn (2008). At block/cluster level, there may be cluster level exhibitions, cluster level mathematics centres, a panel of all mathematics teachers at block level, block level mathematics competitions. At district level, there may be mathematics centres, mathematics exhibitions, mathematics fairs, committee for mathematics activities, mathematics laboratory at District Institute of Education and Training (DIETs). This is how, we can create opportunities for sharing or exchanging experiences and ideas among

thinking community of mathematics practitioners and learners.

Pooling of Learning Resources

As our everyday experience, we find various concrete and abstract sources of learning, all around us, which act as learning opportunities for meaningful construction of knowledge. One can find everywhere around her/him the sources for learning, and everything (either concrete or abstract) around the learner can make the learner experience so many concepts. Mathematics learning too is not an exception in this case. Though mathematics learning opportunities and resources are available in plenty as part of our everyday life, still there is a need for pooling these resources in some organised and orderly, formal and informal manner, so that they become more accessible and transparent. This pooling can be ensured at various levels viz., school level, block level, district level, state level, national level and international level. Pimm and Johnston (2005), while talking about resources and ideas for enhancing the teaching-learning of mathematics, enlist various resources like textbooks and schemes, practical apparatus, homework, parents, learner's room, the history of mathematics, role play, simulation, video and television, school libraries, mathematics clubs and trails.

At national and international levels, science centres, museum, seminars, conferences, symposium, journals, teachers' association etc. can be good resources for mathematics learning. These will be later dealt in Unit 10 of this book. Here, we will talk about learning resources at:

(i)   School level
(ii) Block level
(iii) District level

Let us discuss these in detail.

(i) School Level

(i)a: Mathematics Laboratory/Corner

In every school, a mathematics laboratory or corner can be established, which will have various equipments, apparatus, charts, models: working and static, etc., that can help in building the learning of abstract concepts in mathematics by having experimentation, activities, hands on experience, verification, etc. In mathematics laboratory, electronic calculator, graph machines, mathematical games, puzzle boards, mathematical kit, mathematics videos and clinometers, etc. can be made available. Mangal and Mangal (2009) has given an elaborated list of hardware instructional aids, viz., magic lantern, epidiascope, projector, radio, tape recorder, television, closed circuit television, video cassette recorder, motion pictures, computers and software instructional aids, viz., blackboard or chalkboard, bulletin board or information board, flannel board, pictures, charts, graphs, maps, globes, diagrams, photographs, cartoons, posters, newspapers, flash cards, models, slides, filmstrips, transparencies, programmed learning packages, many of which can be a part of mathematics laboratory. The need is to think how these can be used for better learning of mathematics.

As NCF–2005, too mentions that one of the important aims of mathematics education is "to develop the child's resources to think and reason

mathematically to pursue assumptions to their logical conclusion and handle abstractions." Mathematics laboratory or corner can best develop the habit of thinking, reasoning and rationalising through logical conclusions and handling abstractions.

(i)b: Mathematics Club/Forum/Community/Society

In school, a club of mathematics students can be established under the guidance of mathematics teacher. The attention should be more towards ensuring membership to all, especially to them who are not thought to be good in mathematics.

Various sorts of activities, discussions, quiz at school level, mathematics excursion and tour, lectures by experts, workshops, competitions can be organised and coordinated by such a club/forum. It can be in the form of a club or forum, community or society. Various activities are mentioned by Thomson and Hartog (1993) in 'Activities to teach mathematics in the context of environmental studies' pertaining to number and number relationship, computation and functions, algebra, statistics, probability, geometry and measurement.

The students who are good at linguistics too can be motivated to establish a reading club, and they can meet weekly to discuss the beauty, nature and recent development in mathematical concepts, and hence, it will help in mathematics learning. Group projects can be taken in such a forum which can pave the way for better learning of mathematics with a shift from independence to interdependence, from structured to freedom, from disciplinary to interdisciplinary, and from product to process.

(i)c: School Library

School library can be visualised as one of the prominent learning resource for mathematics. There are various textbooks, reference books, activity books and puzzle books that can be made available in the library. These books can be issued to students. Various journals pertaining to mathematics learning can be put inside the library for awareness about mathematics learning and pedagogy of mathematics teaching.

(i)d: Mentoring

Though mentoring is still a developing concept in Indian context, but it can be effectively used as one of the learning resources in the school.

As revealed from the various sources, a mentor is an experienced person, trusted counsellor or guide who provides information, advice, support and encouragement to a less experienced person, often leading and guiding by example of his/her success in an area.

Working definition of mentoring can be, *A one to one learning relationship between an older person and a younger person for the development of the later.*

Mentors help in strengthening academic skills in general leading to student's success.

Mentoring is a structured one to one relationship or partnership that focuses on the needs of the mentored participant.

Daloz (1990) views effective mentorship as similar to "guiding the

student on a journey at the end of which the student is a different and more accomplished person. In a formal learning situation, mentoring functions can be understood as providing support, challenge and vision."

During mentoring too, formal and group work can be given ample emphasis. Mac Bean, Graham and Sangwin (2004) had a study on school and university students namely 'Group work in mathematics: A survey of students' experiences and attitudes' and concluded that students show a very positive attitude towards group work, but with utilitarian view of its benefits.

(ii) Block Level

(ii)a: Interschool Collaboration

There can be collaboration among schools to provide a place to establish a platform for mathematics. This collaboration will give rise to opening of new opportunities for mathematics learning. This collaboration may be at two different levels: Student's level and Mathematics Teacher's level. Studies have revealed that collaboration of mathematics teachers gives rise to better understanding of learners and learner's problems in mathematics. They discuss various problems pertaining to pedagogy, methods, fundamental problems and sharing available facilities.

(ii)b: Cluster Level Competitions or Exhibitions

Cluster level competitions are other learning resources in mathematics. At cluster level, we can have mathematics exhibitions, mental mathematics quiz competitions, mathematics table writing competitions, etc. All these competitions can develop a healthy attitude towards competition, cooperation and coordination among students.

(ii)c: e-Learning Laboratory cum Block Resource Centre

e-learning can be understood as learning through electronic means, modes and resources. This may be online or offline, synchronous or asynchronous, etc., but the type, the learner uses, must be an electronic form. In Indian context, if it is not easy to have e-learning laboratories at each school, then as an alternative, we can have e-learning laboratory at block level. While talking about e-learning, Bhatia (2009) mentions that e-learning should be used to supplement and not supplant traditional forms of teaching-learning.

Main features of e-learning are:

(i) connectivity or networking
(ii) flexibility
(iii) interactivity and collaboration
(iv) virtual learning environment like texts, visuals, quizes, etc.

Various e-learning tools can be used for mathematics learning like e-mails, blogs, wikis, e-portfolios, animation, videos, links, specialised softwares, etc. Noss (1988) had a study with 13 years old LOGO experienced children, on and off the computer. Children were asked to solve ratio and proportion problems using computer as well as paper and pencil. He used pencil and paper for ratio test. It was found that the performance was better in case of students solving the problems on the computer. Along with these computers related facilities, other learning aids can also be put in block resource centre. Students

are suggested to go through various packages produced/being produced by Regional Institute of Education (NCERT), Bhubaneswar and CIET for pedagogy-technology integration discussing various e-tools and their integration in teaching-learning process.

(iii) District Level

(iii)a: Science Centre

At district level, there are some science centres. These centres inherit mathematics as a science component. There are exhibitions and several other activities at science centres pertaining to mathematics also which may really help in learning of mathematics.

(iii)b: DIET

At district level, there are District Institutes of Education and Training (DIET). These institutes have enriched mathematics laboratories which can help prospective teachers to learn more about mathematics and teaching of mathematics, which in turn will help learners. Most of the models and aids in these institutes are being prepared by student-teachers. It can be revealed from NCFTE (2009) that student teachers learn to integrate ideas, experiences and professional skills through hands on experience of developing learning materials.

(iv) Open Educational Resources, Web Resources and Virtual Classrooms

Now a days, more emphasis is being given on open educational resources. Since most of the resources on internet are paid resources, it is not possible for all to access and use these resources for learning. While it is very important that everybody should learn mathematics in the current era, how can we deprive a major section of the society new technology and resources for learning of mathematics? The answer to these questions is open learning resources. There are several websites which make web content freely available for all. A very well known name is 'wiki'. Wiki means 'what I know is'. This is a very large project and comprises of various components. The most popular open education resource is Wikipedia. Its website address is http://wikipedia.org. It comprises editable text material and information on almost every topic. If it is not there, anybody can create a page for that particular topic. The information can be seen in almost every language, including English and Hindi. Wikipedia also hosts a number of sister projects which are equally important. Some of these are Commons, Wikiquote, Wikispecies, Wikinews, Wikibooks, Wikiversity, Wiktionary, Wikisource and Meta-wiki. All these resources are open for all anytime, anywhere, and that too free of paid services. These sources give freedom to edit and express for every individual. There are Google applications too as other resources.

Some other good web resources in mathematics are:

http://mathforum.org
http://www.algebasics.com
http://www.cutescience.com
http://mathworld.wolfram.com
http://www.ipl.org
http://www.emis.de
http://www.mathmistakes.com
http://www.nctm.org
http://www.awm-math.org

http://www.eric.ed.gov
www.e-book.com.au
www.dli.ernet.in
http://wikieducator.org

There is another resource known as virtual classroom. In virtual classroom, people interacting simultaneously are not face to face, but still there is a sort of synchronous communication among all people. In such a classroom, anybody can express anything anytime, during the class and all others will come to know and respond to the query or views expressed. It all happens when people are sitting at their respective places either at home or at likewise setting. So, in such a learning situation, they are not required to assemble altogether at the same place. While talking about importance of virtual classroom, Amin (2010) says "Teachers' physical presence is not needed all the time. Even at higher education level, a person from one country can have their mentors or teachers from other country. This has created a greater impact and given broad outlook to education." The versatility of such resource is that there can be learners sitting in different continents like Asia, America, Africa and Australia simultaneously and interacting with each other. A website as an example for such classroom can be given as:

www.wiziq.com

Students, while using any website, are advised to be cautious about their possible harms too, as some of the websites may hack their computers, misuse their data, transfer virus to their computers. One of the possible solutions/precautions may be that the computer should have been installed with latest updated anti-virus. One of the free anti-viruses is 'Clam Win', which may be downloaded from link provided on website of UNESCO (2011). Students are suggested to check the current status for this anti-virus.

Handling Hurdles in Utilising Resources

While utilising all above mentioned resources, there are some hurdles felt by either teacher or students. A hurdle, in general, can be understood as a difficulty or obstacle that has to be overcome. So if we want to utilise these for better learning of mathematics, we will have to overcome these hurdles. Broadly we can categorise these hurdles into two categories: first, social and ethical hurdles, and second, technical hurdles. CALtoonz2006 and Roblyer (2008) talk about various aspects of these hurdles. Let us discuss these in detail.

(a) Social and Ethical Hurdles

As ethics are basically related to the society, so these hurdles can be put together with social hurdles due to their complementary nature. Various hurdles or attention seeking issues with reference to CALtoonz2006 and Roblyer (2008) can be mentioned as:

(i) **Secularity of the Content:** India is a secular country as mentioned in our Constitution. So, we have to maintain secularity in the content of the resource. No resource can be utilised and accepted which harm our secularism.

(ii) **Gender Equity:** Gender equity is another very important issue. Our resource should be based on giving equal importance to both the genders, male as well as female.

For the evolution of a modern and developed society, gender equity is important.

(iii) Democracy: Democracy is giving equal opportunity and equal rights to all. Our resource content should provide ample instances for reflecting democracy. If it does not reflect, it may not be accepted by the society.

(iv) Respect for Elders: The resource should give space for and should inculcate value of respect for elders. Our Indian culture is well known universally for respect for elders. So, if our content of resource reflects respect for elders, it will be heartily accepted by the learners as well as their parents.

(v) Respect for the Disabled: This era is the era of inclusion of all in every aspect of our society, including the field of education and betterment of life. Our resource should show equal opportunity to all, and it should pave a way giving respect to the disabled.

(vi) Respect for all the Religions: The resource content should give respect to all the religions. The content should not have any material which shows disrespect to any religion. This may help in fostering fraternity among learners.

(vii) Concern for Animals: Our society is more concerned about animals and their welfare now a days. The resource should respect such concern in its content and presentation.

(viii) Respect for the Environment: While we are stressing for eco-friendliness of everything we are using or producing, how can we leave our resource away from such an important issue. Our resource should be eco-friendly, encourage eco-friendliness, hence, should have respect for the environment.

(ix) Plagiarism and Cyber Cheating: Plagiarism is using and mentioning work of some other person without acknowledging that person, or mentioning in the name of oneself. This is just like cheating, and unethical that the work of some other person is being used or published in the name of self. So, using any resource in such a way should be avoided.

(x) Illegal Downloads/Software Piracy: Software and media companies are prosecuting offenders of illegal downloading and piracy of softwares. Hence, one should avoid illegal downloading and piracy of softwares.

(b) Technical Hurdles

Some of the technical hurdles are:

(i) Colour: Colour used should not be hot colours. Most of the colours should be soft colours and eye friendly. The learner should not feel stress while going through the content as well as pictures and figures.

(ii) Speed: In case of multimedia resource, the speed should be optimum enough to provide learners with ample time to go through the content and concept. If speed will be too fast, learner

would not be able to go through the entire slide, and if it will be too slow, learner would feel like wastage of time and it may create disinterest.

(iii) Smoothness of Animation: In case of animation, it should be smooth enough to facilitate learner for better learning. It should not create a sense of irritation among the learners.

(iv) Use of Screen: Entire screen should be efficiently used. It should not be like that the entire content or picture is lying on a corner and majority of the space of the screen is lying vacant or useless. If only text is there, it could have its orientation beginning from centre. In case of books and e-books too, each page can be considered as one screen.

(v) Special Effects: Special effects, if any, should be learner centred. It should be in consideration with the age level, mental level, previous knowledge, attitude and aptitude level and readiness of the learner.

(vi) Music: Music, sound and voices used should be appropriate with respect to validity, timing and relatedness. It should be soft and ear friendly. Under no circumstances it should be harmful or irritating to the learner.

If all these social, ethical and technical hurdles can be overcome, then not only learners and teachers, but everybody related to the field of mathematics will use these resources for betterment of learning, and hence, for the betterment of the entire field of mathematics.

Some suggestions for overcoming the hurdles could be as follows:

(i) Narration: It can be better, if the text for using at school is in the form of narration. A narrator should always be present over there. It means, if a text is being represented, it should be shown in such a way that it is being narrated by some character instead of simply writing the text in open space.

(ii) Teacher Friendliness: It should be easy for the teacher to handle the resource. If the teacher, will not feel comfortable using the resource, it may create disruption from using the resource in future again.

(iii) Teacher Training and Skill Development: A teacher should be trained and provided with ample skills to use resources in learning of mathematics. It must be compulsory part of a teacher training programme, that prospective teachers be given training for skills to handle learning resources.

(iv) Attitude and Ease of Access: The source should be easily accessible to all the students and teachers. They may not have a positive attitude towards utilising these resources in learning and teaching, but ease of access will surely motivate them for utilising these resources in learning, 'teaching of mathematics.'

If all these social, ethical and technical hurdles can be taken care, then not only learners and teachers, but everybody related to the for field

of study of mathematics will use these resources betterment of learning and hence, for the betterment of the entire field of mathematics.

Summary

Learning resources play a vital role in learning of mathematics. Here and there, several resources are spread which can be used for learning of mathematics. These can be in the form of textbooks, hand books, reference books, supplementary books, audio-visual multimedia or community resources. Sometimes, there is a need of pooling these resources at formal and informal levels. Various resources, mentioned here, provide powerful vehicles to engage and sustain children's interest in mathematics. If these resources are properly used as learning opportunities for mathematics learners, it will surely empower our learners to think like mathematicians.

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Bridging the Gap in Girls' Education through Open Schooling in India
Prospects and Provisions

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Abstract

Education of girls has been a high-priority area for the Government of India. The Central and State Governments have been making efforts to achieve the goal of Universalisation of Elementary Education. Despite the initiatives, the gender gap in India has persisted in the field of education since Independence. Enrolment of boys is more than girls at all levels of school education and drop-outs rates for girls are also higher – indicative of a gender gap that needs to be bridged (though in recent years, it has narrowed considerably at the elementary stage). Though the situation continues to improve, girls still have lower enrolments, lower attendance rates as well as higher drop out rates compared to boys. Open schooling has created enormous opportunities for the expansion of educational opportunities. A variety of variables pertaining to open schooling appear to have made an impact on learners' response to open schooling – the structuring of the programme and its requirements, the in-built flexibilities created for the learners – all independently and collectively influence the enrolment of both male and female learners in open schooling. With this context, the present paper seeks to uncover the impact of different aspects of open schooling in enrolment and retention of the female learners.

Introduction

It is becoming well recognised and an accepted fact that education is an important input instrument for promoting peace and prosperity in a given society. The evidence is also clear that the total benefits to education multiply when schools open their doors

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to both the sexes equally. In particular, girls' education has been one of the most powerful forces that contribute to the all round improvement in society's life (Berelson, 1969; Kingdon, 2002). Benefits of educating women are manifold ranging from improved productivity, income and economic development at the national level to better quality of life at the individual level, notably a healthier and well-nourished population and greater autonomy among women. It is also well documented that there is link between mothers' education and their children's readiness for learning, and between girls' education and productive self employment. Thus education of women is a contributor towards a substantial economic and social return to a country.

In a developing country like India, the main challenge is to expand access and to improve retention in schools so that all children are able to attend the school without dropping out and to facilitate better learning achievements. The Constitution of India is committed to give free and compulsory education to all children of 6-14 years. The National commitment to provide free and compulsory education to all children in the 6-14 years age group is now a Fundamental Right of every child in India after the passing of the Constitution (86th Amendment) Act in December, 2002. Educational attainment has found direct linkage with growth of the individual and nation. In translating this into action, the Right of Children to Free and Compulsory Education Bill was drafted in 2005. This was revised and became an Act in August 2009. The icing on the cake is the RTE Act which states that every child should receive education which is based on equality of opportunity and without any discrimination on any grounds. To attain this, India will have to transcend mere non-discrimination and opt for positive differential treatment to attain social justice. Despite the constitutional provisions there is huge task to be accomplished as there is gender gap in education. Women inequality holds back growth of the society, as they form significant proportion of the population. There are 940 women per 1000 male as per 2011 Census in India. It is more than 49 percent of the total population. For the growth of the country it is essential that women are educated and participate in the economic activities in an equal proportion.

Though the female literacy rate increased from 8.86 per cent in 1951 to 65.5 per cent in 2011, it is still considerably lower than male literacy. As per the 1991 Census, the female literacy rate was 39.42 per cent compared to 63.86 per cent for male. In 2011, the scenario changed. As per the 2011 census, female literacy rate rose up to 65.5 per cent and male literacy rate to 82.2 per cent. This shows that gap in male-female literacy rate narrowed from 24.4 per cent in 1991 to 16.7 per cent in 2011 (Fig. 1).

Fig. 1: Growth of Literacy in India (in terms of percentage from the Year 1901-2011)
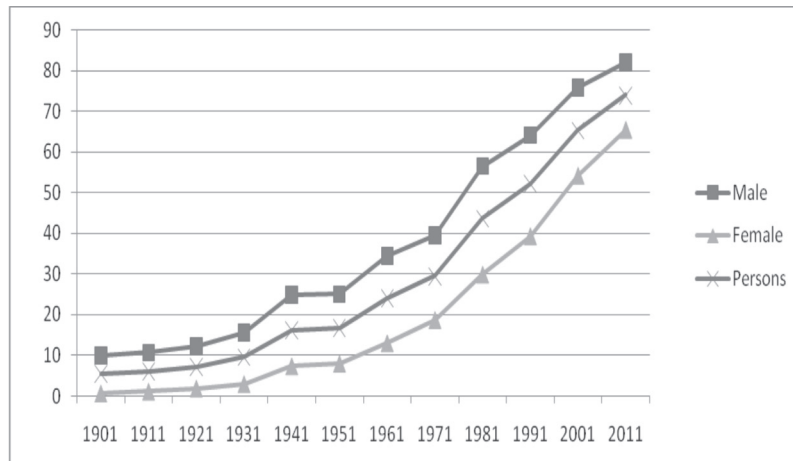
Source: Government of India (2001a) and Government of India (2011): Provisional Population Totals Paper 1 of 2011 India Series 1, Office of the Registrar General and Census Commissioner, India

While India's economy booms, educational opportunities remain out of grasp for large number of rural poor, especially girls. The situation in rural India is even worse (46.1 per cent) against (72.9 per cent) urban India (Census, 2001). Moreover literacy rate for females in rural area is much lower than males (Table 1).

Table 1: Literacy Rates by Sex and Region (1951-2001)

Literacy Rate* (%)			
Year	*Persons*	*Male*	*Female*
1951 (5+ years)			
Rural	12.10	19.02	4.87
Urban	34.59	45.60	22.33
Total	18.33	27.16	8.86
1961 (5+ years)			
Rural	22.50	34.30	10.10
Urban	54.40	66.00	40.50
Total	28.30	40.40	15.35
1971 (5+ years)			
Rural	27.90	48.60	15.50
Urban	60.20	69.80	48.80
Total	34.45	45.96	21.97
1981 (7+ years)			
Rural	36.00	49.60	21.70
Urban	67.20	76.70	56.30
Total	43.57	56.38	29.76
1991 (7+ years)			
Rural	44.70	57.90	30.60
Urban	73.10	81.10	64.00
Total	52.21	64.13	39.29
2001(7+ years)			
Rural	59.40	71.40	46.70
Urban	80.30	86.70	73.20
Total	65.38	75.85	54.16
2011(7+ years)			
Rural	68.95	78.57	58.75
Urban	84.98	89.67	79.92
Total	74.4	82.14	65.46

*(1) Literacy rates for 1951 refer to effective literacy rates and the break up of rural, urban and male-female components are crude literacy rates. (2) Literacy rates for 1981 exclude Assam whereas the 1991 literacy rates exclude Jammu and Kashmir where Census could not be conducted due to disturbed conditions. (3) Literacy rates for Census of 2001 exclude the entire Kuchchh district and three taluka of Rajkot district, one taluka of Jamnagar district in Gujarat and the entire Kinnaur district of Himachal Pradesh where population enumeration of Census of 2001 could not be conducted due to natural calamities.

Source: Government of India (2001 a) and Census of India (2011)

The state–wise data also reflects that there are gender disparities in literacy

Table 2: Literacy Rates State-wise (2011)

S.No	State	Literacy Rate (2011 Census)	Male Literacy Rate (2011 Census)	Female Literacy Rate (2011 Census)
1	Andaman & Nicobar Islands	86.3%	90.1%	81.8%
2	Andhra Pradesh	67.7%	75.6%	59.7%
3	Arunachal Pradesh	67.0%	73.7%	59.6%
4	Assam	73.2%	78.8%	67.3%
5	Bihar	63.8%	73.5%	53.3%
6	Chandigarh	86.4%	90.5%	81.4%
7	Chattisgarh	71.0%	81.5%	60.6%
8	Dadar & Nagar Haveli	77.7%	86.5%	65.9%
9	Daman & Diu	87.1%	91.5%	79.6%
10	Delhi	86.3%	91.0%	80.9%
11	Goa	87.4%	92.8%	81.8%
12	Gujarat	79.3%	87.2%	70.7%
13	Haryana	76.6%	85.4%	66.8%
14	Himachal Pradesh	83.8%	90.8%	76.6%
15	Jammu and Kashmir	68.7%	78.3%	58.0%
16	Jharkhand	67.6%	78.5%	56.2%
17	Karnataka	75.6%	82.8%	68.1%
18	Kerala	93.9%	96.0%	92.0%
19	Lakshadweep	92.3%	96.1%	88.2%
20	Madhya Pradesh	70.6%	80.5%	60.0%
21	Maharashtra	82.9%	89.8%	75.5%
22	Manipur	79.8%	86.5%	73.2%
23	Meghalaya	75.5%	77.2%	73.8%
24	Mizoram	91.6%	93.7%	89.4%
25	Nagaland	80.1%	83.3%	76.7%
26	Orissa	73.5%	82.4%	64.4%

27	Puducherry	86.5%	92.1%	81.2%
28	Punjab	76.7%	81.5%	71.3%
29	Rajasthan	67.1%	80.5%	52.7%
30	Sikkim	82.2%	87.3%	76.4%
31	Tamil Nadu	80.3%	86.8%	73.9%
32	Tripura	87.8%	92.2%	83.1%
33	Uttar Pradesh	69.7%	79.2%	59.3%
34	Uttarakhand	79.6%	88.3%	70.7%
35	West Bengal	77.1%	82.7%	71.2%
-	INDIA	74.04%	82.14%	65.46%

Source: Census of India (2011)

This dismal situation has been stated in the various policy documents published by the Government of India from time to time. The Programme of Action (POA), 1992 in the context of National Policy on Education 1986 mentioned that "there are significant rural urban disparities among women". The National Policy on Education (1986) admitted that the school would not reach all the children, particularly millions of girls and working children whose participation in the school system was thwarted by socio-economic conditions of life.

It is very difficult to achieve Universal Elementary Education (UEE) unless concrete efforts are made to reach out to the girl child. As quoted in POA: "Girls who cannot attend formal schools or have had to dropout will be provided educational opportunities through alternative schooling. The open school, distance education system and other innovative programmes will reach out to girls in rural remote areas and urban slums" (1.7.1, P.O.A.).

Availability of basic facilities in schools not only attracts more girl children to schools but also helps in improving retention rate. An assessment of the scenario in terms of basic facilities that facilitate enrolment and retention of girls also indicates that much more needs to be done in terms of factors such as provision of separate girls' toilet, female teachers. As per the DISE (District Information System for School Education) data about 50 per cent elementary schools in India during the year 2008-09 had separate toilets for girls and nearly about 44 per cent primary schools in India had girls toilet. The figures pertaining to enrolment of girls at primary stage (48.38 per cent) and upper primary stage (47.58 per cent) also indicate that the girls are lagging behind in enrolment. The percentage of female teachers (43.3 per cent in primary schools and 43.46 per cent in all elementary schools) also needs to be improved.

The direction of gender disparity in primary education can be indicated using Gender Parity Index. In a situation

of perfect equality between boys and girls, the value of GPI is 1, and 0 in case of highest disparity. The average of 35 states and UTs in 2008-09 (DISE data) indicates a Gender Parity Index (GPI) of 0.94 in primary classes and 0.93 in case of all elementary schools taken together. The analysis clearly indicates that boys outnumber girls both at the primary and upper primary level.

The positive link between women's education and social progress is a well-established one. As discussed earlier, inspite of policy statements by the Government of India from time to time, there are a number of factors that create hurdles in the progress of women's /girls education. In order to sustain interest and commitment in continued schooling of girls/women, open schooling provides a viable and workable solution to the

Table 3: Selected Indicators Pertaining Girls Enrolment as per DISE Data (2008–09)

S.No.	Indicators	Primary Schools	Upper Primary Schools	All Schools
1.	% Girls Enrolment (Primary)	48.38	47.58	48.15
2	% ST girls to ST Enrolment	48.50	46.45	48.01
3.	% SC girls to SC Enrolment	48.31	47.53	48.09
4.	% Female Teachers	43.30	35.82	43.46
5.	% Schools with Girl's Toilet	44.37	61.44	53.60
6.	Gender Parity Index (GPI)	0.94	0.91	0.93

* **Note:** The term All Schools includes schools having classes from Class I to VIII
Source: Analytical Report, DISE 2008-09, NUEPA

Education of Girls through Open Schooling

A popular model for girls/women's education in India is that of the National Institute of Open Schooling (NIOS). In addition to this there are also State Open Schools. Eleven states have already got State Open Schools. These are located in Andhra Pradesh, Delhi, Haryana, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, and West Bengal. There are 8 states namely Uttar Pradesh, Orissa, Maharashtra, Gujarat, Assam, Chattisgarh, Uttaranchal and Bihar which are in the process of setting up State Open Schools.

challenges of equity in educational provisions for girls and women. Some salient features of open schooling programmes that are addressed to the special needs of the girls/women are as follows:

Policy Regarding Entry to NIOS Courses

The open schooling ensures access to education of the learners as it addresses the shortcomings of the traditional system in terms of its rigidity. The NIOS expects a minimum level of competence for entry into its courses. Any student who has passed primary school can enroll himself/herself in the Foundation Course or the Secondary

Level course. To enroll in the Senior Secondary course, however, a candidate must have a secondary pass certificate, to maintain equivalence with other examining bodies.

In NIOS, there are no rigid entry qualifications and no upper age limit for admission. It has a diverse student profile at the secondary stage having young and old learners ranging from 14 years to 89 years, distributed throughout the country. Flexibilities of the open learning system with regard to entrance policy makes possible for the girls/women engaged in household responsibilities to join NIOS programme at a time suitable to them. They have the freedom as well to discontinue their studies for a while to attend to socio-economic responsibilities. The NIOS provides them an opportunity to rejoin the course at a point where they had left it due to compulsions of life. As such, instead of leaving educational pursuits forever, Open Learning and Distance Education delivery system enables girls and women to pursue their educational efforts without disturbing normal rhythm of life and needs of the family. The open learning can benefit the family without taking the wife/mother away from the house to pursue her studies. Thus the open learning enables the mother to stay home with children and study as well. The strength of open learning system is that it allows women a bit of breathing space within a stripfling situation of gender inequality.

There is yet another motivating factor that promotes girls/women's education. Many parents cannot afford expenses on private cost of education of their children. Due to this, they have to make a choice as to whom they should send for education; for which they prefer the son, as he is seen as the future earning member of the family. To encourage greater participation of women/girls, the NIOS allows partial fee exemption to them for different levels of courses. In order to promote the involvement of women, the NIOS accepts the name of the mother as parent in the relevant column of the Learner's Admission Form.

The Programme Focus

Objectives of the programme, especially under the NIOS vocational and life enrichment stream, are to empower women with required knowledge, life skills, pre-vocational skills, vocational skills and attitudes for their sustainability. Broadly some of the significant aspects of NIOS programmes that accelerate girls/women's education are:

- extending the knowledge of recent advances in science and technology and skill oriented education to the large population of women/girls including those residing in remote and isolated villages;
- changing their mindset about their perceived role towards family, society and country, at large thereby improving their quality of life.

Programme Dimensions

NIOS through open learning and distance education delivery process has mounted a number of programmes.

It runs courses for out-of-school girls/ women as well as for other categories of personnel who are desirous of pursuing the basic education (Class III, V, and VIII)/ secondary/senior secondary level open school courses, general and vocational education courses. Open Basic Education courses cater to the special needs of girls in the age-group 6-14.

It also provides a course for adolescent girls and adult women, named, the *Paripurna Mahila* (Completely Empowered Women). This course covers vast range areas of women's empowerment, namely, legal literacy, health, nutrition, general awareness and the like. The major objectives of the courses are to equip, especially, rural women with better skills and enhance their knowledge so as to prepare them to face new challenges due to technological development. There are several subject areas in which the NIOS is working for the betterment of the women. Some such subject areas are – *Jan Swasthaya* (public health), early childhood care and education, cutting and tailoring, beauty culture, computer applications and poultry farming. Because of the diversity of the courses offered and flexibility of the NIOS programme there has been a gradual increase in the number of NIOS learners and also of the female learners.

The curriculum content serves as a role model for students and plays an important role in breaking gender stereotypes. Gender specific knowledge is integrated in the curricula in all subjects. Also the course teams involve participation of women and men. Care is taken while presenting the graphics and pictures in the course material so that it is gender sensitive. As a result there has been a steady increase in enrolment of women in open schooling (Refer to Table 4 and Fig 2).

Table 4: Gender-Wise Enrolment at NIOS during the Last Five Years (2005–2010)

	Vocational			Academic			Total		
Year	Male	Female	Total	Male	Female	Total	Male	Female	Total
2005–06	11186	11693	22879	182440	84586	267026	193626	96279	289905
2006–07	11329	10837	22166	199788	91195	290983	211117	102032	313149
2007–08	11558	12116	23674	235649	104693	340342	247207	116809	364016
2008–09	10450	25661	36111	261063	110562	371625	271513	136223	407736
2009–10	11511	50300	61811	294158	125544	419702	305669	175844	481513
Total	56034	110607	166641	1173098	516580	1689678	1229132	627187	1856319

Fig. 2: Increase in Women Enrollment in Last Five Years (2005–2010)

Gender-Wise Enrolment Over the Last Five (2005-1010)
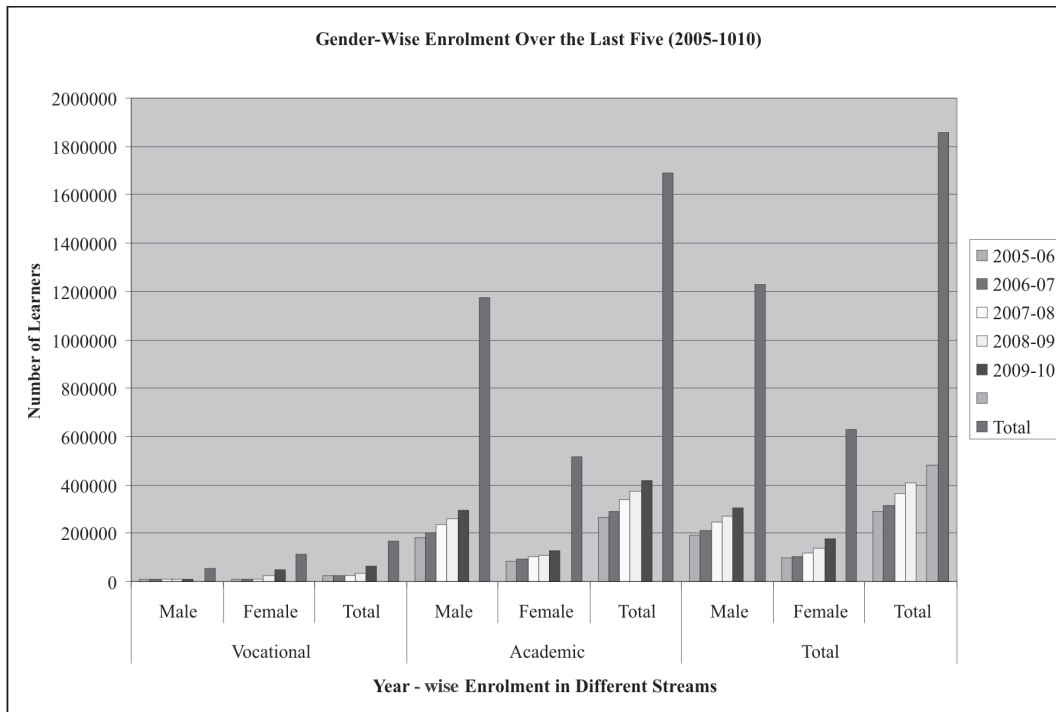
This basically is a comprehensive programme directed towards gender equity. It is directed at generating awareness among girls/women forging an urge for equity measures. Most often, women lag behind initiating enterprising activities, not because they lack ability, but because they do not possess the required skills and access to relevant information that can enable them to set-up their own enterprise. Components of entrepreneurship are inter-woven in the NIOS programmes. The courses seek to develop requisite attitudes and abilities, enterprise management, growth and sustenance of the creative entrepreneurship. The NIOS is taking steps to identify more such gender sensitive courses that would promote women's empowerment. The enrolment in the courses also shows that some of the courses are distinctly popular among the female clientele.

In addition to this, the students can choose the subjects according to their own needs and interests. There is ample choice before the girls/women to select any combination of courses from among the given alternatives. The students can take up vocational subjects along with academic subjects. For example, a senior secondary student may choose play-centre management courses along with any three academic subjects and one language.

Nature of Courses and Course Structure

The NIOS offers a wide spectrum of courses of general and continuing education for different categories of learners through distance education mode. It has worked out a course equivalent to Class III and V to enable the neo-literates to attain primary level competencies. These courses provide an avenue to the women/girls who had to drop-out due to various factors, such as, migration of parents/guardians to another village, death of a family members, etc. The other academic courses offered by the NIOS, such as, foundation course (equivalent to Class VIII), which serves as a bridge course to those joining secondary level programme (equivalent to ten years of schooling); and the secondary level programme which leads to senior secondary programme (equivalent to twelve years of schooling) provides a graded continuity to the female learners. The learners can take up subjects according to their preference/area of interest.

The NIOS in collaboration with Bihar Education Project has implemented the 'Hunar' scheme. 'Hunar', a scheme has turned out to be a huge success in Bihar with over 13,000 of them joining the programme. The scheme was jointly launched by the Union Ministry of Human Resource Development and Bihar Government to make women from minority communities' self-dependent. Under the scheme, started on an experimental basis in July 2008, women from minority communities are being trained in computers and other skills like weaving, knitting, and child and maternity care. A total of 1,37,68 Muslim girls have been imparted skill training in courses like *Gram Sakhi*, Cutting, Tailoring and Dress Making, Basic Rural Technology, Jute Production, Bakery and Confectionery, Beauty Culture and Early Childhood Care and Education. Out of 1, 37, 68 girls, 11347 girls passed the examination and got certificate in respective trades. It is interesting to mention that not even one learner, dropped out of this programme. The success of the Hunar Project in Bihar encouraged NIOS to launch the project in Delhi also. It is very important to note that approximately 61 per cent of the Vocational admission is that of girls and women in the age group of 14-20 years.

Seeing the success of this project, the Government of Bihar offered NIOS to make it continuous for phase II and a target of 50,000 more girls of Muslim, SCs, STs and most backward community were targeted for the session 2010–11. About 45,298 students enrolled and 12,252 appeared in the examination held in July 2011. Apart from 298 accredited institutions (i.e., study centres) under Hunar phase I, 723 new study centres were accredited for running this programme. These 723 study centres were Model cluster schools, institutions and NGOs.

The National Institute of Open Schooling (NIOS) started offering vocational education programmes through Open and Distance Learning (ODL) mode in 1992. Courses in the broad areas of Agriculture, Engineering and Technology, Health and Paramedical, Home Science and Hospitality Management, Computer and Information Technology, Business and Commerce, and Teacher Training

are available. Vocational courses became quite popular among students, and enrolment increased sharply till 2002–03. In subsequent period, however, a declining trend in enrolment is observed. In order to bring out the underlying reasons of such a trend, the paper analyses enrolment data of NIOS for the period 1997–98 to 2009–10. It is found that share of vocational stream in total enrolment of NIOS is very low. Enrolment is concentrated in few states and vocational education is not popular in many states. Moreover, many vocational programmes have negligible enrolment and these programmes have become deadweight for NIOS. A positive feature, however, is that women outnumber men in admission to vocational programmes of NIOS.

The NSS Report (64th Round) (NSSO, 2010) surveyed the educational expenditure and participation in India for the period July 2007 to June 2008. It found that per capita expenditure for males in vocational education was Rs. 13,480 compared to Rs. 2,595 in general education and Rs. 32,594 in technical education. On the other hand, per capita expenditure for females in vocational education was Rs. 17,705 compared to Rs.2,293 in general education and Rs. 31,111 in technical education. An implication of the above is that vocational education for females is more expensive compared to that for males. This is in sharp contrast to general education and technical education where per capita expenditure for females is cheaper than that for males. No such disadvantage is faced by female students in vocational courses of NIOS. The disincentive in terms of higher expenses of vocational

education in conventional mode works as an incentive for females to join NIOS. The bias against females in conventional mode explains to some extent why more females opt for vocational courses of NIOS.

Table 5: Gender-wise Vocational Admission Trend

Gender	2008–09	2009–10	2010–11
Boys	10450 (47%)	8562 (44.89%)	8902 (39.08%)
Girls	11893 (53%)	10511 (55.11%)	13877 (60.92%)

Source: Annual Report of NIOS, 2008-09, Annual Report of NIOS, 2009-10 &Annual Report of NIOS, 2010-11

Student Support Services

Carefully designed self-instructional printed material, audio-video programmes, teleconferencing and personal contact programmes at the study centres give enormous potential to the open learning system as it provides the women/girl opportunity to learn at their own pace and place.

Realising that the distance education methodology is still new to the learners, the NIOS gives importance to the face-to-face instruction also. The Student Support Services are provided through the study centers. The study centers are located in formal schools, colleges; teacher's training institutions and non-government organisations with the capacity to provide academic support to the learners.

Lack of facilities and lack of accessibility are factors that affect education of girls in the rural areas. To send girls to far-off places for education is not economically viable and socially

unacceptable in such a context. The NIOS has been striving to identify good schools and vocational institutes in semi-urban, rural and remote parts of the country to bring more and more girls/women into its fold. Today, the National Institute of Open Schooling reaches out to women and girls through a network of about 4,102 study centres distributed all over the country.

One of the reasons why less number of rural parents are sending girls to schools is the co-educational status of the schools. Surprisingly this feeling exists as much in the urban areas as in rural areas. NIOS has sought a way out by having study centres for 'girls only' in areas where their strength is significant. These schools usually have lady teachers who can understand the problems of girl students better. It is because of these features that its coverage has been expanding. Classes are held on Saturdays and Sundays or evenings of working days. Some Study Centres have special timings for women. Sometimes classes are held in the afternoon when women are free from their domestic responsibilities. This has widened the scope for gender equity in access to educational opportunities to girls/women.

Learner Evaluation

In pursuance of its policy of learner-friendly approach, the National Institute of Open Schooling allows students to take examinations when they are ready. Examinations are held twice a year and students are free to take the examinations according to their convenience. This allows the girls/women to study at their own pace and convenience. In addition to this, the NIOS has introduced a scheme of transfer of credits through which learners who have cleared one or two subjects from the Central Board of Secondary Education (CBSE) but not qualified in the full course can seek admission in the NIOS and take the remaining subjects in the Secondary/Senior Secondary programmes.

The NIOS also introduced On-Demand Examination (ODES). This has opened up wider opportunities for appearing in the examination by parts as per the date and time suitable to the learner.

Future Concerns

Through innovative thinking and experimentation, NIOS has already demonstrated that the rigid mould can be broken. The flexibility in timings and schedules for studies and provision of academic support that they invariably need are the factors that can prevent girl child from becoming workers by default, and the entry of older girls into the workforce can be delayed. But still poverty is a major impediment in girl's education and costs of education, as well as girls' contribution to work, remain serious issues to be considered. The present policy of the NIOS that aims at providing concessions to girl/ women candidate addresses to some extent the constraint of poverty in relation to education of the girl child. Where girls' work is concerned, it is important that the diversity of open schooling programme should address to generate sustainable livelihoods of the poor. So in that context it seems that the NIOS needs to widen its horizon by offering

more livelihoods-oriented courses, and also focussed on catering to girls from all walks of th life.

The NIOS has been alert to the needs of the self employed girls as in its vocational courses it has blended the elements of entrepreneurship, thereby making an attempt to prepare job-creators and not job seekers. The NIOS, as an Open School, furthermore, should find out what forms of self employment are most common amongst it students, and design vocational education and training that will increase their productivity and skills in that self-employment. This would help to create and improve livelihoods, not simply to train its learners in an abstract way in the hope that employment will open up. Through widening its course offerings further it is equally possible to improve livelihoods and reduce poverty by increasing the quality of self employment.

Concluding Remarks

Education for women's equality is a vital component of overall strategy of securing equality and social justice in education. It is important that the emphasis should be on improving conditions for assimilation by enabling women to participate in the educational process.

Through open schooling the possibility of improvement in access and retention of female education is immense.

In view of the constraints faced by the girls/women, provision of open schooling facilities goes a long way in stepping up enrolment and retention. The open schooling has made remarkable efforts to widening access to education by reaching out to the women in remote rural areas.

A variety of variables appear to have an impact on learner experiences and subsequent response to open schooling- the structuring of the programme and its requirements, the flexibility, course material design– all independently and collectively influence the learners' enrolment in open schooling, and as a result, have been successful in helping us bridging the gap between the enrolment of male and female learners at school level. Open schooling programmes can significantly expand and improve educational opportunities, for women and girls as it "can address in a comprehensive manner the most important obstacles to girl's participation in education such as: lack of access to schools, poverty, inflexible schedules, irrelevant curricula, and lack of female teachers".

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Inclusive Education in India: a Paradigm Shift in Roles, Responsibilities and Competencies of Regular School Teachers

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Abstract

The success of inclusive education programmes depends on a number of variables. One of such variables, and perhaps the most important one, is the regular classroom teacher. The nature of their work has undergone a tremendous change since the implementation of inclusive education programmes in India. They are now required to perform a number of additional tasks in order to meet the needs of diverse learners. This paper first discusses the change in their roles and responsibilities in the context of inclusive education. It then provides a review of literature on additional competencies that they would need to have in order to be successful in inclusive classrooms. A brief application of this information for programme planners and administrators is also discussed.

Introduction

The landscape of the education of students with disabilities in India has undergone a tremendous change in the last three decades. The focus of meeting their educational and social needs has shifted from a segregated setting to a more inclusive one. Their needs currently are increasingly being met alongside their non-disabled peers. Such change, however, did not come overnight. It required hard work,

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perseverance and dedication from all stakeholders including policy makers, administrators, teachers, parents and researchers. Policy makers in India were challenged by legislative developments in other countries (e.g. IDEA, 1990) and the initiatives made by the United Nations (e.g. Millennium Development Goals, 2000) to implement legislations, policies and programmes (e.g. PWD Act, 1995; SSA, 2001) that fostered more equitable educational opportunities for all students. Parental groups became more vocal and asserted their rights by demanding equal opportunities for their children. Administrators, teachers and researchers witnessed the inclusive education models that worked well in other countries and started to adopt those models in their schools. Thus the inclusive education initiative that was being implemented in the rest of the world, particularly in developed nations, also gradually paved its way into Indian schools. Incremental progress has been made towards this endeavour during the last three decades and benefitted thousands of students. However, much work still needs to be done to meet the needs of about 30 million children with disabilities in India (Chief Commissioner of Persons with Disabilities, 2007).

Regular School Teachers' Roles and Responsibilities in Inclusive Education

Special education students in India also have high hopes and aspirations as their counterparts do in western countries. They not only need the teachers with right attitudes but also with appropriate knowledge and skills that will help them realise their dreams. The literature on inclusive education is unanimous about

no matter how excellent the educational infrastructure might be, how well articulated educational policy might be, how well resourced a programme might be, effective inclusion does not take place until regular classroom teachers deliver relevant and meaningful instruction to students with disabilities (Mastropieri and Scruggs, 2010). A well-trained classroom teacher is the single most important factor in the success of inclusive education programmes. Studies suggest (e.g. Sanders and Horn, 1998) that the quality of the teacher contributes more to learner's achievement than any other factor, including class size, class composition, or background. It is the regular classroom teacher who is charged with the primary responsibility of providing instruction in classrooms that are now characterised by student diversity. Parikh and Dhylon (1988) make a similar statement by saying "it is the regular class teacher who is the indispensable professional who carries the primary responsibility during integration" (p. 57). Thus, regular school teachers are now expected not only to develop the appropriate curriculum but they also have to define, interpret and deliver it. It is what the regular classroom teachers believe and what they do in the classroom that ultimately shapes the kind of educational programme that students with disabilities receive.

The inclusion of students with disabilities in regular education classrooms requires regular school teachers to upgrade their skills to respond to the new challenges provided by their changing roles and responsibilities. These teachers are

now expected to address problems and offer solutions to challenges posed by special needs students who may vary in their skill levels. They are now required to undertake initial screening of at-risk students, adapt instruction to make them responsive to special needs students, participate in Individualised Education Programme (IEP) meetings, work collaboratively with parents and other professionals, and use technology to assist students overcome their deficits.

Kochhar and West (1996) emphasise that in inclusive education classrooms regular school teachers are required to teach 'content' differently. It must be integrative, flexible and interdisciplinary. In contrast to traditional, teacher-centered instructional approaches in which the teacher stands in front of the classroom and 'lectures' to the entire class, in the inclusive classroom the focus shifts from teaching to learning. Teachers are now required to create situations in which active student learning is maximised. Peterson (1988) argues that the regular classroom teacher is now viewed primarily as a "thoughtful professional", one who is able to understand the relationship between teaching and learning as well as enhance the cognitive functioning of students with disabilities. Sindelar (1995) asserts that a regular school teacher needs to be a professional diagnostician, a decision maker and an instructional manager in order to deal effectively with the challenges posed by exceptional learners. He further says that this professional should be in the best position to assist these students in working with the group, to follow

routines and to comply with accepted standards of group behaviour.

It can be seen that the roles and responsibilities of regular school teachers have been extended following the introduction of inclusive education programmes. It now includes the responsibility of meeting the needs of students with disabilities in addition to meeting the needs of their non disabled peers. It is therefore imperative that regular school teachers have the appropriate knowledge, skills and attitudes to fulfill their new roles and responsibilities.

Regular School Teachers' Competencies for Inclusive Education

Current reform efforts, toward school restructuring aimed at implementing effective inclusion programmes present significant challenges for regular school teachers. The success of these efforts depends primarily on the responsiveness and willingness of these teachers to meet the educational and social needs of students with varying abilities. These teachers are now required to have a number of additional skills and competencies, not generally practiced in regular education classrooms. The Open File on Inclusive Education (UNESCO, 2001) suggests a number of demands be placed on teachers' from the perspective of inclusive curricula such as, regular teachers' involvement in curriculum development at local level, their skill development for curriculum adaptation, management of a complex range of classroom activities, providing support to students' learning, working outside the traditional subject boundaries and

in culturally sensitive ways. A number of authors (Mastropieri and Scruggs, 2010; Kochhar and West, 1996) argue that these teachers are now expected to perform almost all of the role functions as that of a special education teacher. The difference, however, is that they have not received an intensive training in those skills as special educators have. This paper will highlight those additional competencies that regular school teachers need to have in their repertoire in order to be successful in inclusive classrooms.

These teachers are now expected to incorporate the adaptive dimension in all their efforts for students with special needs. As Hargreaves and Fullan (1992) note:

Deeper knowledge of and greater confidence in teaching their subject(s); developing better expertise in classroom management so that more time can be devoted to instruction; knowing how to teach mixed-ability classes; being aware of and becoming proficient in new teaching strategies like co-operative learning or 'whole language' approaches to learning; and becoming knowledgeable about and able to respond to the different learning styles of their pupils– attention to all these things can certainly help teachers increase their pupils opportunities to learn (p.2).

According to Mastropieri and Scruggs (2010), regular school teachers need to be knowledgeable about the learning styles and the motivational patterns of students with disabilities. These teachers also must have a clear understanding of the resources and support systems which are available to assist them for working with students with disabilities. They should present information to the students in a manner which enables them to assimilate the information more easily. Vaughn and Bos (2012) suggested a number of strategies that regular school teachers would need in order to accommodate students with disabilities in the regular classroom environment. These include peer tutoring, cooperative learning, mastery learning and applied behaviour analysis. The literature also points out that regular classroom teachers are required to use instructional strategies such as differentiated instruction (Tomlinson, 2003), activity-based learning (Krishnaswamy and Shankar, 2003), individualised and adaptive instruction (Jangira, Singh and Yadav, 1995) and culture specific pedagogy and culturally responsive teaching (Valmiki, 2003) to facilitate disabled students' learning outcomes in regular classroom environment.

The Council for Exceptional Children (2010) developed and validated a common core of minimum essential knowledge and skills necessary for entry into professional practice in special education. They included: 1. philosophical, historical and legal foundations of special education; 2. characteristics of learners; 3. assessment, diagnosis and evaluation; 4. instructional content and practice; 5. planning and managing the learning environment; 6. managing student's behaviour and social interaction skills; 7. communication and collaborative partnerships; and 8. professionalism

and ethical practices. Although all of these skills may not be essential for regular classroom teachers, a certain level of proficiency in these competencies, however, is required from these teachers when they are expected to work with special needs children. Of the many competencies that have been identified in this paper, there are some that are field tested and advocated as potential methods for delivering effective instruction to students with diverse learning needs. There are many but some of them, that are widely used, include: class-wide peer tutoring (Stephenson and Warwick, 2002), cooperative learning (Jenkins, 2003), self-management skills (Snyder and Bambara, 1997), differentiated instruction (Tomlinson, 2003) and use of assistive technology (Dimmitt, et al., 2006). The school teachers especially need to be proficient in those skills for effective instruction delivery and appropriate management of a classroom that is characterised by diversity.

A number of attempts have been made, especially in western countries, to identify the competencies that regular school teachers need to work effectively with students with disabilities. A variety of methods including literature reviews, survey of educators and other stakeholders, classroom observations, examination of teachers' daily records, experts' opinions, and initiatives of professional organisations such as the Council for Exceptional Children (CEC) have been used to identify such competencies. A wide range of respondents including students with and without disabilities, parents of children with disabilities, special and regular education teachers, school principals and teacher educators have been surveyed to identify these competencies. As a result, several lists of essential teacher competencies have been generated; all of which are context and situation specific. These competencies have been classified under the following seven categories. Each of them will be briefly discussed regarding their relevance to inclusive education followed by a brief review of literature on that competency. The seven core competencies include:

1. Professional knowledge
2. Classroom management
3. Collaboration
4. Assessment and evaluation
5. Instructional techniques
6. Individualised and adaptive instruction
7. Assistive technology

1. Professional Knowledge

Professional knowledge in the context of inclusive education includes a knowledge and understanding of: 1. basic terminology and concepts used in special education; 2. various disabling conditions; 3. a rationale and history of inclusive education; 4. policies, programmes and legislations related to inclusive education; and 5. rights, roles and responsibilities of parents, students, teachers and other professionals as they relate to individuals with special learning needs.

Payne and Murray (1974) conducted a survey of school principals regarding the competencies needed by regular school teachers to work effectively with students with disabilities. The principals

ranked the knowledge of disabling conditions as the most important competency for these teachers. Results of the needs assessment conducted by Gear and Gable (1979) revealed that the teachers in Alabama, USA indicated a high need of training need in the 'professional knowledge' competency area. In a study carried out by Goodspeed and Celotta (1982), the researchers surveyed 37 university professors and 64 regular school teachers to identify the competencies that regular school teachers considered most important, to work with students with disabilities. Both professors and regular school teachers reported 'knowledge of disabling conditions' as the most important competency for regular school teachers to work in inclusive education classrooms.

Sharma (2002) had also reported that Indian teachers require information on the types of disabilities, curriculum adaptation, educational implications, and skills and strategies required for meeting the needs of students with disabilities.

2. Classroom Management

Classroom management for inclusive education includes the knowledge of: 1. Applied Behaviour Analysis (ABA); 2. basic classroom management theories, methods and techniques for individuals with exceptional learning needs; 3. research-based best practices for effective management of teaching and learning; 4. materials arrangement; 5. organisation of aids and support services; and 6. creating a positive atmosphere in the classroom.

The diversity in the classrooms presents a variety of management challenges for regular school teachers. For example, students with special needs, particularly those diagnosed with Emotional and Behaviour Disorder (EBD) and Autism Spectrum Disorder (ASD), may present unique behavioural challenges for these teachers. According to Wang, Haertal and Walberg (1993) effective classroom management has been found to contribute more to school learning than curriculum design, classroom instruction, student demographics, home support and school policy.

As a supportive educational environment has a significant positive impact on overall learning of students with disabilities, Nielsen (1997) argues that regular classroom teachers need to be competent in creating a positive psycho-social environment for all students including those with disabilities. In addition to the psycho-social environment, the physical aspects of a classroom also exert a great influence on the inclusive classroom environment. The physical environment includes such aspects as arrangement of desks, lighting and temperature. Placement of the special needs child in the classroom, in relation to the rest of the students, is also equally important. Depending on the severity of the child's disability, the teacher should be able to decide the proximity control. Such control can be easily handled in primary schools. However, a secondary student's proximity control should be handled carefully as many of them do not like to be identified or singled out. It is, therefore, the responsibility of the

regular classroom teacher to adapt and adjust the physical and psycho-social arrangement of the classroom to be responsive to the needs of the student with a disability.

3. Collaboration

Friend and Cook (2010) describe collaboration as an interactive process that enables people with diverse expertise to generate creative solutions to mutually defined problems. An ever increasing diversity in the classrooms has made it necessary for regular classroom teachers to work with special education teachers, parents of students with disabilities, school psychologists, para-professionals (such as speech and language therapists, physiotherapists, occupational therapists, recreational therapists, etc.) and instructional assistants. Their shared expertise and shared ownership of problems make the likelihood of success for the programme greater than if these educators attempted to deal with the problems in isolation. Friend and Cook (2010) point out that collaboration between regular school teachers, parents of students with disabilities and other school staff is one of the most important issues in the education of students with disabilities in regular school settings.

Using a Delphi technique, West and Cannon (1988) conducted a study involving 100 experts from 47 states in the USA to identify essential collaborative consultation competencies needed by both regular and special educators in inclusive education settings. These experts rated awareness of consultancy theory and models, ability to communicate interactively and solving problems collaboratively as the most important collaborative-consultation skills for regular school teachers who are involved in the implementation of inclusive education programmes.

Regular school teachers could use the following collaborative strategies in order to provide effective instructional programmes to students with disabilities: peer collaboration, co teaching and teacher assistance teams. Peer collaboration involves pairs of teachers working together to solve classroom problems. Pugach and Johnson (1990) found that teachers using this strategy are likely to have significant fewer problems. Friend and Cook (2010) defined co teaching as "two or more professionals delivering substantive instruction to a diverse or blended group of students in a single space (p.109).This is an effective way to utilise each teacher's strengths. Abundant research is available showing the benefits of co-teaching to improve academic achievement of not only students with disabilities but all students (Friend and Cook, 2010; Hart and Whalon, 2008). Teacher assistance teams are also known as support teams, intervention assistance teams or planning teams. In this strategy, a group of teachers meet and brainstorm options for a teacher experiencing problems in the classroom.

4. Assessment and Evaluation

According to a number of writers (McLoughlin and Lewis, 2001), regular school teachers are required to demonstrate competency in assessment in order to identify the specific needs of students with disabilities. Taylor

(2000) points out that assessment, the process of using testing and other formal and informal means of measurement to make educational decisions, is one of the most valuable skills for a regular classroom teacher to have in the implementation of inclusive education programmes. The teachers are required to employ not only basic skills such as gathering learning and background information of students with disabilities, but also, highly specialised skills such as selecting, administering, scoring and interpreting standardised measurement instru-ments (McLoughlin and Lewis, 2001). Friend and Bursuck (1999) suggested that regular school teachers could use assessment information for six instructional and placement decisions for students with disabilities. These include: screening, diagnosis, programme placement, instructional evaluation and programme evaluation. The major decision related to diagnosis is eligibility for special education services. To some extent, regular school teachers will play a role in making placement decisions (such as a general education classroom, resource room or full-time special education classroom). Although the major decisions are made by school psychologists and administrators regarding the placement, regular classroom teachers will assist them in making such a decision as part of the multidisciplinary team.

An evaluation report shows whether or not teaching has been effective. It helps validate successful inclusive education programmes that should be continued and pinpoints problems that should be rectified. Wang, Anderson and Bram (1985) suggested that regular school

teachers should be able to evaluate three aspects of student performance while evaluating their success in inclusion programmes: performance, attitudes and process. Performance measures relate to student's achievement in content areas. Attitudinal measures relate to included student's self-concept and their attitudes toward their teachers and non-disabled peers. Process measures encompass the types of interactions included students have with their teachers and peers.

Regular school teachers need to be knowledgeable about a variety of evaluation methods in order to determine the learning outcomes of students with disabilities. They need to demonstrate competency in performance-based assessments, portfolios and curriculum-based assessments. Performance-based assessments allow teachers to assess students' understanding and proficiency. These assessments allow students to construct a response, create a product or demonstrate what they understand and can do. Friend and Bursuck (1999) argue that these assessments are more likely to reveal student understanding since they call for students to apply knowledge and skills rather than to simply recall and recognise. Alternate assessments such as portfolio assessments are also effective ways of evaluating students with disabilities. Portfolios make it possible to capture the learning process over time as well as the assessment of nontraditional strengths and talents such as artistic or visual abilities of students. Curriculum Based Assessments (CBAs) also provide teachers with information on the demands of instructional tasks and allow them to determine the content and pace

of an instructional programme. Thus, in addition to providing information on a student's progress, CBAs help regular school teachers to match specific instructional practices and materials to a disabled student's learning needs, which results in improved performance on school related tasks.

In a research study, Mukhopadhyay (1990) found that regular and special education teachers in India identified evaluation as one of the most important skill for regular classroom teachers who work with exceptional children. Shukla and Singh (2011) suggested that a flexible and implementable scheme of Continuous and Comprehensive Evaluation (CCE) assumes evaluation as a routine activity and exercise of teaching-learning process, and it encompasses all aspects of pupil's growth such as intellectual, physical, social, personal qualities, interests, attitudes and values through employing a variety of tools and techniques by an evaluation team. They argue that the CCE is the most suitable procedure due to its underlying principles of flexibility, functionality, accountability and economy in evaluating a child with disability in an inclusive setting.

5. Instructional Techniques

This skill is at the heart of all the competencies that regular teachers need to demonstrate while working with diverse student population. These skills are the ones that they ought to use on a daily basis to provide appropriate instruction to special needs students. A number of specific instructional techniques that regular classroom teachers would particularly need to be competent in include: differentiated instruction, activity-based and experiential learning, peer tutoring and collaborative learning. Each one of them has been field-tested and validated to demonstrate their effectiveness. They will be discussed separately for clarity and in order to avoid confusion. Other techniques that have also been field tested with students with special needs include response cards, guided notes, error correction and time trials.

Differentiated Instruction

In the past, regular classroom teachers used ability grouping to deal with variations in student skill levels. Gamoran (1992) reviewed the research on ability grouping and concluded that such an educational practice perpetuated low achievement and widened the gap between high and low achieving students. To overcome these difficulties and to successfully accommodate students with disabilities, regular school teachers needed to use differentiated instruction. This technique requires the teachers to teach one main lesson for all students with variations for each individual student's needs. It is an instructional approach that allows the regular classroom teacher to plan for all students within one lesson, thereby decreasing the need for separate programmes while permitting the teacher to weave individual goals into classroom content and instructional strategies (Tomlinson, 2003). Thus, a diverse group of learners share an instructional activity in which individually appropriate learning outcomes occur within the same curriculum area. Differentiated instruction allows students to learn from

one another in an atmosphere of human diversity. In such classrooms individual differences are the norm rather than the exception. This technique has been well received by regular school teachers who maintain that it is easier than preparing numerous lessons and that classroom instruction has coherence despite individualisation (Porter, 1997). In a research study Jangira et al. (1995) found that regular school teachers in India indicated very high level of training need in 'multi-grade teaching'.

Activity-Based and Experiential Learning

In those classrooms that present instruction passively or in isolation and use a lecture format as the dominant form of instruction, many students do not learn, retain and apply knowledge as effectively. Such instructional delivery methods are, therefore, especially difficult for students with disabilities who are included in regular education classrooms (Krishnaswamy and Shankar, 2003). These students require the teachers to present instruction that is activity-based and allows students to learn through personal experiences. With the use of activity-based and experiential learning, students become engaged in discovery, movement, interaction with the environment and manipulation of materials. Also, since such learning uses real-life activities and materials, skill generalisation and transfer are facilitated. According to Choate (2000) hands-on interactive instructional approaches to a lesson appeal to the senses and make it easier for students with disabilities to learn. Such active learning promotes student

attention, increases on-task behaviour and decreases the incidence of negative behaviour. Freiberg and Driscoll (1992) found that students who were actively involved and engaged in lessons learnt better and faster than students who were "instructionally inactive".

Peer Tutoring

Peer tutoring is an instructional strategy that consists of student partnerships, linking high achieving students with lower achieving students or those with comparable achievement, for structured study sessions. A vast amount of research has been done to demonstrate the effectiveness of this strategy in inclusive classrooms (Stephenson and Warwick, 2002; Fuchs, Fuchs, and Burish, 2000). Peer tutoring has been found to minimise problematic behaviours, increase opportunities to respond and enhance activity comprehension (Marchand-Martella and Martella, 1993). Peer tutoring is also found to be effective in improving on-task behaviour, math performance, reading performance and social interactions of students with disabilities in inclusive classrooms (Fuchs et. al., 2000).

Cooperative Learning

A competitive classroom climate and educational approaches based on comparing pupils with a predetermined standard are not conducive to inclusive education. Cooperative learning, on the other hand, encourages students to work together to complete tasks and solve problems. In this approach, teachers are required to specify each student's role for the task, clarify the sequence of activities and monitor and evaluate

the interactions of group members. A number of authors have emphasised that regular school teachers need to be competent in the implementation of cooperative learning strategies to successfully include students with disabilities in their classroom activities (Jenkins, Antil, Wayne and Vadasy, 2003). These strategies have been found to enhance learning, improve inter-group relations, develop problem solving skills and improve the academic and social skills of students with special needs in regular education classrooms (Putnam, 1998). Studies have also demonstrated that teaching social skills to children with disabilities and their non-disabled peers in cooperative groups in inclusive settings resulted in increased frequency, duration and quality of social interactions (Jenkins et. al., 2003).

6. Individualised and Adaptive Instruction

Individualised and adaptive instruction are educational approaches that recognise, anticipate and programme for variation according to the student's background knowledge, learning styles, motivation and personal interest. Individualisation or creating an educational programme that is tailored to the unique needs of a child with disability is the hallmark of special education. This is what makes special education different from regular education. However a fusion of both well-established stream of instruction is needed from regular school teachers if they are to serve all students in their classrooms including those with exceptionality.

A conceptual framework for instructional adaptations for students with disabilities was provided by Glaser (1977). He envisaged instructional adaptations as a process of choosing and applying an appropriate teaching action following an assessment-based determination that previous lesson for a student was unsuccessful. These adaptations, therefore, require teachers to implement alternative teaching actions such as modifying materials, assignments, testing procedures, grading criteria and varying presentation styles in order to enhance the success of students with disabilities in regular education classrooms. Regular classroom teachers can also accommodate variations in learning styles by developing each student's educational programme using a range of environmental, physical, social and psychological conditions. For example, necessary adjustment of materials (e.g. highlighting essential content, varying sequence, reducing the length of assignments, alternate assignment presentation format such as visual, auditory, etc.) and useful learning aids (e.g. advanced organisers, checklists of steps, study guides, story starters, etc.) are part of individualised instruction. A vast amount of research shows that instructional adaptations such as variations in teaching materials and grouping arrangements lead to enhanced student outcomes (Vaughn and Bos, 2012).

7. Assistive Technology

Recent advances in technology for special-needs students has made it possible for these students to accomplish a number of tasks, while being in regular

education environment, that was not possible earlier. These include the use of ipads, Kurzweil 3000, Read and Write Gold and other communication devices. Therefore, it is imperative that regular classroom teachers have at least some level of knowledge and understanding in the use of such devices and software applications (Dimmitt et al., 2006).

In addition to the 'traditional' knowledge and skill domains discussed thus far, regular school teachers are now also expected to demonstrate ability in a number of emerging competencies. The 'new' competencies derive from the social dynamics that are impacting on the school curriculum. The emerging competencies include maintaining ethical and professional standards (CEC, 2010) and sensitivity toward the cultural background of students with disabilities who are from minority ethnic backgrounds (Mitchell, 2000).

Conclusion

The exemplary and promising pract-ices discussed in this paper offer a framework within which the aims of inclusive education in India may be realised. These practices also constitute the essential competencies that are needed by regular school teachers for the successful implementation of inclusive education. It is the acceptance, development and implementation of these knowledge, skills and competencies that provides the greatest potential for the success of inclusive education programmes in India. These practices also have the potential to create a unified system of education that would be responsive to the unique learning and social needs of students with disabilities in India. All stakeholders, particularly those that are charged with training and preparation of school teachers need to infuse these competencies in their pre-service and in-service training programmes. Regular school teachers who are already a part of the work force should be provided with adequate opportunities for professional development. In this regard, 'one shot' seminars or workshops would not appear to be the answer. Rather ongoing professional development opportunities should be made available to these teachers. David and Kuyini (2012) assert that teachers in India have benefited from in-service programmes which form "part of a long-term systemic staff development plan" rather than from "single shot" short-term programmes. Also, further research is warranted to determine the self-efficacy, current skill levels and training needs of Indian teachers in these skills as this information will help trainers to prioritise areas for training and plan short, and long-term goals.

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Opinion of the B.Ed. Students about Teacher Eligibility Test (TET)

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Abstract

The implementation of the Right of Children to Free and Compulsory Education (RTE) Act, 2009 requires the recruitment of a large number of teachers across the country in a time-bound manner. It is, therefore, necessary to ensure that persons recruited as teachers possess the essential aptitude and ability to meet the challenges of teaching at the school level. The National Council for Teacher Education had, therefore, directed that the essential qualifications for a person to be eligible for appointment as teacher in any of the schools referred to in clause (n) of section 2 of the RTE Act will be that he/she should pass the Teacher Eligibility Test. In the present study, an opinion of B.Ed. students from self-financed and Government colleges has been taken to see what is their view about the Teacher Eligibility Test. The study reveals that the majority of the B.Ed. students want TET be made compulsory, for this will help in controlling the quality of teachers in the schools and will ensure appointment of competent teacher.

The crucial role of universal elementary education for strengthening the social fabric of democracy through provision of equal opportunities to all has been accepted since inception of our republic. The directive principle of state policy enumerated in our Constitution lays down that the State shall provide free and compulsory education to all children up to the age of fourteen years. As evident, even after 60 years, universal elementary education remains a distant dream. Despite high enrolment rates of approximately 95% as per Annual State of Education Report (ASER, 2009), 52.8% of children studying in 5th grade are lacking the reading skill expected in 2nd grade. The idea of 'Right

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to Education' as a fundamental right was hammering the minds of several social reformers and educationists. Article '21 A' inserted in Constitution by 86th amendment in 2002 provides for free and compulsory education for all children in the age group of 6 to 14 years as a fundamental right. Consequently The 'Right of Children to Free and Compulsory Education' bill was proposed to be enacted which seeks to provide that child has right to be provided full time elementary education of satisfactory and equitable quality in a formal school which satisfies certain essential norms and standards.

In translating the 86th amendment into action the draft bill of 2005 was revised and it became an Act in 2009, and India became one of the countries to make education a fundamental right. The 'Right to education has come into force from April 1, 2010. Some of the observations about Right to Education are as follows:

The World Bank education specialist for India Sam Carlson has observed:

> "The RTE is the first legislation in the world that puts the responsibility of ensuring enrolment, attendance and completion on government. It is parent's responsibility to send the children to schools in the U.S. and other countries".

The Indian representative of UN Children's Fund (UNICEF) Karin Hulsof said:

> "It serves as a building block to ensure that every child has the right to guaranteed quality elementary education. The state, with the help of families and communities, has a legal obligation to fulfill this duty".

The implementation of the Right of Children to Free and Compulsory Education (RTE) Act, 2009 requires the recruitment of a large number of teachers across the country in a time-bound manner. In spite of the enormity of the task, it is desirable to ensure that quality requirement for recruitment of teachers is not diluted at any cost. It is, therefore, necessary to ensure that persons recruited as teachers possess the essential aptitude and ability to meet the challenges of teaching at the primary and upper primary level. In accordance with the provisions of sub-section (1) of Section 23 of the RTE Act, the National Council for Teacher Education (NCTE) had vide Notification dated 23rd August, 2010 and 29th July 2011, laid down the minimum qualifications for a person to be eligible for appointment as a teacher in Classes I to VIII. It had been inter alia provided that one of the essential qualifications for a person to be eligible for appointment as a teacher in any of the schools referred to in clause (n) of section 2 of the RTE Act is that he/ she should pass the Teacher Eligibility Test (TET) which will be conducted by the appropriate Government in accordance with the Guidelines framed by the NCTE.

The rationale for including the TET as a minimum qualification for a person to be eligible for appointment as a teacher are:

(i) It would bring national standards and benchmark of teacher quality in the recruitment process.

(ii) It would induce teacher education institutions and students from these institutions to further improve their performance standards.

(iii) It would send a positive signal to all stakeholders that the Government lays special emphasis on teacher quality.

The direct benefit of TET would be that teachers will be recruited at the national level and there will be uniformity in the appointment of qualified teachers as well. Qualifying the Teacher Eligibility Test (TET) is now mandatory for all existing and aspiring primary and middle school teachers in the country, with the passing of the Right to Education Act.

Though many researches have been conducted in the field of National Education Policies, Right to Education and other amendments the topic of Teacher Eligibility Test is altogether new. And, therefore, the researchers have tried to take the opinion of the B.Ed. students from both, self-financed and Government colleges to see what

they have to say about the Teacher Eligibility Test. Do they feel that TET should be made compulsory? Will it help in appointing qualified teachers and improving the quality of education?

Objectives of the study

1. To study the opinion of the students of government and self-financed B.Ed. colleges towards TET.
2. To compare the opinion of the students of government and self-financed B.Ed. colleges towards TET.

The Population and the Samples

The population of the present study is 'the students of B.Ed. training colleges' of the Allahabad city. From the population, a 'purposive' sample of 200 students has been drawn from Kali Prasad Training College, S.S. Khanna Degree College and Ewing Christian College of Allahabad city which is diagrammatically represented in Fig.1.
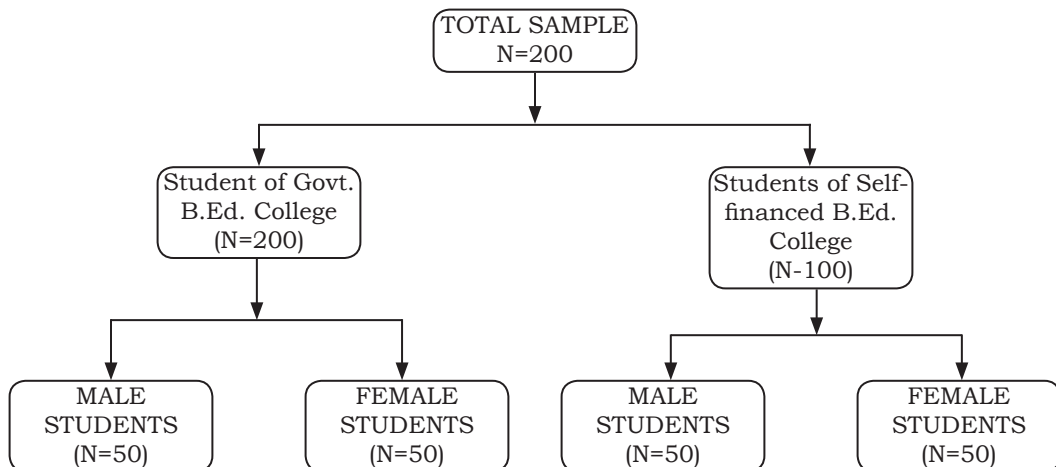

Figure 1

Tool

In the present study a self constructed tool, an 'Opinionnaire Related to TET' has been used. It is a three-point scale having 20 statements. The respondents have to give their views in the form of agree, undecided, and disagree.

Statistical Method

The analysis of the present study is done by using 'Percentage Analysis'

Table 1
Responses of the B.Ed. students of the Self-financed and Government Colleges (in percentage)

Item No.	Statement	Reaction Groups					
		Agree		Undecided		Disagree	
		Self-financed	Govt.	Self-financed	Govt.	Self-financed	Govt.
1	Candidate's aptitude, experience and previous academic background are sufficient criteria for selection of teachers at the school level.	20	22	14	10	66	68
2	Having a B.Ed. degree should be enough to become school teachers.	30	42	09	08	61	50
3	There should be a compulsory eligibility test for school teachers.	73	58	07	07	20	35
4	B.Ed. entrance tests conducted on the level of training institute and states are sufficient for assessing performance of prospective teachers.	49	81	06	04	45	15
5	TET would bring national standards and benchmark of teacher quality in the recruitment process.	85	82	9	10	6	8
6	TET would ensure appointment of competent teachers.	100	98	0	2	0	0
7	TET will be able to check those incompetent people teachers who got their B.Ed. degree through unfair means.	93	83	02	02	05	22

8	TET would induce teacher-training institutes and students-teachers to further improve their performance standards.	88	93	02	01	10	06
9	TET might be another burden on the minds of the teaching aspirants.	10	7	5	3	85	90
10	TET would increase frustration among teaching aspirants.	9	6	01	00	9o	94
11	TET would encourage unhealthy competition	11	13	01	02	88	85
12	TET should be conducted once in a year.	75	78	5	01	20	21
13	There should be no bar on number of attempts in TET.	25	33	04	02	71	65
14	There should be an age limit for appearing in TET.	51	51	04	07	45	42
15	The validity period of TET qualifying certificate should be for seven years.	86	96	01	00	13	04
16	Multiple-choice questions cannot adequately assess teacher's eligibility.	08	04	01	00	91	96
17	TET should also consist of essay type questions along with objective type questions.	64	68	04	03	32	29
18	TET should consist of only objective type questions.	96	98	4	2	0	0
19	TET should also include questions from educational technology, ICT, logic, reasoning and general awareness.	76	83	18	10	6	7
20	Instead of TET there should be a teacher recruitment test which will ensure employment to the B.Ed degree holders.	98	96	2	4	0	0

Finding and Discussion

Table 1 reveals that 66 per cent B.Ed. students belonging to the Self-financed colleges disagree while only 20 per cent agree with the statement no. 1. From the Government colleges

68 per cent B.Ed. students disagree while 22 per cent agree with the statement no.1. This means that the majority of the B.Ed. students are of the opinion that candidate's aptitude, experience and previous academic background are not sufficient criteria for selection of teachers. The reason behind this may be that as now a days students are scoring high percentages through unfair means and there is so much of favoritism that one cannot trust the genuineness of these criteria.

Again the Table 1 shows that 61 per cent B.Ed. students belonging to Self-financed colleges and 50 per cent B.Ed. students belonging to Government Colleges disagree with statement no. 2. 73 per cent B.Ed. students belonging to Self financed colleges and 58 per cent B.Ed. students belonging to Government colleges agree with statement no. 3. And 49 per cent B.Ed. students from Self financed colleges and 81 per cent B.Ed. students from Government colleges agree with statement no. 4 This means that majority of the B.Ed. students are of the opinion that having a B.Ed. degree is not enough for becoming a school teacher and that there should be a Compulsory Teacher Eligibility Test. The Self financed college B.Ed. students are found to be more in favour of TET than the Government College B.Ed. students. The reason behind this may be that the merit of the B.Ed. students being admitted in the Government colleges is much higher then those being admitted in the Self financed colleges, and therefore, they believe that B.Ed. entrance tests conducted at the level of training institutes are sufficient for

assessing performance of prospective teachers.

According to Table 1 more then 80 per cent B.Ed. students from both self-financed and Government colleges gave favourable responses for statement no. 5, 6 and 7. This means that majority of the B.Ed. students are of the opinion that TET would bring national standards and benchmark of teacher quality in the recruitment process and would ensure appointment of competent teachers. It will also be able to check those incompetent student teachers who got their B.Ed. degree through unfair means. The finding is supported by Niraj Priya (2010) who reported that NET Exam should be made compulsory for quality control of teachers at the higher level.

Again Table 1 depicts that more than 85 per cent B.Ed. students from both the colleges have given positive response for statement no. 8. But for statement no. 9, 10 and 11 more than 85 per cent B.Ed. students from both the colleges disagree. This shows that majority of the B.Ed. students do not believe that TET would be any kind of a burden on them or it would increase frustration among them. It would also not encourage unhealthy competition among those aspiring for teaching profession. Instead, most of them believe that TET will induce teacher training institutes and student teachers to further improve their performance standards.

Table 1 shows that more than 75 per cent B.Ed. students from both, Self financed and Government Colleges agree the statement no 12 that TET should be conducted once in a year.

Although more than 65 per cent of the students from both the college disagree with the statement no. 13 that there should be no bar on number of attempts in TET, 50 per cent B.Ed. students wants that there should be age limit for appearing in TET (statement no. 14).

Table 1 also reveals that 85 per cent B.Ed. students from both the colleges agree with the statement no 15 that the validity period of TET qualifying certificate should be for seven years.

It is observed from the Table 1 that more than 90 per cent B.Ed students from both Self-financed and Government colleges disagree with the statement no. 16 that multiple choice questions cannot adequately assess teachers' knowledge.

About the type of question to be included in the TET exam, Table 1 reveals that 60 per cent B.Ed. students from both the colleges said that it should include both essay and objective type questions. But more then 96 per cent B.Ed. students said that like the NET exam, TET should also include only objective type questions.(statement no.17,18) The reason behind this is that objective type tests are more fair and reliable than subjective type tests.

Table 1 also shows, that more than 75 per cent B.Ed. students said that questions from Educational Technology, ICT, logic, reasoning and general awareness should also be included in the TET test. (Statement no.19)

Lastly, Table 1 shows that nearly all the B.Ed. students said that instead of TET there should be a teacher recruitment test which will ensure employment to the B.Ed. degree holders.

Conclusions

On the basis of the findings it can be concluded that the B.Ed students of Self-financed colleges and Government colleges do not differ much in their opinion on the statements given in Table 1, though the B.Ed. students of Self-financed colleges are more in favour of the Teacher Eligibility Test than the students of Government colleges. They all believe that it will check those incompetent teachers who have scored high in the B.Ed. exam through unfair means. They think that this would bring national standards of teacher quality in the recruitment process thus ensuring appointments of competent teachers. The majority of students doesn't take it as a burden but instead believe that it will help them in improving their performance. They prefer objective type questions more than essay type questions. They also want that questions from Educational Technology, ICT, logic, reasoning and general awareness should also be included in the TET. Lastly they are of the view that instead of Teacher Eligibility Test, there should be Teacher Recruitment Test which will ensure employment to the B.Ed. degree holders. The findings of the study conveys a very strong message to the Government that it should make Teacher Eligibility Test compulsory in all the states, for, only this will ensure that each child gets quality education from competent teachers.

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Emotional Turbulance in Adolescents

Ranjana Bhatia*

Abstract

It is said that mind should not be allowed to master us. Instead, we should be able to master our mind. Mind apparently is the root cause of creating all problems whether mental, emotional or physical. In adolescents, havoc is created as mind keeps mastering their body and creating problems resulting into emotional turmoil. The mind of adolescents is flooded with questions they are unable to find answer for. These unanswered questions manifest in the form of search for identity, low self esteem, worries and anxieties related to physical changes, and uncontrolled emotional stage. These troubling emotions can lead to frustration, unrestrained anger, mental instability and various other problems that may cause harm to the adolescents. This is an age when they need help that can come by understanding their tribulations. By identifying visible warning signs of turbulence, help can be rendered to them by various measures that may assist adolescents to pass through this difficult phase with ease. Effective listening skills, building their confidence, healthy relationship and open discussion may help them to sail through this period smoothly. "We are not the sources of problems; we are the resources that are needed to solve them. We are not expenses; we are investments. We are not just young people; we are people and citizens of this world." (From the Children's Statement, UN Special Session on Children, May 2002)

Introduction

The root cause of all our problems—whether mental, emotional or physical, lies in only one place—our mind. When something goes wrong, we tend to toss it in our minds, looking at the problem from all sides, analysing how it will devastate our lives, how things could get even worse, and so on. If one could just decide to stop thinking of it all, there would probably be no problems at all. But somehow, things just never seem to work that way. Even though, emotional turbulence is experienced by all at all times in life, it is more pronounced when a child is transiting from childhood to adolescence. The onslaught of sudden

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physical, mental, social growth and peer pressure causes turmoil in the life of adolescents creating havoc for the them, their family and the society in general. This emotional turbulence interferes with his/her emotional well being and initiative, making transition to adulthood quite difficult. Rapid physical growth begins in early adolescence—typically between the ages of 9 and 13—and thought processes start to take on adult characteristics. Many youngsters find these changes distressing because they do not fully understand what is happening to them.

Media portrayals of adolescents often seem to emphasise the problems that can be a part of adolescence. gang violence, school shootings, alcohol-related accidents, drug abuse, and suicides involving teens are all too frequently reflected in newspaper headlines and movie plots. In the professional literature too, adolescence is frequently portrayed as a negative stage of life—a period of storm and stress to be survived or endured (Arnett, 1999).

Adolescence is a period when the youngsters feel more strongly about everything. Fears frighten them more; pleasures excite them as never before, and irritation causes unbearable agony. They wish to live life king size. This all is so normal. Contrary to this, if they have difficult adolescent period, they engage in destructive behaviour causing harm to self as well as to society. This becomes evident in their attitude as well as behaviour. There are visible warning signs in their personality. Some of them could be repeated absence from school, poor performance in studies, substance abuse, hostile behaviour, withdrawal symptoms, etc.

This is a period when the adolescents are 'Me Centered'. In a study conducted by Jaffe, (1998), it was pointed out that adolescents take time to see and understand the perspective of the other person. They exaggerate their opinion and are generally quite dramatic in their talk which is quite visible in the way they talk but this does not necessarily indicates anything otherwise.

In fact they constantly find fault in the adult's perspective. (Bjorklund and Green, 1992). This can be attributed to the growing cognitive maturity and their new found ability to think critically which encourages them to look for discrepancies in every situation and person.

General Reasons for Turbulence in Adolescents

The psyche of the adolescents is affected as they do not know as well as understand the reasons for so much turmoil in their body and mind. They seek answers for many questions and in this search for answers, they tend to turn to their friends who are in the same boat and are as uninformed as the seeker.

They are not able to handle serious mood swings when they experience severe ups and downs in their mood with alarming frequency. There are some general reasons like changes in the body, difficulty in adjusting to the surroundings, emotional conflicts and difficulty in forming proper relationships. Emotional confusion with family and friends, are pointers towards this turbulence.

Generally, adolescents experience stress especially in situations that appear

difficult, dangerous and painful to them. This overload and unmanageable stress lead to anxiety, withdrawal, aggression, poor skills to cope with the situations. Added to all this is the demand from the school that leads to frustration, negative thoughts and many other psychosomatic disorders.

The adolescents like freedom and independent functioning. They are unhappy if parents interfere with their freedom. Their constant struggle with a sense of identity, a strange feeling about their body and sudden growth spurts, conflicts with parents, increased self reliance, peer relationship, cognitive changes, morals, values and lot more coming together is too much for them to handle.

They are so obsessed with their physical appearance that it starts affecting their self esteem. Research findings have shown that adolescent girls have greater dissatisfaction with physical appearance than boys. (Harter, 1990).

1. Physical Changes

Physical changes are pronounced and at times affect their development of self esteem. Imbalance of hormones leads to metabolic variations in functions and marked mood swings. This affects their energy levels making them lethargic at times and hyperactive at other. Teens often show dissatisfaction with their body, and this, sometimes leads to behavioural disorders like temper tantrums, bouts of anger etc. Arguing for the sake of argument is also common at this age.

2. Emerging Independence and Search for Identity

Adolescents vacillate between wishing to be seen as unique, independent and wanting to do the accepted thing to group norms. There is a constant struggle going on in their mind between the desires for independence and wanting to conform to the norms of the group. Acceptance by the group, however, is very important for them, but at the same time, they want assurance and acceptance from the adults.

The focus changes from social life to friends for them. They have a keen desire to be independent but at the same time, they want approval as well as support of the adults. To be accepted by the peer is a very keen longing in them even if it is at the cost of surrendering the individuality. This also has an effect on their appearance and social effectiveness. The focus from social values to friends changes so much that they start questioning previously accepted values from their families.

Peer pressure becomes a very dominant factor at this stage, but adolescents of different cultures spend different amount of time with their peers (Fuligni and Stevenson, 1995, Larson et al., 1999). In a study conducted by Chen. (1998) it was pointed out that peer factor plays a less important role in Chinese adolescents' misconduct as compared to the American adolescents as they spend less time with their peer. The findings of the study conducted by Greenberger, Chen, Tally and Dong, (2000) has clearly brought out the importance of the peer relationship of the adolescents for their psychological well being in different cultures. In yet another research study

on socio-emotional learning by Blum, McNeely, and Rinehart, (2002) and Eccles Gootman, (2002) it was found that adolescents are more attached to schools if they receive instructions in self awareness, self-management, relationship skills and responsible decision making. Greater attachment to school in turn leads to less risky behaviour and better performance in academics. It was further pointed out that this in turn has positive effects on them when they go for higher education. This also helps them in higher earnings.

3. Self Esteem

The self esteem of a child develops during childhood and remains fairly stable through the entire period of adolescence. The focal point of thoughts of the adolescents is self and internal world of feelings.

As the cognitive ability of the adolescent develops, the ability to conceptualise the self in terms of an abstract, multidimensional framework also increases. This leads to increasing awareness of self, making self esteem more silent during adolescence. A low self esteem causes intolerable problem for the adolescent and that sometimes leads to emotional suffering, Overholser 1995).

A strong feeling that no body likes me, often troubles them which gets further precipitated as it gets associated with negative emotions leading to depression, eating disorders and delinquent behaviour and problems of adjustment (Harter and Marold, 1992, Striegel-Moore and Cachelin, 1999).

Such uncontrolled emotional state at times leads to adolescent suicide which

is caused by chemical imbalances in the brain caused by extreme agonizing stress. There are warning signs of these tendencies which include loss of attention in activities that interested them earlier, difficulty in concentrating in work, personal neglect, general lethargy, changes in sleep pattern etc.

There is a marked interest in the opposite sex in adolescents at this age.

Adolescence is marked by a new interest in the opposite sex. Boys face a more physical desire, whereas girls face a more emotional desire for closeness and intimacy.

Although adolescence will present challenges for young people and their parents, awareness and communication can help pave the way for a smooth transition into this exciting phase of life.

How to Help Them

The lives of adolescents can be incapacitated by negative emotions which are tremendously powerful. These negative emotions can weaken the adolescents causing inconsistency in the energy system which in turn causes a chain of emotional imbalances such as frustration, mental instability, inferiority complex, etc. The emotional well being of the adolescents is disturbed if there is any emotional turbulence. The main reasons for this turbulence are anxiety, anger, fear and guilt. The adolescent is not able to deal with the pain and the reasons that cause this pain. Adolescents need the help for restoration of this balance.

It is needless to mention that the negative emotions are tremendously powerful. They can debilitate lives very quickly by causing disparity

in energy system, which triggers a sequence of emotional imbalance i.e., frustration, melancholia, persistent agony, mental instability, uncontrolled anger, inferiority complex etc. This ultimately culminates in ill health.

They need help to identify the troubling emotion and release it by expressing it. Adolescents are well aware of their strengths, their goals and have the skills to Act on what they want. The best way to deal with them is to engage in a dialogue and connect with them with non-threatening questions.

There are various measures that if adopted can help the adolescents to sail through this turbulent period with ease. Some of them can be as listed below:

- Effective listening skills: Effective listening skills can help a great deal. Listen to them rather than speak. According to Forgatch and Patterson (1989), listening to adolescents non-judgmentally enables them to realise that you value their opinion and this develops their trust in you.

- Asking open–ended questions that require more than a yes or no response helps the adolescents to think through their response. (Hill and O'Brien, 1999).

- Avoid asking WHY questions to them as that put them on the defensive. The question should be reframed in such a way that the response of the adolescent corresponds with his thought process rather then something else. (Plutchik, 2002).

- While providing help to the confused adolescent, the emotional state of the adolescent has to be matched. This will help the adolescent as he/

she will feel understood. (Forgatch and Patterson, 1989).

- Using informal ways of telling them how you came out of a similar situation keeping in view their short span of attention in that emotional state. Choosing a topic that would be relevant to them at that point of time would show them the way to come out of the distressing situation. (Keating, 1990).

- Giving confidence to adolescents to think through the issues. Do not challenge their view point but at the same time tell them how others might have a different perspective of the same situation, and the influence and impact of these differences. (Santilli and Hudson, 1992).

- Youth understands the relationship between their strengths and their goals, and have the skills to act on that understanding.

- Nurture positive relationship with them. The interactions with them should be characterised by respect for their feelings, opinion, warmth towards them, consistency, love and care with more of listening and less of suggestive talking.

- As they need to be encouraged to take their own decisions, they should be allowed to make mistakes and learn from them.

- Genuine interest needs to be shown in their activities.

- Unconditional acceptance with positive feedback can have tremendous effect on the psyche of the adolescents.

- Acknowledging their special abilities, talents and uniqueness can also help

them to pull out of the emotional distress.

Conclusion

Communicating your love, care and concern is the single most important factor that parents and teachers can employ for their children. This will help them to come out of the emotional barriers when they are passing through the turbulent phase of transition from childhood to adolescent. Along with effective communication, it is also important to address the problem rather then live in the hope that it will go away. The emotional trouble can be tackled if the adolescents get the opportunity to work through the problem with timely and effective guidance.

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Personal Development and Soft Skills for Teachers

Meenakshi Singh*

Abstract

Teaching is a profession and teacher education is a process of professional preparation of teachers (NCFTE 2009, p.15). One of the main functions of a teachers' training college is to produce teachers who are skilled in communication and present the updated subject matter in a manner that is interesting and easy to understand. At various forums people raise an opinion that the teacher education curricula lack training in development of the soft skills which are most essential for this profession. The training in interpersonal communication skills and language proficiency is found wanting. The NCF 2005 reiterates that 'the existing teacher education programmes do not recognise the centrality of language in the curriculum'. (NCF, 2005) School teachers continue to be isolated from centres of higher learning and their professional development needs remain unaddressed. (Batra, 2005). During an exercise on syllabus reforms at the Faculty of Education, Banaras Hindu University, this problem was realised, and an audit course of 1 credit on 'Personal Development and Soft Skills for Teachers' was proposed. This paper presents a detailed account of this exercise on two groups of 40 students each in two consecutive semesters of the 2010- 2011 batch of Bachelor of Education. The designing of the programme, its conduction over fifteen classes of one and a half hour duration, the modalities of interaction and training, and the evaluation as well as the outcome of the entire endeavour is presented in this paper.

Introduction

Democracy is based on faith in the dignity and worth of every single individual as a human being. ... The object of a democratic education is, therefore, the full, all-round development of every individual's personality, i.e., an education to initiate the students into the many-sided art of living in a community. It is obvious, however, that an individual cannot live and develop

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alone. .... No education is worth the name which does not inculcate the qualities necessary for living graciously, harmoniously and efficiently with one's fellow men. (Secondary Education Commission, 1952–53, p.20)

The responsibility of providing such an education in schools and the classrooms is directly upon the teachers and indirectly upon the teacher training institutions. One of the main functions of a teachers' training college is to produce teachers who have democratic values, are professional in their disposition, are skilled in communication, and present the updated subject matter in a manner that is interesting and easy to understand.

The training programme being offered for teacher preparation, however, is unable to prepare pupil teachers for this. The experiences during the internship or practice teaching programmes indicate this deficiency of the programme. 'Pupil teachers' are found wanting in interpersonal communication skills and language proficiency in spite of being equipped with sound theoretical knowledge of skills and pedagogy. This has been pointed out in the National Curriculum Framework 2005, which iterates that 'the existing teacher education programmes do not recognise the centrality of language in the curriculum'. (NCF, 2005)

There are innumerable ways of looking at curriculum theory and practice. In *The Curriculum* Franklin Bobbitt (1918) writes:

The central theory [of curriculum] is simple. Human life, however varied, consists in the performance of specific activities. Education

that prepares for life is one that prepares definitely and adequately for these specific activities. However numerous and diverse they may be for any social class they can be discovered. This requires only that one go out into the world of affairs and discover the particulars of which their affairs consist. These will show the abilities, attitudes, habits, appreciations and forms of knowledge that men need. These will be the objectives of the curriculum. They will be numerous, definite and particularised. The curriculum will then be that series of experiences which children and youth must have by way of obtaining those objectives.

The urgency is to address ourselves seriously to examining the issues related to the preparation of teachers as well as to prune the theory and practice of teacher education (NCFTE 2009). In the light of the RTE Act 2009, there is a more pressing need to prepare competent teachers. "The most important factor in the contemplated educational reconstruction, is the teacher— his personal qualities, his educational qualifications, his personal training and the place that he occupies in the school as well in the community", very prudently pointed out by The Secondary Education Commission (1952). This responsibility automatically transfers to 'teacher training institutions' and 'teacher training programmes'. The existing teacher education curriculum and majority of teacher training institutions inherently lack in this regard. The NCFTE (2009) sums up the grim situation as:

At all stages, teacher education institutions are managed by faculty with little or inadequate professional training to handle the tasks of a teacher educator. The absence in the system of institutions and programmes focussed on the professional preparation of trainers/teacher educators for different stages of education accounts for the situation. (NCFTE 2009, p 83)

The entire programme of 'teacher training' needs to be restructured and redesigned with the changing social backdrop.

In this era of Globalisation and Liberalisation, 'teacher training' needs to be directed towards the needs of a more global citizenry. The teachers being produced must not only be worthy of being absorbed in all kinds of schools but must be able to make a place for themselves in the global market. Not just the trainee teachers but the in-service teachers too, need to be made abreast with the needs of the society. They should be provided opportunities for periodic enrichment of soft skills. Unfortunately, this is not the case as school teachers continue to be isolated from centres of higher learning and their professional development needs remain unaddressed (Batra, 2005). There is need to bring greater convergence between professional preparation and continuing professional development of teachers at all stages of schooling in terms of level, duration and structure (NCFTE 2009 p 8).

The NCFTE 2009 makes a mention of the need for such skills among teacher educators as well, and largely holds the

teacher educators responsible for this scenario.

By way of summing up, we may note that at all stages, teacher education institutions are managed by faculty with little or inadequate professional training to handle the tasks of a teacher educator. The absence in the system of institutions and programmes focussed on the professional preparation of trainers/teacher educators for different stages of education accounts for the situation (NCFTE 2009 p 83).

The NCF 2005 position paper on Teacher Education for Curriculum renewal elaborated this point and referred to the need to focus on pedagogies appropriate for adult learners for the preparation of teachers. (The weakest aspect, perhaps, of teacher education is the absence of professional preparation of teacher educators). These needs make it mandatory for teacher educators to function differently. They will have to prepare the pupil teachers who can present ideas better, speak more effectively, fluently and confidently in public, write reports, carry out group discussions, meetings or, to sum it all up, to perform better as professionals.

Thus, the curriculum for 'teacher training programmes' calls for new dimensions and new skills that need to be inculcated and imbibed as inherent personality traits of the new age teacher. The teacher today does not have the convenience of being revered as a 'guru' from day one. The youngsters are free from inhibitions and are quite vocal about what is being served to them by their teachers. An efficient and effective

teacher will be one who is a professional with tremendous interpersonal skills and one who can continuously keep the youngsters in awe by one's bearing and disposition within the constitutional framework and core values. He/she shall have to be geared for numerous other roles that he/she would have to take on, such as, a leader, a team worker, an employee, a negotiator, and above all a professional with great human values and a role model for the coming generations.

What are Soft Skills?

Philip Moss and Chris Tilly (1996), define soft skills as "skills, abilities and traits that pertain to personality, attitude and behaviour rather than to formal or technical knowledge'. Another study by Peter Capelli and Maria Ianozzi (1996) divides soft skills into three categories of work relevant attitudes: disposition or personality, motivation, and willingness to sacrifice self for the good of the group. As defined in Career Opportunities News, October 2002,

> "A soft skill refers to the cluster of personality traits, social graces, facility with language, personal habits, friendliness, and optimism that mark each of us to varying degrees. Persons who rank high in this cluster, with good soft skills, are generally the people that most employers want to hire. Soft skills complement hard skills, which are the technical requirements of a job. The ideal, of course, is someone strong in both job and personal skills….,"

For this reason, soft skills are increasingly sought out by employers in addition to standard qualifications. In face to face interviews, employers focused on punctuality, attendance, and personal habits, including non verbal communication, dress and hair style (Moss and Tilly 1995, 1996; Kirschenman and Neckerman1991; Kirschenman, Moss and Tilly 1995).

Background

The teaching profession is probably the only one in which one's ability is evaluated by the performance of others. A successful teacher is one whose students have achieved great heights (in the area he was concerned with in particular and) in life. Likewise, a successful teacher educator is one whose students in their turn become great teachers. A good Teacher Training Institute is one which turns out professional teachers year by year. At a more practical level, we may say that the absorption of our pass outs and their further good performance speaks about our standards as teacher educators.

During practice teaching or internship programmes, pre-placement activities and during selection committees for local schools, where there was an opportunity to observe the trainee teachers, from the point of view of employers, the shortcomings of the training programme as far as soft skills were concerned became evident. Similar experiences form the 'fountainhead' of the course which is the focus of this paper. Propelled by such an experience, when the opportunity to propose new courses arose during an exercise of syllabus revision at the Faculty of Education, Banaras Hindu University an 'Audit Course' of 1

credit was proposed which was named "Personal Development and Soft Skills for Teachers". The course, which was planned over 15 sessions of an hour and a half each, has been successfully running on batches of 40 pupil teachers each in two semesters since the 2010–11 session.

This paper is based on the observations of the two batches of 40 students each in two semesters of the 2010–11 batch of Bachelor of Education. By virtue of being based on observation and experience and not on theory or logic, this paper may be taken as the outcome of an empirical study. It provides detailed narrations of on goings of the experiences on a group of pupil teachers.

Shaping the Course

Objectives

Due to the fact that no such programme existed for teachers, input from school principals and senior professors was sought. After a lot of research and a series of group discussions among the teacher educators the course was structured in such a way that it may be contained within 15 sessions of 1 hour duration and be effective, precise and need based. At this stage it was decided that this course will be for a small group of pupil teachers and attendance and active participation will be the mandatory requirements.

The objectives of this course were:

•   To bring about personality development with regard to the different behavioural dimensions that has far-reaching significance for teachers.

•   To recognise feelings, diagnose needs and fears, and improve one's ability to deal with interview anxiety.

•   To learn and practice new skills and techniques for effective outputs in job market for teachers.

•   To get exposed to professional etiquettes to make a lasting impression.

Selection Criteria

The call for applications for the course was notified soon after the beginning of the semester. An unexpectedly overwhelming response of pupil teachers willing to take the course raised the issue of selection criteria. Finally, a list of names of all pupil teachers who had applied for the course was prepared and the names of 40 pupil teachers was drawn by lottery. This practice had to be continued in the next semester and has become the standard practice for selection of pupil teachers since then.

Modalities

The transactional strategy employed was basically of lecture cum demonstrations based on the supplied readings complemented by Power Point presentations, screening of film and video clips, sharing of experiences, mock interviews, role playing sessions, panel discussions, etc. The sessions and the content of each was organised and planned by the author in the capacity of Course In-charge. The programme of 15 sessions was conducted by a group of four teacher educators from within the Faculty of Education, Banaras Hindu University, Varanasi. The course content is divided into three main headings, i.e. 1. Preparation for the Job Market;

2. Prior Preparation for Interview; and
3. Professional Etiquettes.

Day1

Theme: Programme Overview, Introduction to Soft Skills, Self Motivation: Internal and External, Sharing of Expectations and exchange of emails!, What is to come....

The Day 1 was dedicated to a formal introduction of the course and sharing of expectations from and of the pupil teachers. The notice of the commencement of the course made a special mention of timely arrival to the programme as a mandate and expected arrival at least 5-10 minutes in advance of the scheduled time.

At the very outset the pupil teachers were supplied with an open ended questionnaire, which they were asked to fill up as they arrived and which was collected shortly afterwards before the beginning of the session. The questionnaire had the following questions:

1. What brings you to this programme?
2. What do you understand by personal development?
3. What are your high points? Enumerate any three things you like about yourself.
4. What are the deprivations you perceive in yourself? Enumerate any three things you dislike about yourself?
5. Where do you place yourself on a scale of 1-10 as a socially skilled person? (Low) 1... 2... 3... 4... 5... 6... 7... 8... 9... 10 (High). Why?
7. What do your friends like about you?

8. Which qualities of a person appeal to you the most?
9. Why do you think you should be recruited for a teachers post?

They were later given a presentation telling the details of the programme and what was to be expected in the coming days. The concept of soft skills was introduced and expectations shared. The students were introduced amongst one another and a brief outline of the fifteen days programme was described. The main ideas driven through were:

• Stand up and be counted or be counted out. Make yourself counted in the first few days, be visible. (This was to emphasise the need of participation and involvement in the course, as remaining in the background would neither have helped the pupil teachers nor would have done any good to the purpose of the course.)

• The trait of Accountability is highly valued....Do things right the first time. Diminish the need of constant supervision. (This was stressed upon to discourage attention seeking behaviour of some students who want an extra special treatment, and would not be satisfied with general instructions given to the entire group.)

• Don't be afraid to ask questions. (This was once again to encourage active involvement of the pupil teachers, and to facilitate the kind of environment in which they could feel free to ask questions to dispel any kind of doubt.)

• Ideas are everywhere... it's up to you to make them a reality. *Great ideas*

without application have no value. (This was intended to encourage students to incorporate their own ideas and to make use of their insights during trying situations particularly during interviews).

In the first batch only 17 of the 40 pupil teachers had personal email IDS (in the second semester all 40 pupil teachers had email IDS). Those who had email IDS were asked to help the remaining to create theirs. This was the first step which had two main consequences. Firstly, it led to a collaborative learning and strengthening of bonds between the pupil teachers (who were new to one another in the first batch). Secondly, it facilitated all further correspondence and exchange of information within the group. It also marked the first step towards being computer savvy for many of the participants.

It may be mentioned that although, the need to develop a sense of dressing among pupil teachers was felt, it was not imposed immediately upon the pupil teachers. Within the group there were both types of individuals, those with good sense of dressing and those with poor sense of dressing. Some of the pupil teachers who were dressed appropriately were called upon the dais and the others were asked to describe why their dresses were considered good. This was an indirect indication towards the importance of proper attire. All the pupil teachers were asked to use their discretion to dress appropriately as if they were to report for an interview on all subsequent days of the course. No tips on dressing were given on the first day.

During the same week, a content analysis of the open-ended questionnaire was undertaken which led to certain conclusions that helped to shape the programme. It was evident that most pupil teachers had strong inhibitions about their personalities and majority (90%) had mentioned that they had joined the programme to improve upon themselves while some had mentioned 'to be a socially skilled person'. Very few students (8.5%) knew precisely what is meant by personal development. As an answer to question 3, sixty-six of the seventy pupil teachers gave pertinent replies which are given below in Table 1. Four pupil teachers misunderstood the questions and their answers were restricted to their favourite hobbies.

Table 1: High points/strengths reported

High points/ strengths	percentage	High points/ strengths	percentage	High points/ strengths	percentage
positive attitude and thinking	33.33	laborious	26.6	empathetic	22.2
		helpful and kind	17.77	confidence	15.5
truthfulness	15.55	sincere	15.55	faithfulness	13.33
thoughtful	11.11	tries new things	11.11	devotion to duty	11.11
will power	8.88	respect for elder	11.11	honesty to profession	8.88
disciplined	8.88	punctuality	8.88		

patience	6.66	politeness	6.66	enthusiasm	6.66
focussed	4.44	responsible	4.44	strong determination	4.44
judiciousness	2.22	optimism	2.22		
team spirit	2.22	leadership	2.22	God fearing	2.22
giving ones best or 100%	2.22	never overconfident	2.22	good manager	2.22
				creative	2.22
being straight forward	2.22	understanding	2.22	trusting	2.22

The pupil teachers mostly reported positive thinking and positive attitude (33.3%) as their strength. In addition, laboriousness or hard working (26.6%) and an empathetic (22.2%) helpful and kind nature (17.7%) were also reported as their strength by many. The others included sincerity (15.5%), confidence (15.5%), truthfulness (15.5%), faithfulness (13.33), thoughtfulness (11.11%), and respect for elders (11.11%), devotion to duty (11.11%) and the motivation to try new things (11.11%). Honesty to profession (8.88%), will power (8.88%), disciplined (8.88%) and punctuality (8.88%), were far less reported strengths. Surprisingly leadership (2.22%), giving ones best or 100% (2.22%) and good manager (2.22%) which are essentially the core strengths of a good teacher were rarely reported as strengths.

As an answer to question 4 the shortcomings reported are given in Table 2.

Table 2: Weaknesses/shortcomings reported

weakness/ shortcoming	*percentage*	*weakness/ shortcoming*	*percentage*	*weakness/ shortcoming*	*percentage*
lack of confidence	35	inability to converse in English	32.5	stage fright	22.5
				recklessness	20
laziness	22.5			too emotional	20
shyness	17.5	nervousness	17.5		
not practical	15	poor time management	15	isolation	12.5
negative thinking	12.5			short temper	10
		self centred	7.5	confused	10
introversion	7.5	over trusting	7.5	negligent of health	5
talkative	2.5	jealous	2.5		
can't handle groups	2.5	argumentative	2.5	conservative	2.5
		old fashioned	2.5	liar	2.5

Answers to this question were more realistic and true sounding. 35% students had reported lack of confidence, 32.5% students had reported inability to converse in English while 22.5 % students had reported stage fright as their main weakness. This reaffirmed the need of the programme and laid down the main focus areas for the programme.

In response to question 5 related to placing oneself on a scale of 1-10 with regards to social skills, 6 out of 80 pupil teachers gave no response, which may be taken as inability to understand the question. The remaining pupil teachers (72) gave the following preferences.

Table 3: Self rating of pupil teachers on a scale regarding social skill

Index	1	2	3	4	5	6	7	8	9	10
Opted by	0	0	2	8	28	14	10	8	3	1

The inference drawn from these answers was that most pupil teachers rated themselves as mediocre preferred to mark themselves at '5'; they had a lack of confidence and stage fright mainly due to their inability to converse in English. They also admitted that they were at times too emotional, nervous and lazy.

The answers to the remaining questions reiterated these preferences. None of the pupil teachers could give a pertinent reply to the last question "Why do you think you should be recruited for a teachers post?" This background information helped a great deal in shaping the course and planning the subsequent sessions. It also helped during the mock interviews as each one could be given appropriate feedback and suggestions.

Day 2
Theme: Skills for writing Job applications 1.Preparing your Curriculum Vitae (CV) and précis 2.Writing SOPs (Statements of Purpose) 3.Writing applications for various purposes.

The second day was focussed on preparing the proper Curriculum Vitae, capsule CV and writing the SOP or 'Statement of Purpose'. They were at first told the important features of a good CV and were then supplied with blank formats to prepare their own CV. They were asked to email their CV for corrections, and later to print the corrected CV, and to come prepared with hard copies of their CV and Précis in proper folders to all classes. The pupil teachers were also given brief instructions on the nuances of writing various applications and 'covering letters'. They were supplied with an elaborate school application form and were asked to fill it up.

The majority of pupil teachers had turned out in crisply ironed shirts and trousers. However, the footwear was full of variety. They had avoided informal clothing. Most girls reported in white suits. A few still resorted to fancy party wear and were told that they were not dressed appropriately for an interview. No tips on formal dressing were given on the second day as well.

Day 3
Theme: Prior preparations for Interview; Pre-interview Checklist; What you need to carry to the interview; From CV to shoes; From entry to retreat.

The third day was dedicated to prior preparations of job interview. The pupil teachers had reported with

hard copies of their CV and précis in neat folders as instructed. A detailed presentation on prior preparations for interviews was made. The importance of proper planning and keeping time was reiterated. They were asked to prepare a checklist of all that they would carry to an interview. Any additional important items missed out by them were suggested, and a proper pre-interview checklist was prepared. The proper dress code for men and women were discussed in details separately.

The pupil teachers were made to practice entry into an interview board room several times. Most pupil teachers had a tendency to avoid eye contact while they were entering the room. None were smiling, and nearly all were very tense and nervous during the first trial. Some slopped on the first available seat without waiting to be asked to sit. The retreat from the interview room after the interview was also practised. Their mistakes were pointed out individually, and the appropriate way of entry and retreat from an interview board room were demonstrated. The pupil teachers rehearsed it in small groups among themselves.

Day 4 and Day 5

Theme: Prior preparations for Interview: Common interview questions and interview mistakes. Negotiating and Marketing what you have.

The fourth and the fifth days were devoted to rigorous preparations for a job interview. On the third day the pupil teachers were familiarised with the common interview questions that might be asked during an interview for a teachers post. They were also made

aware of the common blunders that people tend to commit during interviews. All pupil teachers were asked to prepare replies to three questions,

* Tell us about yourself?
* Why do you think we should take you?
* Do you want to ask us any question?

This exercise went a long way in preparing them for being impressive at the interview. These replies were then practised as dramatisation in front of the entire class.

The fifth day began with screening of video clips of interviews and their dramatisations to emphasise the extent of damage certain mistakes committed by the interviewee may cause. The pupil teachers were prepared for three more questions.

* Why did you give up your last job?
* What are your strengths and weaknesses?
* Why do you want to join us/take this job?

The pupil teachers were handed a list of 20 questions and were asked to discuss appropriate answers to them in small groups. The groups were supervised by individual teachers and the queries resolved.

Day 6 and Day 7

Theme: Presenting yourself at the job interview; Introducing oneself at the interview; Manners in public places.

The sixth and the seventh day were devoted entirely to, mock interviews. The pupil teachers were instructed in advance to come dressed formally for an interview. On the sixth day they were marked on the basis of their confidence

in answering, fidgeting, mannerisms and body language. Not much heed was given to the quality of answers. The pupil teachers were at first divided into five groups of eight members each. They were further divided into two sets of four. The two groups were to role play as interviewers for each other. The pupil teachers were thus made to face a panel of five interviewers (one teacher and the remaining four pupil teachers). The pupil teachers involved in the role of interviewers were encouraged to ask simple, easy and good questions, and not get too personal or critical. The idea was to give a pleasurable experience to the pupil teachers to boost their self confidence. The teachers, however, had the liberty to ask any kind of questions if they felt that the particular participant was in the right state to answer them. The seating plan was simulated as close as possible to an interview room keeping the semicircular arrangement to facilitate effortless eye contact with each interview board member. The individual teachers' chambers were made use of for the purpose.

Each participant was to enter the room after seeking permission politely. Having entered, they were to give, each interviewer, a copy of their précis or capsule CV. One of the interview panel members, most often the teacher, would ask them to take their seat. They were to introduce themselves after greeting the interviewers and then sit facing them only when asked to. The body language of the pupil teachers was closely watched all through and noted down by all five for feedback. The pupil teachers who were not ready with multiple copies of précis were asked to give blank sheets of paper bearing their names, pretending it was their précis. It was found that as a consequence of having practiced in the previous session, the entry and retreat of participants was far more relaxed, and they could make eye contact with the interviewers, and in general remain calm.

At the end of the exercise the individuals gave feedback to each participant. Thus each participant got feedback from five individuals. This exercise was beneficial to the pupil teachers in two ways. One obvious benefit was the experience of having taken a mock interview and simultaneously responded to five individuals. The other advantage emerged from the pupil teachers' role as interviewers. They could realise the importance of proper posture, body language, eye contact, and speech quality, proper framing of answers, facial expression and much more than what any lecture would have taught them. This turned out to be the most remembered and highly appreciated experience cited by all pupil teachers.

The seventh day was more rigorous in the sense that the pupil teachers were asked tricky questions which led them into traps. They were rebuffed, slighted wherever possible, and their patience put to test. The pupil teachers' attitude as reflected by their answers to random questions was carefully recorded for feedback. Body language was carefully monitored. Even correct answers to questions were rebuked and dismissed as wrong. This was to test the confidence and conceptual clarity of the pupil teachers. The procedure followed was the same as that on the

sixth day but different groups were formed, and the pupil teachers were sent to different teachers. The interviewers were free to ask trapping questions, and no element of sympathy was to be incorporated. The pupil teachers were given detailed individual feedback about their performances. How an individual was trapped due to an answer was discussed, and how a participant clearly escaped a potential trap was also described and appreciated.

They were also given practice in public manners such as hand shake (man with man, woman with woman and man with woman), giving and receiving a business card etc. Common etiquettes were discussed. They were provided readings on interpretations of body language. Those with incorrect manners were told so, and those who had overcome difficulties pointed out earlier were lauded.

Day 8

Theme: Structuring Communication: Introduction, Main body, Summary, Keeping it Short and Simple

The eighth day and the subsequent days were related to communication and its related competencies. The importance of effective communication, more so for a person involved with the teaching profession, was asserted by means of a lecture supplemented by a Power Point presentation. The nuances of effective communication were explained keeping in mind all significant aspects. The pupil teachers were briefed about the organisation of the content of 'communication' laying emphasis on the three important parts viz., the introduction, the main body

and the conclusion. The 'working' of human attention and its shortcomings were explained, and the importance of short and simple sentences emphasised. Inputs from various teaching skills taught as a part of the B.Ed. curriculum (such as skill of introducing a lesson, skill of stimulus variation) were utilised. Ideas and experiences of speeches given by persons with good opening sentences or conclusions were shared.

Day 9

Theme: Listening Skills, Importance of Listening for Effective Communication, Active, Passive and Reflective Listening

The ninth day was reserved for discussions on 'Listening' skills and their importance for making effective communication. The fact that, 'good listening involves encouraging other people to say interesting things, understanding the things that they tell, and being sensitive to the thoughts and feelings that underlie the things that they tell', was established by the help of a Power Point presentation. Several instances of disasters resulting from inability to listen carefully were cited to draw the point home. Active, passive and reflective listening was also described. They were explained why it is not enough just to listen, but to enable the speaker to know that one is listening and how the combination of body, face, eyes and voice indicate to the speaker that one is indeed listening. Interpreting the body language of the listener and drawing feedback from it was also explained. The pupil teachers were asked to narrate their experiences and life events, if any, when 'Listening and listening skills' had played an important role. Several

instances were narrated to establish the importance of listening for effective communication. Finally, tips to improve one's listening skills were suggested.

Day 10

Theme: Important components of a Dialogue: pitch, inflection, courtesy, tone, rate of speech, enunciation, improving voice and speech. Non- verbal communication: expression, posture, gait, body language and eye contact.

The session on the tenth day was divided into two sections. The first was about components of a dialogue: pitch, inflection, courtesy, tone, understanding, rate of speech, enunciation and improving one's voice and speech. The second part was about non-verbal communication in which the importance of proper posture, gait, body language, etc. was emphasised in connection with non- verbal communication.

The modality adopted in the first section was lecture accompanied by demonstration of each component. The importance of each was established. The pupil teachers were asked to judge their voice qualities, rate of speech and pitch in pairs. The queries regarding these were resolved as a whole group. Practice on inflection (tone of speech) was given, and interpretation of upward and downward inflection was clarified. The pupil teachers were asked to list words with difficult pronunciations. These and others (from the faulty pronunciations of the pupil teachers) were repeated with corrections. The importance of proper enunciation and pronunciation was emphasised.

The second session on nonverbal communication was initiated by randomly selecting three pupil teachers and asking them to speak about their childhood. The remaining pupil teachers were asked to give feedback on the non verbal aspects of their speeches. Most important points were noticed by the pupil teachers, and the remaining points were brought to notice by the teachers. This enabled the pupil teachers to understand the importance of proper expression, eye contact, body language etc., and the difference they make upon the overall impact on the audience even during an impromptu speech.

Another demonstration was made by the teachers' to show the impact that posture has on the sound that we make. The sound produced while sitting or reclining is quite different from that produced while standing. Thus the importance of proper posture not only for effective communication but also for voice quality was established.

Day 11

Theme: Communication skills: How to make sure you are not only heard but also listened to? Nuances of public speaking.

The eleventh day was devoted to the nuances of public speaking. This was covered in three parts:
1. Preparation and research.
2. Structuring one's speech
3. Effective delivery.

In the first part, the importance of prior preparation and research into the kind of audience, their area of interest, their knowledge of the subject, their attitude towards the subject, the size of the audience was focussed upon. Further, the importance of being prepared for the kind of questioning

and cross questioning to be expected and with relevant statistical data was reiterated. The introduction and the conclusion of a speech and the do's and don'ts thereof were dealt within the second part related to structuring one's speech. The pupil teachers were narrated anecdotes of some instances when an effective introduction swept the mood of the audience and held them spell-bound throughout the speech. The third part dealt with the effective delivery of a speech that is not impromptu. Keeping points ready on a slip or making use of Power Point presentation tricks like 'using presenters view' on a second monitor were discussed and demonstrated.

In addition, pupil teachers were asked to practice compèring, welcoming a visitor or a guest (welcome address), farewell speeches and thanks giving speeches (vote of thanks). Some pupil teachers were asked to come on the stage and make announcements in different settings and of different issues. Some were asked to greet people from the audience, and thank them for their support publicly. These activities were fun for all and gave them grounding in what to expect from their future profession as teachers. The pupil teachers were made to pick a chit with the activity to be performed from a pack of chits containing several such activities.

Day 12

Theme: Professional etiquettes: How to present yourself to people— seniors, co-workers, parents, subordinates and students. Greetings, Introductions, Announcements.

The twelfth day was devoted to professional etiquettes expected from a well-groomed individual. Here again the transactional strategy employed was of role playing. At first the importance of 'etiquette' for a well read and educated person was discussed. This was followed by the demonstrations of appropriate body language, tone, inflection and gestures for interactions at different levels, particularly, while greeting seniors and co-workers. They were also briefed about 'Parents' – Teachers' Association' and the expectations of parents. They were made to practice formal introductions and announcements. Practice in volume and voice projection during announcements and introductions was given. The pupil teachers were asked to introduce two other participants and say something interesting and in character about them to a fourth pupil teacher.

Day 13

Theme: The art of Conversation: How to make proper introductions; Paying and receiving compliments; small talk and networking; Joining and leaving a conversation.

The thirteenth day marked the practice of soft skills related to the art of conversation. Practice on initiating conversation and small talk (initiating conversation with a stranger) was given to the pupil teachers. A group activity on 'paying and receiving compliments' was organised, in the form of a game, and the most appropriate compliments paid in the most befitting manner were highlighted. Practice on introducing a person and adding a snippet of

information about that person while introducing was undertaken after dividing them into groups of four. Each participant was asked to pick any two persons of the group and introduce them to the fourth, assuming they were not acquainted. They were explained the fine difference between intrusion in a closed group, and joining a group which is accommodating, and how to make such a judgement instantly and how to proceed to join such a group. The skilful withdrawal from a group at an appropriate moment was also explained.

Day 14

Theme: The Personality: What should the teacher's personality be like?; Personal grooming and hygiene; The do's and don'ts in dressing; positive attitude and zest for the future

The fourteenth day was dedicated to the teacher's personality. The importance of positive attitude and thought was emphasised. The teachers' conduct and its importance in shaping the life of children were stressed upon. Pupil teachers were asked to come up on the dais and recall (from their childhood experiences) a teacher who had a long lasting impact on their lives, and speak of whatever was unique about that teacher's personality. One participant was asked to write the qualities narrated by the pupil teachers on the board.

In the later half, the personality of the new-age teacher was discussed. The need to adapt with changing times was stressed. The role of a teacher as a role model and harbinger of values was stressed.

The do's and don'ts in dressing and grooming were also taken up. The concept of a smart teacher in a smart class was discussed. The professional attitude and the tendency to look at things with a positive perspective were emphasised. Discussions based on the readings provided (*On Saying Please* by A. G. Gardiner, and excerpts from the book *How to Win Friends and Influence People* by Dale Carnegie) were held.

Day15

Theme: E-mail etiquette: Sending effective messages; Responding to messages; Organising the different parts of an email.

The fifteenth day was the last day of the course. The students were briefed about the email etiquette. They were told why they must make it a habit to check their email every day and reply instantly. They were told about the various features of an email such as carbon copy (cc), blind carbon copy (bcc), e-signatures, customising one's mail box, adding filters and other relevant features. They were advised to have two separate email id's, one for professional correspondence and the other for personal correspondence. They were cautioned against spam and internet crime, and why it was important not to divulge their email passwords to others.

Evaluation

The programme, had been designed in such a way that each session had scope for evaluating the learning of the pupil teachers simultaneously. These pupil teachers were watched closely by the teachers and the changes in their overall disposition were very visible. For the sake of a formal grading the pupil

teachers were evaluated on the basis of another mock interview. They were also asked to write about their experiences during the course, and how it had made a difference in their perception about themselves (mainly for feedback about the course).

Outcome

Since this was the very first trial of its kind, and it dealt with youngsters who had undertaken a course for developing soft skills and to bring about certain changes in their perception of themselves, it is not easy to quantify the outcome. The participant's performance in the final interview, their feedback and the observations of the concerned teachers are the only cues or indicators of the accomplishments of the objectives of the course.

Over the period of two months that this course was spread upon, the changes in the pupil teachers were quite visible. They were more, participating more confident and assured of themselves, not just during the course class, but in other classes also. They had become more conscious of their grooming and were invariably properly attired (decent and teacher like). They knew how to frame their ideas, asked more questions and were conscious to apply what they had learnt from the course in all their dealings.

In the final interview, their performance was far much better and improved as compared to the earlier experience. The students had overcome interview anxiety to a great extent and gave smart replies to majority of the questions. Their disposition throughout the interview was positive, coolheaded and under control. No instances of perturbed behaviour or nervousness were reported. They were conscious of their body language and almost all sat erect, on the edge of the chair, without leaning back, throughout the interview. The answers they gave indicated a positive attitude of a promising individual. They had proper explanations for their gap years. They convincingly advocated their cases when asked why they should be selected.

Going by the feedback of the pupil teachers, it can be assumed that they were more prepared for not just interviews but also other challenges that they may come across. One of the pupil teachers had mentioned "*I feel that I was an uncut piece of rock earlier and this course has polished me into a gem.*"

Many of the pupil teachers went on to appear in job interviews after the completion of their Bachelor's programme. Many of them reported that they felt no anxiety during the interview and the very thought that they knew how and what to face gave them confidence. Some of the pupil teachers sent written testimonials to the teachers and a few of those have been published in the e-News Letter of the Alumni Association of the Faculty of Education, BHU, available at http://www.aaebhu.com.

Conclusion

The outcome of this exercise leads to the conclusion that it was certainly, fruitful exercise which succeeded in transforming a group of youngsters, and helped them to overcome their anxieties and fears. Going a step further, one may say that this kind of training should be

made a mandatory part of the curriculum for trainee teachers, since mere bookish knowledge and degrees alone do not suffice for a professional course. Such programmes on preparation of teachers as well as teacher educators provide the right kind of direction towards school education. When we churn out future teachers they must be able to make a mark among other teachers from any part of the globe and carve a niche for themselves as capable inviduals. They must be balanced, confident individuals with proper grooming and soft skills to match the finest.

Epilogue

Two fresh batches of 40 pupil teachers in each semester of the 2011-12 batches have also undertaken the course. In addition, this course was also organised for 40 girls from an affiliated college of the University at their college by the same group of teacher educators. All pupil teachers gave overwhelming responses and feedback to the organisers of the course.

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Fifty Glorious Years of NCERT in Guidance and Counselling

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Abstract

*NCERT is the only nodal agency at the national level which has contributed to the field of guidance and counselling consistently, and over the last 50 years. While celebrating the Golden Jubilee year of NCERT, golden jubilee of guidance and counselling work at NCERT legitimately comes to mind. The Department of Educational Psychology and Foundations of Education of NCERT (name changed at different points of time) had been engaged in professional work in guidance and counselling extensively since its inception, or even much before in Central Bureau of Educational and Vocational Guidance (CBEVG) which was established as early as in 1954, and later on merged with NCERT in 1961. This way it is one of the oldest and primary thrust area in which NCERT continues to be engaged till today. The Golden Jubilee year is the time for introspection, reflection on its achievements and future challenges.**

Historical Context

Guidance services in school education made a beginning after the recommendations of Secondary Education Commission (1952-53) emphasising the need to introduce planned guidance services for enabling students to plan their future wisely and for proper social adjustment. The Commission recommended the services of trained Guidance Officers and Career Masters as well as the Centre to take up responsibility for opening regional training centres. As a result, establishment of CBEVG in October 1954, as a section of the Secondary Education Division of Ministry of Education was the first major step. The CBEVG was responsible for encouraging and strengthening the development of guidance movement in the country, and providing necessary leadership by making the public aware of its need, and creating a better understanding of its nature and philosophy.

In September 1960, CBEVG was placed under administrative control of Central Institute of Education,

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Delhi. A year later, with establishment of National Council of Educational Research and Training, it was merged with its National Institute of Education. Before its merger with NCERT, CBEVG was working for the implementation of Centrally Sponsored Scheme for Guidance (originally formulated by CBEVG) through which various State Governments were offered central assistance for setting up Bureaus of Guidance or expanding the existing ones. This assistance was also offered to private educational and research institutions and social welfare agencies.

The Centrally Sponsored Scheme for Guidance was introduced by the Government of India as a part of Third Five Year Plan for education. The CBEVG, though being a Central agency meant to meet the needs of the whole of the country, had certain functions in common with State Bureaus such as training of guidance personnel, conducting research on various problems in the field of guidance, preparation of tests and tools of assessment, collection and dissemination of occupational information including preparation of occupational information literature and other visual aids. However, unique functions of CBEVG as an all India institution were with the aim to provide leadership to the guidance movement. Its important activities included: preparation of the Government of India's schemes for development of guidance in the country, advising the Ministry of Education on matters pertaining to guidance, offering consultation services to state Governments, Universities and other agencies working in the field of guidance, organising conferences of guidance personnel from all over the country, collecting guidance statistics on a nation-wise scale, serving as a clearing-house for information regarding psychological tests and research in the field of guidance, and co-ordination with other agencies working in the field of guidance such as National Employment Service.

All these functions of the Bureau continued after merger with NCERT. Rather research and training functions assumed greater importance. The following would throw light on how NCERT continued to perform these functions in changing times.

Training

The Council had made consistent efforts in training professionals in guidance and counselling to meet the educational, career, personal-social-emotional needs of school students and promote their well-being. NCERT's flagship programme on Post Graduate level Diploma Course in Guidance and Counselling for preparing the trained personnel to plan and implement guidance and counselling services at school level is well known since 1958. The distinctive feature of this nine months course was its focus to provide the trainees sound theoretical orientation and practical skill training in all areas of student development and for all the school stages.

In the initial stages, state level educational agencies and teacher training colleges deputed candidates following the recommendations of Education Commission 1952 and 1964-66. However, later on, fresh candidates aspiring to be school counsellors also

benefitted from the course and were employed as counsellors in government schools within a period of two years after completion of training. NCERT's follow-up of the trained counsellors revealed that during 90s, employment opportunities to trained counsellors were available more in non-school settings than in schools. However, they are employed in the field in school settings and non-school settings, utilise their training, and are generally satisfied. The course continuously evolved in line with the educational policies, emerging school students' needs/ concerns and that of society, latest trends in the field as well as feedback provided by the trained counsellors from time to time. Guidance in the context of vocationalisation of education, career development of girls, guidance for special groups such as differently abled, creative, educationally backward, economically disadvantaged were some such areas introduced especially during 1980s and 90s, to equip the trainee-counsellors meet the needs of the students.

Over a period of time, the need and demand for guidance and counselling services in schools increased. However, the trained counsellors/teacher-counsellors have been in short supply in comparison to the ever increasing demands. Therefore, NCERT offered this course from its four RIEs (Ajmer, Bhopal, Bhubaneswar and Mysore) since 2000.

Subsequently, the reputation and wide acceptance of this course enabled the Council to plan for the first time International Diploma Course in Guidance and Counselling for Asian and African countries, as guidance and counselling services are now being increasingly recognised as indispensable for school students even in developing countries. This six months face-to-face mode course was specially designed on the 'Teacher as a Counsellor' model which emphasised the teachers' special role in helping and guiding students. The course aimed to empower the teachers to be guides and mentors rather than only subject experts, and bring about changes in their attitudes, perceptions and ways of interacting with students. The first such course was offered for teachers and teacher-educators from Maldives, Sri Lanka and Zambia during 2002-2003. During 2005-2006, 2006-2007 and 2007-2008, trainees from Bhutan, Fiji Island, Sri Lanka and from different states of the country participated.

In view of the more flexible approaches available in the form of Distance and Open Learning systems and use of technology to train persons in large numbers staying at far off places, the Council decided to offer the International Diploma Course in Guidance and Counselling (IDGC) through Distance/Online Mode. NCERT entered into a Memorandum of Agreement (MOA) with Commonwealth of Learning (COL), Canada to offer a pilot run of the course, to make the training facilities in guidance and counselling available to teachers and guidance workers from Asian (including India) and African countries. The course, first of its kind, commenced on January, 2009 and is being offered at six study centres of NCERT including DEPFE (nodal centre) and five RIEs located at Ajmer, Bhopal, Bhubaneswar, Mysore

and Shillong. The unique features of this course are: (i) Opportunities for multicultural interaction among students representing various ethnic and racial groups, (ii) Exposure to present-day practices and trends in guidance and counselling in various developing countries, and (iii) Enrichment in the form of therapies and healing practices derived from various philosophical and cultural traditions, use of spirituality in counselling, human values in cross-cultural perspectives, and new approaches to psychological assessment. The one-year course consists of three phases, viz. Guided Self-learning (6 months; Distance/Online), Intensive Practicum (3 months Contact Programme at the study centre), and Internship (3 months; in participant's home town). The quality of this course lies in its study material including self-learning modules for all the theory courses, *Course Guide, Practicum Handbook and Tutor Guide* which is developed under the guidance of an Instructional Designer from Commonwealth of Learning, Canada; supplemented with audio-video programmes; uniformity in the transaction of the course at all the study centres and great emphasis and weightage to experiential learning.

Short-term In-service Training

Along with the professional Diploma Course, the Council designed and introduced a short-term in-service course in guidance and counselling for school teachers to train them as career masters/career teachers during 1960s. The course popularly known as Career Masters/ Teachers Training used to be of 21-30 days duration. It was aimed at providing teachers some basic understanding of guidance and counselling concepts and techniques to prepare them for career information and guidance work in schools. Literature in simple language was developed for the purpose which took the shape of Publication *Readings for Career Teachers* in 1985. Such courses were either conducted by the Council for school teachers of various states at their respective places, or NCERT faculty was deputed from time to time to act as resource persons in courses organised by state-level guidance agencies. The career teachers training programmes covered almost all the states/regions of the country and are still popular in the North Eastern states. As a special effort for the educational upliftment of schools managed by educationally backward minority communities, particularly the Muslims, the Council organised 28 days training course for career teachers of minority managed schools continuously for three years during 1985-86 to 1987-88. Besides this, a series of 3 week training programme were also organised for DIETs personnel from different states on understanding and guiding elementary school children.

Development

Development of materials in guidance and counselling has been NCERT's forte. It is the only organisation which has developed a wide variety of materials including resource books, manuals, handbooks, monographs, readings, training packages, exemplar activities, self-learning modules, case studies, guidelines, distance learning modules, audio-visual materials etc.

in the area. The materials are targeted for different users like counsellors, guidance personnel, trainee counsellors, counsellor educators, teachers, students etc.

Keeping in view the changing societal needs, policy perspectives and curricular concerns in school education coupled with research findings, field experiences/observations and gaps pointed out in trend reports, the nature of materials and user target group has varied from time to time.

The 1950s and 1960s were the era of introduction of guidance services in schools and the focus of guidance was on educational and career guidance, and training personnel. Therefore, to begin with, NCERT developed guidance literature in the form of guidance series, monographs and pamphlets, relevant specifically to the Indian situations for dissemination to states to support guidance services at the state and school level. Series titles like *Guidance Movement in India, Guidance Services in Schools* are still of interest to guidance professionals. Not only that, *Guidance Review,* a quarterly journal was also published to create awareness and disseminate the developments in the field across the country. These efforts of the Council pushed the development of guidance movement in the country. As the focus of guidance services during the first three decades continued to be more on educational and vocational guidance of students which was supposed to help them find suitable employment and contain youth unemployment, the literature produced by NCERT had that tilt. The guidance literature was simple, and especially published

for use of school students, teachers, parents etc. For example, a series of pamphlets *Vyavsay Prichaya Mala* on titles like Hamare *Vyavsai, Lipik Varg Ke Vyavsai; Kala Sambandhi Vyavasai* etc. introducing different occupations to VIII and IX standard students; booklets for secondary school students on titles like *You and Your Future', 'What Makes You a Good Reader, How Can You Learn Better, How to Get Along With Others, How to study effectively* etc. career literature on three jobs families – 'Humanities', 'Science' and 'Commerce', etc., booklets like *Your Child at the Cross Roads* for parents, were widely disseminated and found useful by them as well as by those conducting training programmes for teachers and counsellors.

With introduction of 10+2+3 pattern of education in 70s, organisation of guidance services for the new pattern and development of related guidance material in the form of approach paper, articles, sets of guidance posters etc. also became a priority for the nodal centre. Later on, guidance programmes to promote self-employment and develop entrepreneurship qualities in vocational stream students and self-instructional modules in the area of pedagogy for vocational teachers were developed.

The material development in 1980s and 90s has been based on traditional lines as well as changing times and technology. The materials contributed to addressing the educational areas emphasised in NPE (1986), viz. all round development of children; child-centered education; vocational education; disabled; educational development of disadvantaged includ-ing SC/STs, children from rural, hilly, desert areas

etc; promoting women's participation in vocational, technical and professional education and Universalisation of Elementary Education (UEE). On the one hand there were publications meant for guidance personnel and teachers like books on *Annotated Bibliography of Occupational Literature; Readings for Career Teachers, Manual for Guidance Counsellors, Guidance for Gifted*, Guidance Programmes for *Adjustment of Navodaya Vidyalaya Students*; package for *Enhancing Personal-Social Skills of Students*, exemplar activities integrating *Guidance Inputs into Teaching of Subjects for Self-Development, and Work Orientation of Students*; practical guide on *Counselling Case Management, Guidelines for Setting up a Guidance and Counselling Centre in Schools Readings In Value Education For Counsellors*; Manual each on *Behaviour Modification and Learning and Development* etc On the other hand, materials for students were also developed which included Modules for *Self-guidance of Students, Manual on Peer Counsellors, Monograph on Careers, Programmes for Entrepreneurship Development etc.*

The *Multimedia Packages* target all the stakeholders having audio-video programmes for teachers, parents, students, teacher-educators and can be used in teacher training as well.

A wide variety of publications were meant for teacher-educators, counsellor-educators, researchers etc. For example, Volumes of Readings *on Child-Centred Education; Researches in child and Adolescent Psychology, Behaviour Modification; Building Personal and Career Consciousness of Girls. Handbook on Identification and Development of Talent*, Resource book and a manual on *Education for Creativity*; research based books on *Vocational Maturity of Creative Adolescents, Career Behaviour of Creative girls*, *Career Development of Creative Girls*; Handbooks containing reviews of tests each on *Personality Measurement*; *Measurement of Values, Attitudes, Interests*; *Ability Measurement etc. in India.*

NCERT also developed indigenous training material and resource books for the first time for the use of trainee-counsellors, counsellor-educators and practitioners. These resource books are on theory and practice of guidance and counselling, career development, occupational information etc. These books along with other materials mentioned above are also used by trainee counsellors.

The latest landmark achievement of the Council is the development of self-learning modules for all the theory courses of International Diploma Course in Guidance and Counselling through Distance/Online Mode. Coupled with Course Guide, Practical Handbook and Tutor Guide, all these publications form a complete package for conducting the above mentioned course which is also offered by the Council across six study centres in the country. Right now, the focus is on development of audio-video programmes to supplement and standardise theory and practicum courses across study centres.

In general, the materials support NCERT's stand that guidance is for all. It is an integral part of education and is aimed at all round development of students. It is developmental and proactive, and should begin from the

primary school stage. The Council has worked towards influencing the traditional mindset of guidance and counselling seekers as well as providers who visualised the scope of guidance limited to assistance in educational and vocational choices or in crisis situation only. More so, the Council has produced required materials and aids, which have potential to promote guidance and counselling services and train persons in this field.

Research

Research in guidance and counselling at NCERT over the years has been conducted keeping in view students' needs and the contemporary concerns of school education. The research areas explored include abilities, interests, achievement, adjustment, vocational development, needs and psychological characteristics of different categories including educationally/socially dis-advantaged, gifted, creative students etc. at different school stages and the effect (efficacy) of planned interventions or existing guidance programmes in schools. However, the emphasis of research areas from time to time during the last five decades aimed at providing basis for development of suitable materials for dissemination, utilisation in orientation/training/extension programmes and to design suitable need-based guidance programmes. A bird's eye view of researches carried out in guidance and counselling follows:

In the 1960s and 70s, research was mainly focused on areas like vocational development, career/occupational information, abilities, adjustment etc. to widen understanding of educational and vocational guidance. The focus has been to study effect of counselling intervention on achievement of bright underachievers, potential failures; understanding problems, interest patterns and work values of boys with superior scholastic ability, adjustment patterns of boys with scholastically superior ability in relation to socio-economic status and educational achievement; vocational development, expectations and choices of adolescents; evaluation of different methods of teaching of occupations (humanities, science, commerce) at middle and higher secondary leaving stages; stabilisation of abilities and interests with respect to age and grade level of children; evaluation of guidance programmes being implemented etc. In the late 1970s, students from different socio-cultural groups were also studied with a view to promoting their development and academic participation. These were extensive studies involving other institutions also. First such study was for understanding backgrounds, needs, problems, perceptions, attitudes, and cognitive, developmental, educational, and psychological characteristics of First Generation Learners (FGLs), and its effect on educational and vocational development for the purposes of planning interventions. Another study was carried out to examine the effect of socio-cultural deprivation on educational development of rural children. During seventies, intensive studies on the load of homework and its relationship with students' academic achievement, nature and function of group process with a view to improving teaching-learning process and motivating children were carried out.

While training professionals and strengthening guidance services continued, the focus of research during the 1980s was for planning suitable interventions for various categories of student populations, and to provide an empirical base to guidance services in schools. Some studies attempted to identify guidance-needs of different groups of students like scheduled castes, tribals, creative, girls etc. and even those enrolled in vocational stream to develop guidance interventions. Few other studies were meant to find out the outcome of guidance interventions carried out to achieve specific purposes like developing career potential of girls, promoting adjustment of Navodaya Vidyalaya students finding impact of school guidance programme through follow-up of school leavers etc. Some were exploratory studies, for example, identifying learning problems of primary school children and prevalent practices adopted by primary school teachers were aimed to develop suitable material and provide training to primary teachers. Longitudinal studies on adolescent development and even meta analysis of Indian studies on adolescent development helped to create holistic picture of Indian adolescents for guidance of counsellor-educators and trainee-counsellors. All the above mentioned areas of research and the variety of groups studied are generally not understood under the purview of guidance and counselling. However, these go with the national concern of promoting development of all students and addressing needs and social concerns of different groups.

As indicated in the trend reports, there was decline on research in guidance and counselling in late 80s and 90s. During the late 90s, the focus of guidance and counselling research was to research into the Council's reputed counsellor training programme. For the purpose, a first follow-up study of counsellors trained by NCERT was undertaken to study employment status, job effectiveness and satisfaction of trained counsellors, and to suggest changes for improvement in counsellor training programme and for administrators and policy makers. Even profile of effective school counsellor was prepared. Another study was aimed at validation of selection procedure (admission) used for performance in the counsellor training programme and job effectiveness. Both the studies established creditability of the professional training.

During the same period, in line with its leadership role, an in-depth study of guidance research in India was completed in order to provide insight into the status of guidance research in India and guidelines for further research and practice. The changing needs and behaviours of adolescents in fast changing society also inspired the study of adolescent's perception of social norms to identify areas of conflict in adolescents, and developing guidelines for parents to reduce adolescents' conflicts, and enhance their development.

In later years, the assessment of guidance needs of students, though not as part of a systematic research continued as part of information collected by the trainee-counsellors each year so as to plan suitable interventions like individual and group counselling

as well as classroom developmental guidance and counsell-ing programmes.

In short, the NCERT's research projects were in tune with the socio-cultural context and realities prevailing in the country to contribute towards developing theory and practice of guidance and counselling suitable to our own context. The findings of research studies and status/need surveys also formed the bases for developing materials and designing the programmes for state level functionaries, guidance counsellors and counsellor training programmes from time to time.

Research Related to Development of Psychological Tests

In continuation to one of the CBEVG's mandatory functions related to development of tools for psychological assessment, some projects were taken in this area during the first two decades after its merger. The tools developed at that time were intended to be used for guidance and counselling or for further research in the area due to lack of Indian tools and norms available for conducting research on school students as well as providing guidance and counselling to students. The major tests and tools developed during this period included: *Scholastic Aptitude Tests, Non-verbal Test of Intelligence, Group Test of Intelligence, Vocational Interest Inventory, Differential Aptitude Test Battery, Personality Inventory for Adolescents, Scale to Measure Adolescents' Aptitude towards Authority, Standardisation of Achievement Test Battery for classes I to VII, Construction and Standardisation of Achievement Tests in Book-keeping and Elements of Commerce.*

Diagnostic Tests on 'Indices and Surds' to know the difficulties of students and provide specimen to teachers for further development of their own tests were also developed.

The work related to developmental norms for children in the age group 5 ½ to 11 years with a view to improving the process of their education was completed on a very large scale. By the end of 1970s, the development of tests discontinued due to lack of suitable faculty and activity demanding a lot of time. Also, Indian psychological tests published by some Indian publishers, foreign tests, or Indian adaptation of foreign tests were found available in the market. NCERT decided to establish a test library on the recommendations of International Congress of Applied Psychology for procuring tests for reference purposes. This library is now known as National Library of Educational and Psychological Tests (NLEPT), and is an archive of a large number and variety of specimen sets of tests / tools and materials and literature on testing for consultation by faculty and trainees of Diploma Course in Guidance and Counselling, researchers and professionals across the country. The tests obtained in different areas like intelligence, personality, aptitudes, values, attitudes, interests etc. are reviewed by psychometric experts. Some of the tests reviews were published by NCERT in the form of Handbooks for the benefit of users. The library serves as a reference test library, an information centre for educational and psychology tests. Every year about 400-500 researchers consult the library.

Extension

Networking and leadership role in the field of guidance and counselling has been central to NCERT all these years. Promoting guidance and counselling services has been the biggest challenge for NCERT as guidance and counselling services in the states struggle for survival due to lack of financial and other kinds of support. The organisation continued to motivate the states and sustain their interest in offering these services to students. These included orientation programmes for persons in leadership positions for their awareness and involvement for building strengths (professional) of staff, orientation of educational administrators at the top, and teachers and parents. NCERT played a big role in facilitating interaction among state level educational administrators and key guidance professionals across the country. This interaction in the form of national level conference began in 1976, and six such conferences were organised upto 1998 at Delhi, Bangalore, Pune, Thiruvanthapuram, Tirupati and Secunderabad. These conferences provided a platform, for sharing of ideas and the guidance and counselling activities conducted by different states, an opportunity of getting exposed to new and emerging concerns and strategies, and planning meaningful programmes at their places for strengthening of guidance and counselling services. The Council has been periodically conducting, after every 2-3 years, orientation programmes of 3-4 days duration in guidance and counselling for District Education Officers, Principals of Higher Secondary Schools and Heads of States and Private Bureaus, Key Guidance Personnel in states etc. across the country. As the persons in these positions keep on changing, orientation of incumbents was considered important to create awareness in key persons to help them provide leadership for monitoring guidance and counselling services in schools and provide necessary support. The orientation programmes also included new and emerging concerns/problems requiring guidance intervention. Till 1990-91 these programmes covered quite a large number of states. In order to involve other stakeholders like parents and teachers for developing/organising guidance services in schools, a series of orientation programmes of 3-day duration for PTA personnel were also organised at Delhi, Pune and Thiruvanthapuram. About 100 PTA personnel were exposed to guidance and counselling services.

During 1985-88, NCERT especially planned and conducted a series of seminars-cum-workshops on guidance services for managers and principals of minority managed schools. The purpose was to provide them orientation to guidance and counselling services, their implementation in schools, and their role in introducing the services and providing continuous leadership and monitoring. Similar programme focusing on training methodology was organised for Directors and Resource Persons of Regional Resource Centres for Minorities Educational Programmes. These programmes along with training of career teachers equipped these institutions to plan and implement guidance and counselling services systematically. The Central Tibetan

Schools Administration (CTSA) was also helped to systematically plan and implement guidance services in schools through orientation of administrators and principals and training of career teachers. Vocational education emerged as another area of introduction of guidance and counselling services in school during 1980s (NPE, 1986 POA, 1992) when vocational teachers at the +2 stage were expected to provide guidance and counselling to students and their parents. A series of seminars and training programmes for vocational teachers across various states were organised. The programmes in guidance and counselling and development of material suitable to the needs of vocational teachers and even educational administrators were later taken up by Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE), a constituent of the Council especially established at Bhopal to provide leadership to vocational education programme in the country.

The Council had also been organising refresher courses/enrichment programmes and seminars for trained guidance personnel/counsellors to make them aware of new developments in the field and to help them address to the emerging needs of students from time to time. Such programmes though started in 1960s were more frequent during 1980s. A wide range of issues, concerns, and developments such as guidance for slow learners, creative students, vocational stream students; application of technology in guidance and counselling; new approaches to counselling; family counselling,

counselling skills; counselling for AIDS, drugs abuse; development of personal-social skills and promoting mental health; guidance for groups with special needs and socially disadvantaged; organisation of guidance services at district/state level; strengthening value education in schools etc. were included on the basis of need surveys conducted for state- level guidance agencies.

NCERT had to continue efforts towards strengthening of guidance services, as due to discontinuance of central assistance, these services suffered a set back. That is why today about 20 states have guidance set-up though many of them still fall short of their functions. It has been due to the persuasion and academic assistance of the Council that motivated and encouraged some of the states to initiate/sustain these services. As a part of strengthening exercise, the Council continued to organise orientation programme/seminars, etc., for key resource personnel in guidance and counselling in one form or another. These included all the guidance personnel whether trained or untrained. Special programmes were also organised for untrained key personnel in guidance positions to help them develop insight and provide leadership for monitoring these services in schools.

Beginning of 21st century witnessed an increase in student problems reported by media as well as a wide variety of new areas of concern like suicides, aggression, depression, anxiety, stress, violence, crime, drug and child abuse etc., Of course traditional concerns like academic performance, career and adolescent adjustment were also

prevalent. The government was also concerned with upheaval in students lives and guidance and counselling for students were demanded by all the concerned. During the decade, a series of programmes were organised to include large number of key guidance personnel in states. A programme was especially conducted for North-East states suitable to their needs. Using satellite technology, more than 400 guidance personnel from 24 states and Union Territories of the country were provided orientation. Then another strengthening effort was made to include all the stakeholders from all over the country including state level educational administrators, school principals, teachers, NGOs, guidance personnel from different institutions/ settings, teacher-educators, counsellor -educators, practitioners, etc., to share the platform and take up appropriate role in providing guidance and counselling services to students.

Besides orienting guidance personnel, attempts were also made to strengthen the guidance component in pre-service teacher training through a series of enrichment courses during 1990s in psychology for the psychology faculty of DIETs especially from DPEP states. Emphasis was on effective teaching-learning strategies, behaviour modification techniques, fostering child development and creativity, principles and techniques, of guidance and counselling. It was expected that teacher-educators will serve as catalysts to promote the idea of guidance at elementary school stage. Before that in late 1970s and during 1980s, a series of enrichment programmes in different states were also organised for secondary

teacher-educators and educational psychology faculty from SIEs, inter colleges, CBSE schools etc.

NCERT, since its inception, has also been providing consultancy in guidance and counselling to various kinds of organisations. Government and private schools, colleges, NGOs seek assistance in introducing guidance and counselling programmes in schools, setting up guidance cells, getting their staff trained and in organisation of specific guidance activities for students on careers. NCERT provided academic resources and assistance to state education departments and other professional training institutions to plan programmes for their staff. Guidance and counselling faculty at NCERT serve as resource persons in designing counsellor training programmes, preparation of materials and evaluation related activities.

Future Vision

NCERT would continue its efforts to strengthen state level guidance agencies for implementing guidance and counselling services in schools. Even *NCF, 2005* has categorically emphasised the need for strengthening guidance cells of SCERTs/SIEs. This is important at this stage because of the dismal condition of guidance and counselling services in schools and status at the state level. The states which used to be pioneers in implementing these services at school level and performing other responsibilities like research, training, development of psychological tests, guidance literature etc. are either not carrying out such work or doing minimal. Some states never initiated. The states which are still

providing these services to some extent require further encouragement and enrichment. The Council though have been continuously working towards strengthening/reviving these services as mentioned earlier, lack of financial resources, inadequate or untrained staff, lack of state level leadership are the stumbling blocks in states. Under Rashtriya Madhyamik Shiksha Abhiyan (RMSA), it is expected that states would be able to seek academic and financial assistance to systematically plan and implement guidance and counselling in the secondary schools. NCERT will prepare a template for SCERTs to augment guidance and counselling services in the states in the context of RMSA. This will help ensure minimum standards of guidance and counselling services in schools across the country. The states would be encouraged to depute suitable faculty/teachers to undergo professional training to meet the requirement of trained personnel at state, district and school level. This will help not only strengthen guidance services, but also help in bringing about changes in the perception of people about the nature and importance of guidance and counselling, and role of trained personnel. Emphasis would be on promoting guidance and counselling as an integral part of education, where teacher needs to be guidance minded to play his/her role and that guidance services for school students is the responsibility of all stakeholders in education. For this purpose, EDUSAT can be used to reach out in large numbers across the country.

The Council, being a research organisation, would continue to conduct fundamental research as well as action-oriented research in the field of guidance and counselling. Promoting or financing such researches on identified themes could also be a possibility.

Diploma level training of teacher-counsellors/counsellors through distance/online mode would continue. It is expected that the demand for trained counsellors would increase particularly for quality training. NCERT may consider various options and bring in multitier models of training and expand in terms of study centres. Already requests from a few organisations seeking approval for setting up study centres have started pouring. Under these circumstances, the Council and its nodal department would have the major responsibility to provide leadership and assistance, as well as monitor the quality of training at various study centres, and devise ways and means for further improvement. The nodal centre may also conduct specialised short-duration courses on different themes of guidance and counselling to help capacity building of counsellor-educators and trained personnel.

The Council has already been emphasising that guidance and counselling must be provided by professionally trained persons. The counsellors need to be adequately trained in theory and specific areas of skill development corresponding to the needs, concerns and problems of secondary and senior secondary school students. Therefore, the Council would continue to emphasise the need to offer programmes in guidance and counselling by various organisations meeting certain standards evolved by

various international associations. Presently, a very few national level organisations, universities, state level organisations, private universities and NGOs are training counsellors for work in different settings and with diverse populations. It is expected that with increasing need and demand of guidance and counselling in schools, many organisations may be interested to train counsellors. The Ministry of Human Resource Development (MHRD) has already advised Central Board of Secondary Education (CBSE) for making it compulsory to have counsellors in its affiliated schools. Also, the University Grants Commission (UGC) has been advised to initiate Diploma programmes in counselling so that adequate numbers of qualified counsellors are available for secondary and senior secondary schools. In this context, NCERT has already submitted the details of school counsellor's role and functions; common core learning experiences and competencies required in guidance and counselling curriculum; focus of course contents related to theory, practicum and internship; requirement of adequately trained/experienced staff, required physical and material resources, etc.

NCERT would work to ensure through MHRD that only adequately trained professionals in guidance and counselling provide these services to school students. Not only that, the Council would also advice on the competencies of school counsellor which are required to be developed through Diploma Courses/Training Programmes offered/to be initiated by an organisation/university in the country. Assistance in planning and designing courses, planning infrastructure and training counsellor educators to provide quality training would be provided. NCERT during all these years has moved from face-to-face mode to distance mode, and from national to international level of the Diploma course. It already evolved from 'specialist' model of counsellor training to 'teacher as a counsellor model'. Therefore, NCERT would help interested organisations to plan and offer courses in both modes and models.

To ensure quality training, NCERT would work towards taking up the role of accreditation body for the country wherein it becomes mandatory for trained counsellors to get registered with the Council in order to be practicing counsellors. These steps are considered important/essential in view of untrained personnel practicing in the field.

In short, NCERT's efforts for more than five decades have not only promoted the guidance movement in the country but truly established it as a leader in the field.

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What Administrators Do and How? A Study of Occupational Efficacy and Job Activity of Educational Administrators

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Abstract

The quality and standard aspect of education requires effective educational administrators more than anything else. An administrator's efficacy involves achieving worthwhile goals that support one's vision and mission. Further it also depends on his cognizance and understanding of the process, and his ability to cope with the change. The study sought to investigate the Occupational Efficacy and Job Activity of Educational Administrators at Secondary Level of Education. The sample comprised of 250 Educational Administrators (119 Educational Administrators from High School Level and 120 Educational Administrators from Higher Secondary School Level). The data were collected by using Standardised Occupational Self-Efficacy Scale and Job Activity Analysis Scale (Self-constructed Scale). Percentage statistics, t-test and Karl Pearson's Coefficient of Correlation were used to analyse the data. The overall results revealed that Effective Educational Administrators differ significantly from Ineffective Educational Administrators with respect to their cognizance of Job Activity. A significant positive correlation exists between Occupational Efficacy and Effective Educational Administrators' cognizance of Job activity and low correlation exists between Occupational Efficacy and Ineffective Educational Administrators' cognizance of Job Activity.

Background

Administration in education is needed for the accomplishment of set educational objectives with the optimum resource utilisation, collaborative efforts and giving a psychological satisfaction to all the concerned persons. Similarly, administrators are of vital importance

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to the success of every dynamic organisation. Other things such as capital, materials and technical know-how are no doubt important, but without administrator an organisation is but a muddle of men and machines; and without effective administrators no organisation can successfully compete and survive. A competent administrator has the ability to persuade others to accomplish the goals of the organisation. He/she motivates his/her human resource and provides the dynamic force and directions that combine static resources into reality; without it management activities remain dormant. A dynamic administrator develops dynamic employees and the two together make a dynamic organisation.

Today, educational administrators have multifaceted roles to play. They are expected to uphold the highest standards in professional commitment, communication skills, interpersonal skills, classroom personality, emotional maturity and academic integrity.

Administrator's occupational efficacy relates to the maximisation of return to the organisation by all means. An administrator's efficacy can be understood in terms of his capacity to adapt, maintain himself and grow regardless of the particular functions he fulfils. This means administrator's adaptability who shows ability to solve problems and to react with flexibility to change; his sense of identity which represents knowledge or insight on the part of the members about the goals of the organisation and how they perceive them; administrator's capacity to test reality which implies ability to search

out, accurately perceive, and correctly interpret properties of environment and administrator's state of integration among the group members such that they are not working at cross purposes. Thus, administrator's effectiveness lies in the fact how much he/she understands the process and copes with the changes.

In reality, all educational administrators face tremendous challenges in their work. They do not simply act as disciplinarians but also act as the leaders of entire communities of learners. An educational adminis-trator needs to organise and manage the administration, provide support service and activities that facilitate the effective running of an organisation. He/she has to provide direction and day-to-day management in their institution. Furthermore, he/she has to exhibit strong interpersonal and communication skills because much of his/her work involves working collaboratively with others. Job activities that an administrator is called upon to perform are important for effective functioning of an institution. It means the activities which are executed by an administrator by involving many persons for successful administration of the institution; the time he/she spent on these activities, resources consumed by him/her and the operational data that best reflect the performance of activities. In short, it means what the administrators do and need to be able to do. Good management demands that an administrator has a clear understanding of the duties and responsibilities to be performed on a job. He/she is 'the

most visible', 'the most vulnerable', and 'potentially the most influential member' of an educational organisation who is responsible for directing a variety of activities besides being in-charge of coordinating his/her group members. He/she is also responsible for their professional welfare and the harmony with which they work together. As democratic management styles and specialised central functions become more prevalent, the demands upon an educational administrator become increasingly complex.

An institution is not an independent or isolated entity; it operates in a social context, an important element of which is the community. Because of this, every administrator needs to develop a good understanding of and competency in building and maintaining effective institutional-community relations. Similarly, administrators, must recognise and accept the fact that they have to provide an opportunity to every employee to improve their professional skills and thereby, their performance, and also the opportunity taken by an administrator himself/ herself for his/her professional growth. Furthermore, an administrator has to carry out the supervision of all the institutional activities as it helps him/her to capitalise on the strengths and correct the weakness that is, of an individual, group, or programme. Thus, for being called as an effective educational administrator, he/she must have the cognizance of various activities which he /she is supposed to perform in an institution.

Research findings on educational administrators' occupational efficacy established the following facts: Runhaar (2010) found that occupational self efficacy and learning goal motivation are positively related to reflection and feedback asking. Furthermore, positive relationship was found between occupational self-efficacy and transformational leadership of school principals. Schofield (2008) has identified six recurring characteristics necessary for an effective principal to lead a school effectively. These include: relationships, culture and climate, leadership, curriculum, philosophy and commitment. Mweemba (2007) found that principal's perception of their effectiveness does not significantly differ from the staff's perception of their principal's effectiveness. Ravi (2003) has found a significant difference in the efficiency of a principal as an administrator based on educational qualification and experience. No relationship was observed between efficiency of the principal as an administrator and as a teacher, and Shaheen (1988) found that age, sex and professional attainment had no effect on principal effectiveness.

Research findings on educational administrators' Job Activity established the following facts: Sudsberry (2008) found principals of high performing, high needs schools are active in the role of leading school improvement; work within an environment of shared leadership, and are attuned to the wants and needs of the staff. Richard (2008) found principals in higher poverty level schools spending a significantly greater amount of time on tasks. Morris, Porter-Gehrie and Hurwitz (1984) described and analysed the activities of school

principals, and found principals usually spend less than half of their working days in their offices, they have a good deal of discretion in their decision-making and that the principal's behaviour affects four distinct constituents viz. teachers and students, parents and others in the community, superiors and the principal himself or herself. Tyagi (2009) found that senior secondary school heads used reflective practices in different ways to develop teachers. They introduced innovations in their schools to provide professional support to develop teachers and coordinated with other schools to develop learning innovation for reflective practices.

Rationale of the study

In this global world, educational institutions are increasingly being seen primarily as facilitators of country's competitiveness, economic growth and wealth generator, key producers of human capital, major sources of scientific and business knowledge and exemplars of technological innovations. In an increasingly global world, an educated work force is vital to maintain and enhance progress in rapidly changing environment. Therefore, educational administrators are required to deliver best educational standards. The quality and standard aspect of education requires effective administrators more than anything else. An administrator's efficacy lies in the fact how much he is cognizant; understand the process, delivers the best and copes with the change.

The studies reviewed, however, showed that a great deal of researches on Efficacy and its impact on learning goal motivation, student's enrolment, student's achievement and such other variables has been conducted. These studies have suggested that efficacy augments educational administrators in producing greater amount of performance and outcomes. Some of the studies have explained that activities of principals influences school improvement and the community relations. However, there has been no study examining the occupational efficacy of educational administrators and its relation with their cognizance of job activity. Also a very critical area here has been left out focusing on the counselling and training of the educational administrators to help them to become effective, and to change their lifestyles if they are not conducive to the functioning of the institution. Thus, this study explores the gap by looking into the occupational efficacy and job activity of educational administrators with the object to find out their efficacy in transacting their multiple jobs at secondary level of education.

Statement of the Problem

"What Administrators Do And How? A Study of Occupational Efficacy and Job Activity of Educational Administrators."

Operational Definition of Important Terms

   (i) **Occupational Efficacy:** Occupational Efficacy for the present study refers to the scores obtained by the sample subjects on Occupational Self Efficacy Scale (OSES) prepared by Sanjyot Pethe, Sushama Chaudhari and Upinder Dhar.

(ii) Effective Educational Adminis-trators: Effective educational Administrators for the present study refers to those educational Administrators who score high on Occupational Self Efficacy Scale (OSES) prepared by Sanjyot Pethe, Sushama Chaudhari and Upinder Dhar.

(iii) Ineffective Educational Administrators: Ineffective educational administrators for the present study refers to those educational administrators who score low on Occupational Self Efficacy Scale (OSES) prepared by Sanjyot Pethe, Sushama Chaudhari and Upinder Dhar.

(iv) Job Activity Analysis: Job Activity Analysis for the present study refers to the scores obtained by the sample subjects on Job Activity Analysis Scale (JAAS) constructed by the investigator.

Objectives of the Study

The following objectives were formulated for the present investigation:
1. To describe the sample of educational administrators with regard to Occupational Efficacy and Job Activity.
2. To undertake correlational analysis between Occupational Efficacy and Job Activity of educational administrators.
3. To identify effective and ineffective educational administrators at secondary level.

4. To study and compare the Job Activity of effective and ineffective educational administrators at secondary level.
5. To undertake correlational analysis between Occupational Efficacy and Job Activity within the groups of effective and ineffective educational administrators.

The study empirically tested the following hypotheses:
1. Occupational Efficacy is significantly related with Job Activity of educational administrators.
2. Effective and ineffective educational administrators differ significantly on cognizance of Job Activity.

Methodology and Procedure

In the state of Jammu and Kashmir there are three Provinces and for the present study, only ten districts of Kashmir Province were involved in the collection of data. 250 educational administrators served as the sample for the present study which were identified on the basis of random sampling technique from the list obtained from Directorate of School Education, Kashmir (DESK). Among 250 educational administrators, 119 educational administrators (Head-masters and ZEOs) were taken from High School Level, 120 educational administrators (Principals) were taken from Higher Secondary School Level and 11 educational administrators (CEOs and Director) were taken from both High and Higher Secondary School Level.

Table 1.1 The breakup of the sample of Educational Administrators

High School Level					Hr. Sec. School Level			From Both Levels					
Headmaster		ZEO			Principal			CEO			Director		
Male	Female	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
30	30	30	29	119	60	60	120	10	×	10	×	01	11
Grand Total = 250													

Instruments Employed

The research instruments consisted of:

- **Occupational Self Efficacy Scale-OSES,** prepared by Sanjyot Pethe, Sushama Chaudhari and Upinder Dhar (1999). The scale consists of nineteen items and has six sub-scales namely: Confidence, Command, Adaptability, Personal Effectiveness, Positive Attitude and Individuality. In this scale, the respondents are asked to respond on the 5 points given against each statement. All the statements are scored given a weightage to each of the alternative response of the statement in the pattern as: Strongly Disagree-01, Disagree-02, Neutral-03, Agree-04, Strongly Agree-05. The reliability coefficient of the scale is. The scale has indicated high validity on account of being.

- **Job Activity Analysis Scale-JAAS,** a self constructed Scale (2010). This scale consists of 66 items and has five sub-scales namely: Managing Institutional Support Service, Managing the Instructional Programme, Managing the Community Relations, Professional and Personnel Development, Supervision and Appraisal. The scale has 38 positive and 28 negative items. Each item of the scale is provided with three alternative responses namely 'Yes', 'Undecided' and 'No'. The scoring of scale is done as: for positive items: "1" for "Yes" and "Zero" for "No", for negative items: "1" for "No" and "Zero" for "Yes". No score is given to the responses falling under Undecided category. The theoretical range of score is from 0 to 66. The reliability coefficient of the scale is. The scale has indicated high and significant construct validity.

Statistical Treatment:

The data collected was subjected to the following statistical treatment:
Percentage statistics, t-test, Karl Pearson's coefficient of correlation

Analysis and Discussion:

The analysis and discussion of the results has been carried out along the following lines:

A. Descriptive Analysis of Educational Administrators.

B. Correlational Analysis between Occupational Efficacy and Job Activity.

C. Comparison of Effective and Ineffective Educational Administrators on Job Activity.

D. Correlational Analysis between Occupational Efficacy and Job Activity within the groups of Effective and Ineffective Educational Administrators.

## A. Descriptive Analysis of Educational Administrators

This part of analysis gives an account of the classification and description of the overall sample of educational administrators (250) at Secondary Level of Education on the dimensions of Occupational Efficacy and Job Activity.

(i) Occupational Efficacy:

Table 1.2 Showing Overall Percentage of Educational Administrators on Occupational Self Efficacy Scale at Secondary Level of Education (N=250)

Range of scores obtained on OSES	Classification	N	Percentage
83 & Above	Above Average	37	14.8%
65-82	Average	171	68.4%
64 & Below	Below Average	42	16.8%

Table 1.2 revealed that out of 250 educational administrators, 14.8 per cent of the educational administrators fall in above average category. This implies that these educational administrators always set targets higher than those set by their organisations. They possess greater ability for doing their work independently and show immense capability to work effectively even under the pressure of deadline. It has also been found that a predominant majority of educational administrators i.e., 68.4 per cent fall in the average category. This indicates that these educational administrators exhibit moderate level of confidence in their institutional tasks and show reasonable adjustability to different challenges that come in their work. When they fail in a task, they often re-evaluate their strategies. The data further revealed that 16.8 per cent of educational administrators fall in below average category. This indicates that these educational administrators lack confidence to work independently and so can't make an impact on others.
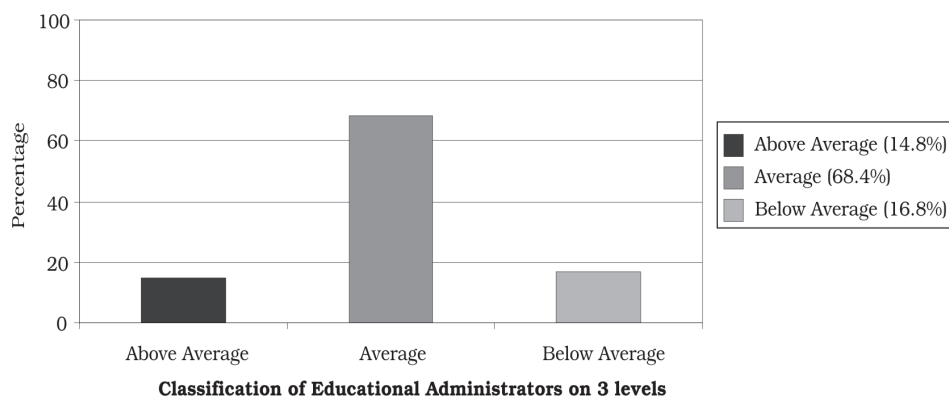
Fig. 1.1 Bar Diagram showing overall percentage of Educational Administrators on Occupational Self Efficacy Scale- OSES (N=250)

They are easily moved over unforeseen consequences and display their worries when facing a challenging situation.
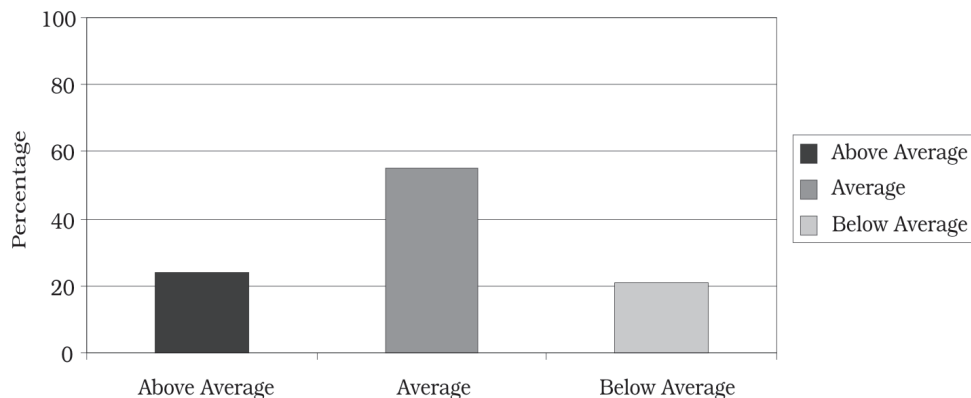
(ii) Job Activity Analysis:

Table 1.3 Showing overall Percentage of Educational Administrators on Job Activity Analysis Scale at Secondary Level of Education (N=250)

Range of scores obtained on JAAS	Classification	N	Percentage
56-68	Above Average	60	24%
43-55	Average	138	55.2%
30-42	Below Average	52	20.8%

Table 1.3 depicts that out of 250 educational administrators, 55.2 per cent fall in Average category. This indicates that these educational administrators provide modest opportunities to their group members to express their views and are occasionally available to those who need their assistance. They show less strict attitude in monitoring the punctuality of students and staff. They supervise the institutional task either by themselves or by delegating it to some responsible group members. The data again revealed that 24 per cent of the educational administrators possess above average job cognizance. This indicates that for the effective functioning of the institution, these educational administrators provide minimum essential facilities in their institution for its smooth functioning. Each division of work is allotted a fixed time in the time table. Funds generated by school activities and services are utilised on the tasks meant for it. They gave adequate attention to quick frequency of meets in their institution. For the professional growth and development, these educational administrators attend various training programmes and allow their staff to attend the same. They discuss the inputs recorded with their group members, and its follow up is taken as an academic reformatory exercise which is continued till results are not achieved. This highlights that a maximum number of educational administrators generally take up job activities which they are supposed to do. It has also been found that 20.8 per cent of educational administrators fall in below average category. This indicates that these educational administrators fail to provide minimum facilities for the smooth functioning of their institution. They show least interest in changing the old and out-dated material with the latest equipment and technology. They show more interest towards curricular activities than the co-curricular activities and don't allow the students to participate in the same. They fail to provide any sort of assistance to their staff and students for carrying out the process of teaching and learning. Little time is spent on attending training programmes and conference, and they do not allow their staff to attend the same claiming it creates unnecessary disturbances in the institution. They always complain of fatigue and hand over all their responsibilities of monitoring the quality of institutional work to their subordinates.

Fig. 1.2 Bar Diagram showing overall percentage of Educational Administrators on Job Activity Analysis Scale- JAAS (N=250)

B. Correlational Analysis between Occupational Efficacy and Job Activity of Educational Administrators

Table 1.4 Correlation between Occupational Efficacy and Job Activity of Educational Administrators (N=250)

Occupational Efficacy & Job Activity	r = 0.401	Sig. at 0.01 level

Table 1.4 depicts a significant positive correlation between Occupational Efficacy and the Job Activity of Educational Administrators as being 0.401. This suggested that Occupational efficacy of educational administrators is more or less influenced by their cognizance of Job Activity, and indicates that these administrators often provide minimum essential facilities for the functioning of their institution. Some time is allotted by them to each division of institutional task ensuring its completion on said time. For the functioning of their institution, occasionally, meetings are organised by them in which a freedom of 'Say' is provided to some of their group members. These administrators often try to maintain a balance between their administrative task and teaching classes and provide help to their staff ensuring good running of both academic and non-academic aspects of the institution. As they believe in continuous improvement of their profession, they sometimes attend different training programmes and occasionally allow their staff members to attend the same in order to remain cognizant about the educational updates. They sometimes supervise the institutional task either by themselves or delegate this responsibility to their subordinates and rarely discuss the institutional matter with their group.

In view of the above empirical evidence, the hypothesis number one which reads as, *"Occupational Efficacy is significantly related with Job Activity of Educational Administrators"* stands accepted.

C. Comparison of Effective and Ineffective Educational Administrators on Job Activity

In order to realise the third major objective of the study, as a first step, effective and ineffective educational administrators were identified with the help of Occupational Self Efficacy Scale. The high and low groups were drawn by employing extreme group technique of 27 per cent above and below. As

1. **Managing Institutional Support Service:** Table1.5, row (i) makes it clear that the two groups of Educational Administrators differ significantly on the Managing Institutional Support Service dimension of Job Activity Analysis Scale. The calculated 't'-value came out to be 3.98 which is significant at 0.01 level of significance. The mean difference favours EEA than IEA

Table 1.5 Showing Mean Comparison of Effective and Ineffective Educational Administrators on five areas and total score of Job Activity Analysis Scale (N=67 each)

Areas	Group	Mean	SD	t-Value	Level Of Significance
Managing Institutional Support Service	EEA IEA	14.67 12.64	2.78 3.20	3.98	0.01 level
Managing the Instructional Programme	EEA IEA	15.56 14.00	2.37 3.20	3.25	0.01 level
Managing the Community Relations	EEA IEA	5.32 4.94	0.92 1.09	2.23	0.05 level
Professional and Personal Development	EEA IEA	4.77 4.04	1.13 1.42	3.31	0.01 level
Supervision and Appraisal	EEA IEA	11.86 10.85	2.00 2.21	2.80	0.01 level
Total Score	EEA IEA	52.20 46.42	0.92 9.21	5.07	0.01 level

EEA- Effective Educational Administrators
IEA- Ineffective Educational Administrators

such the above 27 per cent i.e., 67 educational administrators possessing high score were identified as Effective Educational Administrators and 27 per cent i.e., 67 educational administrators possessing low score were identified as Ineffective Educational Administrators. This was followed by the comparison of Effective and Ineffective Educational Administrators on Job Activity.

which implies that for the effective functioning of the institution, EEA provide minimum essential facilities in their institution for its smooth functioning. Each division of work is allotted a fixed time in the time table. Funds generated by school activities and services are utilised on the tasks meant for it. On the other hand, IEA show least interest in changing the old and out-dated material with the latest equipment.

Even they fail to prepare a list for purchase requisitions when the need for any material arises.

2. **Managing the Instructional Programme:** From the above table, row (ii) it may be inferred that the two groups of Educational Administrators differ significantly on *Managing the Instructional Programme* dimension of Job Activity Analysis Scale. The calculated 't'-value came out to be 3.25 which is significant at 0.01 level of significance. The mean difference favours EEA than IEA which implies that these educational administrators maintain a perfect balance between their administrative work and teaching classes. Besides curricular activities various co-curricular activities are also organised by them for the growth of the students. They provide enough opportunities to their staff and students to express their views. These findings, are supported by the study of Richard (2008) who found principals in higher poverty level schools spending greater amount of time on tasks. Similarly, Sudsberry (2008) found principals of high performing schools, high needs schools are active in the role of leading school improvement; work within an environment of shared leadership and are attuned to the wants and needs of the staff. On the other hand, IEA believe that task of teaching and administration is very hectic and also they fail to provide any sort of assistance to their staff for carrying out the process of teaching.

3. **Managing the Community Relations:** It is evident from the above table, row (iii) that Effective and Ineffective Educational Administrators differ from each other on *Managing the Community Relations* dimension of Job Activity Analysis Scale. The calculated 't'-value came out to be 2.23 which is significant at 0.05 level of significance. The mean difference favours EEA IEA which implies that EEA gave adequate attention to quick frequency of meets in their institution. They prepare a formal agenda before conducting any meeting and provide a freedom of 'say' to every employee in the decisions relating to the institutional matters. On the other hand, IEA call a meeting any time without preparing an agenda or informing their staff in advance. In addition, every employee doesn't have a say in the decisions relating to the institutional matter. These educational administrators keep themselves busy in needless tasks and remain unavailable to others who need their support.

4. **Professional and Personnel Develop-ment:** Table 1.5 row (iv) also reveals that Effective and Ineffective Educational Administrators differ on *Professional and Personnel Development* dimension of Job Activity Analysis Scale. The calculated 't'-value came out to be 3.31which is significant at 0.01 level of significance. The mean difference favours EEA than IEA which implies that for the professional growth and development, EEA attend various

training programmes and allow their staff to attend the same. The finding is in tune with that of Morris, Porter-Gehrie and Hurwitz (1984) who found that principals usually spend less than half their working day in their offices, they have a good deal of discretion in their decision making, and their behaviour affects four distinct constituents-teachers and students, parents and others in the community, superiors, and the principal himself or herself. On the other hand, little time is spent by IEA on attending training programmes and conferences, and also they didn't allow their staff to attend the same claiming it creates unnecessary disturbances in the institution and is mere a wastage of time. The finding is in tune with that of Usmani Shaheen (1988) who found that professional attainment had no effect on principal effectiveness. Similarly Meyers (2008) found principals that did not attend the workshops and smalled faculties had a greater measure of success in two of the dimensions of professional learning community.

5. **Supervision and Appraisal:** Row (v) of the same table indicates that Effective and Ineffective Educational Administrators differ significantly from each other on *Supervision and Appraisal* dimension of Job Activity Analysis Scale. The calculated 't'-value came out to be 2.80 which is significant at 0.01 level of significance. The mean difference favours EEA than IEA which depicts that these educational

administrators supervise the institutional task directly instead of delegating the responsibility to subordinates and then discuss the inputs recorded in the inspection diary with their group members. Follow up of the records is taken by them as an academic reformatory exercise, and are continued till results are not achieved. IEA always complain of fatigue, and hand over all their responsibilities of monitoring the quality of institutional work to their subordinates. They show leniency towards the employees and students who remain absent from the institution.

6. **Total Score:** Lastly row (vi) of the above table indicates that Effective and Ineffective Educational Administrators differ significantly from each other on overall dimensions of Job Activity Analysis Scale. The calculated 't'-value came out to be 5.07 which is significant at 0.01 level of significance. The mean difference favours EEA which indicates that EEA exhibit better cognizance of activity on overall dimensions of Job Activity Analysis Scale than IEA. The findings are in tune with that of Bredeson and Johansson (2000) who reported that school principals exercise significant influence on teacher professional development. The four areas where principals have the opportunity to have a substantial impact on teacher learning include: the principal as an instructional leader, the creation of a learning environment, direct involvement in the design delivery and content of professional development, and the assessment of

professional development outcomes. Further Szabocsik (2008) found that administrators who have a deep understanding of reading can better recognise and support excellent literacy teaching as well as identify and correct instructional practices. Similarly, Borowiec-Koczera, Ann (2001) found that school administrators participation in professional development activities hold a positive impact on school climate.

In view of the above empirical evidence, the hypothesis number two which reads as, *"Effective and Ineffective Educational Administrators differ significantly on Cognizance of Job Activity"* stands accepted.

D. Correlational Analysis between Occupational Efficacy and Job Activity within the groups of Effective and Ineffective Educational Administrators.

Table 1.6 Showing the correlation between Occupational Efficacy and Job Activity within the groups of Effective and Ineffective Educational Administrators (N=67).

Variable	Groups	Value of "r'	Level of Significance
Job Activity	EEA	0.652	0.01 Level
	IEA	0.102	Not Significant

Table 1.6 row (vi) indicates that there is significant positive correlation between Occupational Efficacy and the Job Activity of Effective Educational Administrators having coefficient of correlation as 0.652, which is significant at 0.01 level of significance. This suggested that more the Occupational

Efficacy; higher shall be the rating of Effective Educational Administrators' cognizance of Job Activity. The same row of the table again revealed that there is low correlation between Occupational Efficacy and the Job Activity of Ineffective Educational Administrators. The coefficient of correlation came out to be 0.102 which has failed to arrive at any level of significance. This implies that Occupational Efficacy negligibly fosters Ineffective Educational Administrators' cognizance of Job Activity.

Conclusion and Implications

On the basis of the findings of the present study, effective educational administrators have emerged as those who possess greater ability for doing their work independently, and show immense capability to work effectively even under the pressure of deadline. They ensure proper planning of their institutional matters and quickly adjust to different challenges that came in their task. They abide by the rules of their institution and make their ideas known to the group. On the other hand, ineffective educational administrators lack confidence to work independently and so cannot make an impact on others. They maintain a visible communication gap with their group members and take all decisions themselves which are hardly directed towards the fulfilment of institutional goals. This study helps in understanding the occupational efficacy of educational administrators. Majority of educational administrators have been found to have average occupational efficacy. Therefore, special programmes should be organised to improve their professional efficiency. A significant

difference has been found between effective and ineffective educational administrators on all dimensions and composite scores of Job Activity. So various institutions entrusted with the training of administrators should organise special programmes for all administrators and not for selective ones only so that the behaviour of ineffective educational administrators can be brought up to effective level. A hand book may be prepared for administrators that may guide them in administering their institutions effectively and to become effective institutional leaders. Special in-service orientation programmes should be organised for ineffective educational administrators to orient them with different dimensions of Job Activity, and train them in techniques of effective management and thus improve their efficiency. The educational administrators should be given special incentives and promotional avenues in order to reward their better performance in their respective fields.

This study has meaningful implications for school educational administrators, policy makers and state etc., in the sense that, it will provide useful hints on the evaluation, promotion and appointment of educational administrators. This study also helps in understanding the dynamics of superior subordinate relationship in their educational context that has been increasingly recognised as a means to enhance efficiency of educational administrators.

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Book Review

Philosophy and Sociology of Science – An Introduction

The book 'Philosophy and Sociology of Science' is an attempt to integrate the philosophical, methodological, and sociological dimensions of science. The philosophy lays down the foundation of modern science with method of science emerging from it, whereas sociology guards and propels the scientific and technological advancement in ethically appropriate direction. Thus, both philosophy and sociology of science complement each other and serve as indispensable components of science and its practices.

The author of the present book Sir Steward Richards is a professional scientist as well as a zoologist who had been offered to take up two very unfamiliar courses at that point of time, viz., History of Science and Logic and Scientific Method, which had a great impact upon the author's professional career. The present book is written keeping in mind the relative degree of ignorance in these neglected spheres of science.

The book has been divided into two parts – Part I: Methods and Philosophies of Science, which includes five chapters, and Part II: Interactions of Science and Society, consisting of three chapters.

The first part of the book describes the structure of science in terms of scientific view of the world, and the incessant use of the term 'science' in various spheres so as to add certain dignity or value to it. A distinction between a scientific law and a scientific theory, which are mostly used interchangeably, has been accounted. The following excerpt from the book, clearly explicates this difference-

"Laws state invariable relations and regularities about the world which can be confirmed empirically by any observer, whereas theories 'underlie' laws and are not so accessible to direct test by sense perception. Theories thus leave room for personal opinion."

Part I also talks about the role of logic in the scientific argument. Logic, rational, empirical evidence, etc. are terms which are often symbolic of the scientific method, which are widely used in science for the formulation and verification of certain theories, scientific facts, or observation. This includes, induction, deduction, and inductive argument, however, the author in this part tries to bring to our notice the inherent nuances in each of these methods by giving various examples, for instance, take the argument:

All Englishmen are British.
All Yorkshiremen are British.
Therefore, all Yorkshiremen are Englishmen.

This has the form:

    All As are Cs.

    All Bs are Cs.

    Therefore, all Bs are As.

In the above example, the two premises are true but the conclusion is false. There can be many more such instances and even others, where one or both of the premises is/are false, that leads to an invalid conclusion.

An extrapolation of the above processes is scientific attitude, popularly referred to as science in practice. Only a person who is well versed with the above mentioned processes and arguments of science can be regarded as a true practitioner of science. The author here explains in detail about the acquisition of scientific attitude by some of the eminent scientists, by taking valuable excerpts from their original work and autobiographies. For example, The works of William Harvey on the 'Circulation of blood', Stephen Hales on the 'Movement of Sap', William Wells on the 'Formation of Dew', and Emile Durkheim on the 'Social Causes of Suicide'. In each of these accounts, the author has reiterated the importance of original observation, experimentation, analysis, hit and trial method, eliminating the invalid by careful analysis, logic based on certain pre-conceived laws of nature and about the world.

In another subsection of part-I, the author helps us in developing some historical perspective about the scientific method, so as to study and understand the current position that is highly complex. Beyond the advocacy of the use of logic and inductive method, there emerged a novel hypothetico-deductive method, which fantasise science and gave ample space for ideas and 'happy guesses', as stated by William Whewell (1794-1866).

This was followed up by Karl Popper's Method of Falsification of Theories. He highlights the importance of even a single disconfirmatory statement to falsify a theory. Another method discussed at length by the author is Thomas Kuhn's 'Scientific Paradigm'. The various stages in the development of a new scientific knowledge have been explained in this account. Normal Science, Phase of Scientific Revolution, Paradigm Shift, and Construction of New Knowledge are the usual sequence of events.

Nature of science is another area where the author has tried to venture. The common thread that binds all the science and social science disciplines is the philosophy of science. However, the basic question or puzzle that the author tries to address is to find out the inherent nature of the difference amongst these disciplines. Are there merging boundaries between the physical, chemical and biological sciences, or can any one of the discipline such as physics subsume all the other disciplines, because it carries a universal predisposition, is the basic question being asked by the author. Here, the author tries to explain that although the basic principles can be derived from the physical sciences, but they cannot be stretched beyond a certain point, where the core subject takes over and provides with valid arguments and solutions to the problems. Thus, each subject has the propensity to contribute in a great way, and is at par with other streams.

The Part II of this book majorly deals with the interactions of science and society. The purpose is to examine science as an institution of the modern world. The author tries to build connections between the industrial and military applications of science and their consequent impact in economic terms. The growth of science in terms of number of people practicing it, amount of money spent on it, or the quantity of knowledge it produces has been depicted beautifully with the help of logistics and graphs. Besides talking in quantitative terms, the author has also ventured into the structural and functional aspects of science where an attempt has been made to take into account the external factors impinging upon the scientific practice such as societal, religious and political systems. Merton has purported four main ethos of science-Universalism, Communism, Disinterestedness, and Organised Skepticism, based on which all the prevalent scientific discoveries are to be analysed. The only way for scientific innovation is by means of scientific revolution. Now that it has been established that science is an integral part of technology that effects society, a famous American economist in his seminal study, The New Industrial State (1966), argues that it is the demands of technology which, more than any other factor, determine the major movements in economics, science, and society in general. But, where are the means to detect the feasibility of such technological advancements, and what determines them. Here comes the question of ethical dimension of science. Various eminent philosophers have tried to explain it in their own terms. Immanuel Kant (1724-1804) has defined two kinds of mental activities, those governed by pure theoretical reason and those stemming out from pure practical reason. The relationship between the scientific knowledge and human values is no more estranged, rather connected by way of guided activity, as advocated by Jacques Monod (1971). The author here tries to draw a deep comparison between the scientific society as it is, and ...as it could be. Thus, liberating science from the grounds of materialism and aggrandisement, towards a more humanised and compassionate version. Science although always claimed by scientists as objective, and Cartesian, cannot be separated from its applied component that is technology, and hence cannot be taken as value-free or neutral. It cannot escape the dilemma of responsibility. In this context, the author has quoted several relevant and apt vignettes.

There has always been a site of conflict between religion, culture, and scientific practices. The author in the last chapter tries to address and resolve it in some way or the other. The major concerns being the social stratification of science, sexist discrimination, roots of disenchantment, clashes between the scientific theories and religious explanations of the same phenomenon, and last but not the least belief in the existence of God. All of the above instances generate the real food for thought and impel us towards an anti-science ideology; nevertheless the author tries his best to strike the right balance between the two.

Towards the end, I would like to congratulate the author for his imagination, insight, diligence, and courage to delve into this virgin area of science, and explore the unsaid and untold but very much indispensable aspects of science. The sequence of the chapters in the present book is being well thought of and is logically relevant. The use of vivid examples from all the streams, incorporating appropriate pictures and data sets at the right places aided in comprehension. By quoting the ideologies of some of the great philosophers and scientists, the author has tried to compile the different worldviews, which may immensely help in shaping our own understanding about these issues.

Each content area of the book has been dealt in a well-versed manner, and does not require any further elaboration.

Philosophy of science studied in the light of history offers the student a singular blending of arts and sciences, synthesis and analysis. Scientific achievement is almost invariably tied up with social goals. It is for this reason that no analysis of the scientific enterprise can be completed without the perspective of sociology. Only by examining specific features of the growth of science in society, in particular the nature of its tense relations with the great ethical and political issues of the day can the scientist assess with detachment the necessity and desirability of pursuing one kind of science rather than another when funds are insufficient to support both. Given the burgeoning complexities of the modern world, it is only with an awareness of the broadest social dimensions of science and technology that the individual scientist may formulate a policy which can optimise the balance between human beings and the world in which they have to live.

I sincerely recommend this book for all the science students, science student teachers, and science teacher educators for gaining a deeper level of understanding about the philosophical and sociological perspectives of science and in devising appropriate content knowledge for their learners.

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